6TH INTERNATIONAL CONFERENCE FOR ENTREPRENEURSHIP INNOVATION AND REGIONAL DEVELOPMENT 2013

REGIONAL ECONOMIC RESILIENCE THROUGH INNOVATION AND ENTERPRISE

JUNE 20-21, 2013
ISTANBUL, TURKEY

PROCEEDINGS

OF THE 6TH INTERNATIONAL CONFERENCE FOR ENTREPRENEURSHIP INNOVATION AND REGIONAL DEVELOPMENT

IEIRD
İSTANBUL ŞEHİR ÜNİVERSİTESİ
The University Of Sheffield.
KOSGEB
İSTANBUL BÜYÜKŞEHİR BELEDİYESİ

6TH JUNE 20-21, 2013
ISTANBUL, TURKEY
INTERNATIONAL CONFERENCE FOR ENTREPRENEURSHIP
INNOVATION AND REGIONAL DEVELOPMENT 2013

REGIONAL ECONOMIC RESILIENCE THROUGH INNOVATION AND ENTERPRISE

PROCEEDINGS

OF THE 6TH INTERNATIONAL CONFERENCE FOR ENTREPRENEURSHIP INNOVATION AND REGIONAL DEVELOPMENT

Title:
Proceedings of the 6th International Conference For
Entrepreneurship Innovation And Regional Development,
Regional Economic Resilience Through Innovation And Enterprise,
ICEIRD 2013

Editors:
Melih Bulu, Gökçen Arkalı Olcay

Technical Editors:
Hasan Küçük

Publisher:
Lookus Scientific

Papers have been double-blind peer reviewed before final submission to the conference.

Many thanks to the reviewers who helped ensure the quality of the full papers.

ISBN: 978-9944-380-09-6

Organizers

Sponsors

Dear International Conference for Entrepreneurship Innovation and Regional Development Participants,

On behalf of the Organizing Committee, I am privileged to welcome you to the 6th International Conference for Entrepreneurship, Innovation and Regional Development ICEIRD 2013. Over the past six years ICEIRD has grown to be the major international conference in entrepreneurship and innovations. It is an honor to preside the 6th anniversary issue of the conference themed Regional Economic Resilience through Innovation and Enterprise, which continues the tradition of high-quality, broad international participation in all areas of entrepreneurships and innovation for regional development.

The ICEIRD 2013 conference brings together academicians, researchers, business executives, industry organizational leader, government and non-government representatives, management consultants, service providers, technological and business experts and entrepreneurs and innovators. The program consists of thoughtful leadership, industry research, best-of-breed practices and technology solutions that can be deployed on regional development. While doing this entrepreneurship and innovation are the main pillars of the Conference.

The sprit of the Conference lies in the belief that the global and regional economy favors organizations that can reach across boundaries effectively. It rewards those that can collaborate smoothly with their partners and customers. As a result, business excellence is no longer about individual players—it's about effortless coordination and communication.

We are honored to have Dr. Lars Eklund, Founder & Chairman of Scandinavian Competitiveness Group, Mikel Landabaso, DG Region Head of Unit of the thematic competence center on smart and sustainable growth at the European Commission, Christopher Mondini, ICANN's Vice President and Professor Soumodip Sarkar of University of Evora, Portugal as our keynote speakers.

Istanbul Şehir University provided all the facilities for the Conference. Therefore we thank to the Rector Ahmet Ademoğlu for his motivating support and all the personnel of the University. Moreover we thank Istanbul Development Agency, International Competitiveness Research Institute(URAK) and KOSGEB for their supports.

Today's developed world, crisis is everywhere and we come together in order to understand and resist against it. Let us experience value of ICEIRD2013 and bring that energy to your community for positive changes.

Melih Bulu

ICEIRD2013 Conference Chair

Table of Contents

Track 1: Innovative supply chains, network collaboration and joint ventures		14
Exploratory and exploitative innovation performance contingent on alliance ego-network patterns	*Anastasios G. Karamanos*	14
Communication as the basis for innovation	*Grzegorz Leszczyński, Magdalena Sapała, Marek Zieliński*	25
Co-Creation: Examples and lessons learned from south-east europe	*Anja Orcik, Teodora Stojanova, Robert Freund*	36
Importance of direct and indirect sales channel in modern business of a bh leasing company	*Aida Abduzaimovic, Sasa Vujic, Slobodan Vujic*	45
Usage of uniqueness of the regions as economic advantage: a new tool to increase regional economic resilience	*Zivile Gedminaite Raudone*	56
Track 2: Management of Innovation in SMEs-I		64
Model of Cost Estimating in Process Planning of Innovation	*Piotr Chwastyk*	64
Competitive intelligence in small and medium enterprises: the pursuit of competitive advantage and the design of innovation	*Jihene Chebbi Ghannay, Zeineb Ben Ammar Mamlouk*	75
Examining complex interactions of factors affecting innovation activities of firms. A field study of SMEs in six European countries	*Avraam Papastathopoulos*	85
What Are the Determinants Leading to Innovation in Manufacturing Firms	*Gündüz Ulusoy, Kemal Kılıç, Gürhan Günday, Lütfihak Alpkan*	98
Project duration estimations using grey analysis models	*Maria Mikela Chatzimichailidou, Stefanos Katsavounis, Dusko Lukac*	109
Track 3: Regional Development Strategies-I		119
Path dependence, subsidiarity and their impact in EU regional development policy: the case of Greece	*Sophia Athanassopoulou, Yiannis Bassiakos, Panos Tsaltakis, Eleni Tsipouri*	119
Efficiency of the R&D sector in the EU-27 at the regional level: an application of DEA	*Aleksander Aristovnik*	131
Prototype of the Regional Development: Kazan	*Sabri Er, Bünyamin Zile, Ahmet Özçelik*	142
A Regional Development Index Proposal for a NUTS2 Level Region in Turkey	*Emine Arslan Pauli, Yasin Dalgıç, Kadir Yasin Eryiğit, Jülide Alan, Mehmet Sait Cülfik*	152
Bridging the gap between business support providers and business practitioners, from theory to practice	*Paraskevi Giourka, Ioannis Bakouros*	164
Track 4: University and Regional Development		172
Agglomeration economies and the role of universities in the regional development of Southeast European countries	*Mirjana Stankovic, Bratislav Stankovic*	172
The National Center for Technology Development A Step Towards: Knowledge Based Economy	*Mohammad S Khorsheed*	184
Knowledge and technology transfer between academia-industry cooperation: a case study	*Luis Farinha, João Ferreira*	193
On the challenges of the science to business (S2B) marketing: role of potential and partnership in early stage technology transfer	*Szabolcs Prónay, Norbert Buzás*	202
International student exchange as a tool for developing inter-regional innovative entrepreneurship	*Tiit Elenurm*	213

Track 5: Entrepreneurship and SMEs competitiveness		221
Impact of human, structural and relational capital on educational needs of SMEs in Croatia	*Jadranka Svarc, Jasminka Laznjak, Marina Dabic*	221
The Causal Relationship between Entrepreneurship and Unemployment in Nigeria	*Abubakar S. Garba*	231
Progress in Turmoil Times: Turkey's New Export Strategy	*Melih Bulu, Metin Gürler*	240
The internationalization of greek firms: determinants for Relocating to neighboring regions of Bulgaria	*Christos Georgiou, Nicos Komninos*	250
SME – a chance to raise employment and speed up recovery in Serbia	*Miroljub Hadzic, Petar Pavlovic*	260
Track 6: Innovation processes in services		270
Microinsurance development prospect: The case of Romania	*Vintileanu Cristina Monica, Stylianos Kechagias*	270
Modelling and metamodeling of e-health systems: An introduction	*Besim Verdi Abdullai*	280
Smart Innovation for Healthy Ageing: A Model for Physical Activity Adherence throughout the Lifecycle	*Vassilis Barkoukis, Garifallia Daroglou, Athanasios Geligiannis*	293
Public Relations & Communication for Innovation & Regional Development	*Radu Jecu*	301
CHANGING THE RULES OF THE GAME: WHAT IS YOURS IS MINE! Social Aspects of Sharing and Servicizing Practices in the Mobility Sector	*Nihan Akyelken, Karen Anderton*	311
Track 7: Promoting entrepreneurship and innovation for competitive regions		324
Regional support for innovation in SMEs in traditional industries	*Rene Wintjes*	324
The Role of Social Innovations' Networks in Regional Development	*Ingrida Geciene*	333
Using the potential of salash in Vojvodina for an entrepreneurial venture	*Dunja Vujičić , Ana S. Trbovich , Danijela Lalić*	342
Entrepreneurship as an integral part to Economic Resilience: the case of Kosovo	*Abetare Domi, Panayiotis H. Ketikidis*	353
Networking Business Incubators and Clusters in Serbia as a Tool for Fostering Regional Development	*Ildiko Zedi, Bojan Lekovic*	369
Track 8: Women and entrepreneurship		379
Women's Entrepreneurship in Bursa	*Alper Altan, Tamer Değirmenci, Mehmet Sait Cülfik*	379
Women Entrepreneurship in Western Balkans and Turkey – Institutional Framework, Incentives and Initiatives	*Ana S. Trbovich, Jana Subotich, Danijela Lalich*	385
Useful, Market Oriented Contacts: Why Knowing Male Peers is Useful to Small Female Service Entrepreneurs	*Katharina Simbeck, Jan Kratzer*	396
The role of individuals in the process of innovation	*Sladjana Gajic, Danijela Lalic, Jelena Stankovic*	412
Track 9: Entrepreneurship education and regional development		419
The Growth of Kosovo Entrepreneur's through Education & Innovation	*Fatmir Stublla*	419
The needs assessment for university business incubators in South-Eastern European countries	*Dimitar Nikoloski, Evis Kushi, Gjorgji Mancheski, Marjan Angeleski*	426
Elderly Care: Coping with Long-Term light-care Conditions (LTC); describing the health need, designing the equity audit and discussing the health commissioning	*Evangelos Ergen*	436
The Role of Academia in the Development of Regional Innovation Systems: A Comparative Study of the Øresund and Moscow Regions	*Peter Kiryushin, Bala Mulloth, Tatiana Iakovleva, Vladimir Solodov*	450
Developing System of Entrepreneurial Education in Secondary Schools in the Republic of Macedonia	*Radmil Polenakovik, Bojan Jovanovski, Trajce Velkovski*	461

Track 10: Competing regions thrugh innovation and entrepreneurship		471
Linking University and Industry: Experience of Turkey and Challenges in Kazakhstan	*Alibekova Gulnaz, Tunç D. Medeni*	471
Skolkovo innovation cluster: Innovation giant or colossus with feet of clay?	*Dina Williams*	479
Can innovation be the key factor for city competitiveness? A case study: Eskişehir	*Engin Yüksel, Mehmet Sait Cülfik*	494
Regional aspects of innovative behaviour of European and Russian enterprises	*Oleg Golichenko, Yulia Balycheva*	499
Clusters from Strategic Management Perspective: The Role of Clusters for Firms' Innovativeness	*Judith Terstriep, Christian Lüthje*	510
Track 11: Enhancing the competitiveness of SMEs through innovation		525
Steps toward the development of model for supplier selection in industrial enterprises	*Nikolay Kolev*	525
Cooperatives Versus Global Capitalist Objectives	*Abdullah Ökcesiz, Deniz Ökcesiz*	536
Selection and evaluation of factors influencing the innovation activeness of small and medium-sized enterprises	*Svilen Kunev, Diana Antonova*	541
Investigating the processes of adoption and diffusion of product innovations in depositing and credit granting services	*Milena Todorova, Diana Antonova*	552
Track 12: Regional Development Strategies-II		562
Potential Clusters in TR41 Region	*Yasin Dalgıç, Emine Arslan Pauli, Mehmet Sait Cülfik, Jülide Alan*	562
Entrepreneurs and Regional Innovation Development: Case for West-African Nation's Development	*Akinleye Afolabi Ogungbemi*	568
Building contemporary urban spaces of knowledge and innovation Lessons from australian practice	*Tan Yigitcanlar*	575
The role of the Small and Medium Sized Enterprises (SME) within the regional development of the Slovak republic, of the Republic of Serbia and of the Republic of Tajikistan	*Jan Janać, Osim Mamatkulov, Katarína Rentková*	587
Track 13: Innovation for competitiveness of regions		598
One Review At Innovative Policy And Strategy In Montenegro	*Aleksandar Vujovic, Ljiljana Bozovic, Marko Backovic, Ivan Radojicic*	598
A Set Covering Heuristic for Logistic Centers	*Stefanos Katsavounis, Maria Mikela Chatzimichailidou, Marko Makipaa*	607
Innovation and Knowledge Economy in Transition Countries	*Shenaj Hadzimustafa, Gadaf Rexhepi, Sadudin Ibraimi*	617
Reflections on a study visit to Silicon Valley: What lessons can a South East European Region learn from the San Francisco Bay Area Innovation System?	*Nikos Zaharis*	625
Are Government Supports Effective in Fueling Innovativeness of SMEs in Emerging Countries? Evidence from Turkish Case	*Gokcen Arkali Olcay, Melih Bulu*	636

Track 14: Management of Innovation in SMEs- II		643
Using publicly available internet tools to teach patent research and development	*Soren Jensen, Stoyan Tanev*	643
The impact of Information Communication Technologies and Innovation activities on Entrepreneurial Businesses: Empirical Evidence in Transition Economies	*Shqipe Gerguri-Rashiti, Hyrije Abazi-Alili, Veland Ramadani*	653
Patents - possible advantage to increase the performance of SMEs	*Sorin Mircea Axinte, Gabriela Ivanus*	664
The Effect of Venture Capital Investments in Financial Problems in Turkey	*Ahu Coşkun Özer*	673
Track 15: Regional innovation strategies and smart regions		683
Development Agencies as Enablers of Regional Innovation: The Case of Turkey	*Ayla Esen, Özen Aşık Dizdar*	683
Design of Regional Innovation Strategies for Smart Specialization within the Context of Regional Planning in East Marmara Region	*Candan Umut Özden, Hüseyin Özgür Ünsal, Fatma Avşar, Hale Gülbaz, Cem Bayrak*	693
EU Innovation Strategy and Global Competitiveness	*Slavica Rocheska, Olivera Kostoska, Marjan Angeleski , Gjorgji Mancheski*	705
A Regional Innovation Strategy: R&D Project Brokerage Events in Bursa and Eskişehir	*Mehmet Sait Cülfik, Adem Bölükbaşı*	711
Using pre-commercial procurement as a driver of innovation for the regional public sector: The case of greece	*Lefteris Antonopoulos, Elpida Samara, Chrysostomos Stylios, Ioannis Bakouros*	718
Smart Cities and the Future Internet: Competitive advantages and governance of embedded spatial intelligence in cities and regions	*Nicos Komninos*	729
Track 16: Corporate Entrepreneurship		742
Corporate Entrepreneurship in Macedonia	*Ljubomir Drakulevski, Angelina Taneva Veshoska*	742
Comparison of Fleet Management systems and future strategies for partnerships with regional technology leaders	*Dashmir Istrefi, Betim Çiço, Branko Trajkovski*	749
Correlation between FDI And GDP growth rate in transition economies – example of Serbia	*Branislav Fodora, Suzana Kolar*	757
Informality and Perceptions of Entrepreneurship in Sierra Leone: Nation Networks and Diamonds	*Aaron C.van Klyton*	764
Track 17: Entrepeneursip and Innovation		778
Determining the Critical Factors of an e-Waste Management System: The Case of IT and Telecommunication Products	*Maria Chrysovalantou Emmanouil, Emmanouil Stiakakis, Maria Vlachopoulou, Vasiliki Manthou*	778
The Impact of Company's Human Capital on Innovation Activities: Firm-level Evidence from South-East Europe	*Hyrije Abazi Alili, Remzije Rakipi*	789
The Relationships between Organizational Culture and Innovation Performance	*Ercan Ergün, Yunus Emre Taşgit*	801
Business Process Management and its Implementation in Slovak Enterprises	*Andrea Oborilová, Zuzana Papulová*	808
An empirical study of customer-oriented new service development in the mental health sector. Preliminary findings of three mental health hospitals	*Stavros Sindakis, Paul Trott*	817
Author Index		827

CONFERENCE EXECUTIVES

Conference Chair

Assoc. Prof. Dr. Melih Bulu, *İstanbul ŞehirUniversity, Turkey* – General Chair
Prof. Panos H. Ketikidis, *CITY College - International Faculty of the University of Sheffield, Greece* - Co–Chair
Assist. Prof. Dr. Gökçen Arkalı Olcay, *İstanbul Şehir University, Turkey* - Co–Chair

Organizing Committee

Assoc. Prof. Dr. Melih Bulu, *İstanbul ŞehirUniversity, Turkey*
Prof. Panos H. Ketikidis, *CITY College - International Faculty of the University of Sheffield, Greece*
Assoc. Prof. Dr. George Efstathiadis, *CITY College - International Faculty of the University of Sheffield, Greece*
Assist. Prof. Dr. Gökçen Arkalı Olcay, *İstanbul Şehir University, Turkey*

International Scientific Committee

Prof. Ramazan Aktas, *TOBB Economics and Technology University, Turkey*
Dr. Zoran Anisic, *University of Novi Sad, Serbia*
Prof. Ioannis Bakouros, *University of Western Macedonia, Greece*
Prof. Dimitar Birov, *University of Sofia, Bulgaria*
Prof. Elias Carayannis, *George Washington University, USA*
Assist. Prof. Ali Coskun, *Bogazici University, Turkey*
Prof. Mehmet Demirbag, *University of Sheffield, UK*
Assoc. Prof. Stefan Dimitrov, *Sofia University, Bulgaria*
Prof. Ljubomir Drakulevski, *Ss. Cyril and Methodius University, Macedonia*
Prof. Nihat Erdogmus, *Istanbul Sehir University, Turkey*
Prof. Valentina Gecevska, *Ss. Cyril and Methodius University, Macedonia*
Prof. Ferhan Gezici, *Istanbul Technical University, Turkey*
Assist. Prof. Itir Gogus, *Bilkent University, Turkey*
Assoc. Prof. Elissaveta Gourova, *Sofia University, Bulgaria*
Assoc. Prof. Emine Nur Gunay, *Bogazici University, Turkey*
Prof. Robert Huggins, *University of Cardiff, UK*
Prof. Christos Kalantaridis, *Bradford University, UK*
Prof. S. Cem Karacal, *Southern Illinois University, USA*
Assoc. Prof. Abdulmecit Karatas, *Istanbul Development Agency, Turkey*
Prof. Petros Kefalas, *The International Faculty of the University of Sheffield, CITY College, Greece*
Prof. Paul Knepper, *University of Sheffield, UK*
Prof. Muammer Koc, *Istanbul Sehir University, Turkey*
Prof. Nicos Komninos, *Urban and Regional Innovation Research Unit, Greece*
Prof. Hüseyin Leblebici, *University of Illinois, USA*
Assoc. Prof. Aslihan Nasir, *Bogazici University, Turkey*
Assist. Prof. Orsan Orge, *Bilkent University, Turkey*
Prof. George Angelos Papadopoulos, *University of Cyprus, Cyprus*
Prof. Radmil Polenakovik, *Ss. Cyril and Methodius University, Macedonia*
Dr. Alexandros Psychogios, *The International Faculty of the University of Sheffield, CITY College, Greece*
Assist. Prof. M. Abdullah Sahin, *Istanbul Sehir University, Turkey*
Dr. Soumodip Sarkar, *University of Evora, Portugal*
Anna Sotiriadou, *The International Faculty of the University of Sheffield, CITY College, Greece*
Assoc. Prof. Kamen Spassov, *Sofia University, Bulgaria*
Prof. Bratislav Stankovic, *St. Apostol Paul University, Macedonia*
Prof. Arzu Tektas, *Bogazici University, Turkey*
Yanka Todoroff, *University of Sofia, Bulgaria*
Assist. Prof. Bahadir Tunaboylu, *Istanbul Sehir University*
Prof. Gunduz Ulusoy, *Sabanci University, Turkey*
Dr. Tim Vorley, *University of Sheffield, UK*
Prof. Nazli Wasti, *Middle East Technical University (METU), Turkey*
Prof. Colin Williams, *University of Sheffield, UK*
Assoc. Prof. Tan Yigitcanlar, *Queensland University of Technology, Australia*
Nikos Zaharis, *South East European Research Centre (SEERC), Greece*

BIOGRAPHIES OF KEYNOTE SPEAKERS AND WORKSHOP CHAIRS

Keynote Speaker / Professor Soumodip Sarkar

Soumodip Sarkar is a professor at the Department of Management, University of Evora, Portugal, and researcher at CEFAGE-UE. He is also the coordinator of the Program in Entrepreneurship and Innovation. He received his PhD in Economics from Northeastern University, Boston in 1995. He previously worked at the Harvard Institute for International Development (HIID) and later CID, Kennedy School, Harvard University.

Professor Sarkar is currently the Dean of Doctoral School (IIFA), of the University of Évora, responsible for all PhD programs and research centers at the University.

His research interests are innovation, entrepreneurship and international business. He has published papers in many scientific journals and is in the editorial board of four international peer-reviewed scientific journals. He is a project leader in many Portuguese and European projects and has been a consultant to the USAID and Nathan Associates. He holds copyrights to the integrated innovation model developed by him along with simulation software.

He was a Visiting Fellow at the Asia Center, Harvard University, in 2006. His book on innovation entitled: Innovation, Market Archetypes and Outcome was published in 2007, by Springer-Verlag. Another book on entrepreneurship and innovation Empreendedorismo e Inovação, published by Escolar Editora, was released in September of 2007, now in it´s third edition. In 2008 his third book the Entrepreneurial Innovator, was published by Elsevier-Campus in Brazil. He has given diverse talks and workshops all over the world, including at the Helsinki School of Economics, Harvard University, University of Massachusetts, Indian School of Management etc. He is a much sought after speaker, and has appeared as a keynote speaker in many international conferences, as well as giving talks on innovation for senior managers and organizations all over the world, and advising firms on innovation management and growth. In 2008, he was considered one of the top 100 experts internationally by the World Economic Forum (WEF Innovation 100).

Keynote Speaker and Workshop Chair / Dr. Lars Eklund

During his 30 years as a practitioner in social science research, in the private sector, in government, and as a consultant Dr. Eklund has acquired first-rate skills in developing innovation and competitiveness on all levels and in many places around the world. He has spearheaded major initiatives in Sweden, Baltic Sea Region, Europe, Middle East, Africa, and Asia. As Director of Competitiveness and Head of Division of Vinnova, Swedish Governmental Agency for Innovation Systems and as President, Vice President, and Director of The Competitiveness Institute, the leading global network of competitiveness practitioners, he obtained a unique global connectedness and leading position in the field of innovation and cluster based competitiveness. His track record as innovation development analyst and facilitator of innovation processes on regional, national and multinational levels is marked by his typically Scandinavian values dialogue and pragmatism. He has served in a number of leading positions in the field of development and innovation, reporting directly to the ministers and deputy ministers of various concerned governments. Dr. Eklund is a facilitator second to none when it comes to design, preparation, and conduct of stakeholder dialogues targeting innovation strategy, policy, and action. The outcomes of his stakeholder workshops are the robust building blocks needed in his recent challenging constructs of innovation competition and innovation super markets.

Dr. Eklund's recent positions are the Founder and Chairman of the Scandinavian Competitiveness Group (2009-2012), concentration on concept development and business practices perfection regarding innovation competition and innovation super markets, preparation of a major global feasibility study on the subject, foundation of the Institute for Innovation Competition. (2009-2012); Director of Competitiveness, Head of Department, and Member of the Executive Board at Vinnova, the Swedish Governmental Agency for Innovation Systems (2001-2008), design and execution of major innovation and competitiveness initiatives in Sweden, Baltic Sea Region, Europe, Middle East, Asia, and Africa; Founder, Ambassador, and Fundraiser Pan African Competitiveness Forum (2007-2008); President and Chairman on the Board of Directors at The Competitiveness Institute and Vice President for Europe, Middle East, and Africa (2003-2008).

BIOGRAPHIES OF KEYNOTE SPEAKERS AND WORKSHOP CHAIRS

Keynote Speaker / Mikel Landabaso

Mikel Landabaso is DG Regio Head of Unit of the thematic competence centre on smart and sustainable growth at the European Commission. He has worked in DG Regio since 1990, both in horizontal Units on policy conception and in Geographical Units on policy implementation, including working as the assistant to the Director General. Previously he was Head of the Research Department at the Basque regional development agency – SPRI. He was given the 2004 annual "Christiane Bom Award" by the European Regional Development Agencies Association – EURADA for his contribution to innovation in European regional policy. He has a PhD in Economics (University of the Basque Country), Diploma in Advanced European Studies, (College of Europe), M.A. in Development Economics (University of East Anglia). He has been a Visiting Scholar at the University of North Carolina at Chapel Hill and he was part-time professor of regional development at the Free University of Brussels and the University of Deusto.

Keynote Speaker / Christopher Mondini

In this role he works to broaden and deepen relationships with companies beyond the domain name sector, to educate global business on the workings and role of ICANN, and to provide ways for continued dialogue and collaboration on Internet Governance issues. His aim is for the voice of business to be heard in a rapidly evolving multi-stakeholder framework. Christopher is a former management consultant, United States diplomat and corporate investigator, whose work has focused on cross-border regulatory challenges faced by technology companies. He holds degrees in Economics and International relations.

Workshop Chair / Prof. Metin Türkay

Metin Türkay is Professor of Industrial Engineering and the Director of Koç-IBM Supply Chain Research Center at Koç University. His main area of interest is in the development of discrete-continuous optimization models and solution algorithms for complex problems. His methods had been applied to sustainable supply chain management and logistics, optimization of energy systems and systems biology. He received BS and MS degrees from the Middle East Technical University, Ankara, Turkey and PhD degree from Carnegie Mellon University, Pittsburgh, Pennsylvania. His PhD work received Ted Peterson PhD Dissertation Award on computing and systems theory. He received a number of awards including TÜBİTAK Career Award, TÜBİTAK Young Scientist Incentive Award, IBM SUR Award, IBM Faculty Award and IBM OCR Award.

BIOGRAPHIES OF KEYNOTE SPEAKERS AND WORKSHOP CHAIRS

Workshop Chair / Tina Lee Odinsky-Zec

Tina Lee Odinsky-Zec is the Director of Innovation and Entrepreneurship Center at Zagreb School of Economics and Management where she has lectured, managed international projects and mentored hundreds of students on business plan development since 2006. She is currently pursuing her doctoral degreee under UNESCO Chair for Entrepreneurship, Dr. Slavica Singer at the J.J. Strossmayer University in Osijek, Faculty of Economy. Her thesis is centered on visualizing social entrepreneurship in Croatia, a theme that she has been committed to since 2002. She has been on the NESsT Business Advisory Network since 2008 and held a seminar on Creativity for social entrepreneurs at the inaugural Ashoka University held at Duke University in 2011 as well as a follow up at Ashoka U 2013 held in San Deigo, CA.. She was a Visiting Professor at Rouen Business School France from 2010-2013. A graduate of Rochester Institute of Technology in Rochester, NY, she helped start up their first overseas undergraduate program in Dubrovnik, Croatia in 1997.

Workshop Chair / Prof. Ziya Burhanettin Güvenç

Having his BS, MS in physics from Ankara University, Prof. Güvenç received his PhD in physics from California University. Since 1997, Prof. Güvenç has been working at Çankaya University previously as a Vice-Dean and later Dean of Engineering and Architectural Faculty; he is currently the Rector of the University for 6 years. During the years 1998 and 2006, he took part in various research projects in the USA and Germany as a visiting scientist. Prof. Güvenç lectured in electronics and communication, physics, chemistry, electromagnetic theory, computer simulation, computer science, and scientific calculation. His main research interests include nano-science, nano-technology, innovation, regional development, competitiveness and clustering. He had led various national and international research projects, supervised many MSc and PhD thesis, lectured and published many articles on these topics.

Being one of the pioneers of development of various clusters in Turkey, Prof. Güvenç has been actively contributing to University-Industry Collaboration since 2007. He is the chairman of the Cluster Development Team and the Board of Directors of Entrepreneurship and Innovation Research and Application Center of Çankaya University. He had led and completed two EC funded projects for knowledge transfer to the members of 'Work and Construction Machinery' cluster located in one of the largest Organized Industrial Zones of Ankara. He had been actively involved in execution of local economic development projects executed in various regions of Turkey. He initiated SME cure projects as social responsibility; which last for two academic semesters and are undertaken by a group of senior undergraduate University students and their academic supervisors. As of today, more than 200 such projects have been undertaken and completed by Çankaya University. He is the founding director and current chairman of the 'Association of Manufacturers of Construction Machinery Producers Cluster' and 'Association of Anatolian Railway Transportation Systems Cluster' (Turkish abbreviations: İŞİM and ARUS, respectively), which each having more than 100 members. He also led the establishment of 'Anatolian Clusters Cooperation Platform' (Turkish abbreviation: AKİP) which has currently 16 members and as the current chairman of this platform, he has been involved in the organization of many events and projects. He has joined many conferences, seminars, TV and radio programs to give speeches on the topics of regional development and clustering.

PROCEEDINGS

6TH INTERNATIONAL CONFERENCE FOR ENTREPRENEURSHIP INNOVATION AND REGIONAL DEVELOPMENT

JUNE 20-21, 2013
ISTANBUL, TURKEY

2013

REGIONAL ECONOMIC RESILIENCE THROUGH INNOVATION AND ENTERPRISE

EXPLORATORY AND EXPLOITATIVE INNOVATION PERFORMANCE CONTINGENT ON ALLIANCE EGO-NETWORK PATTERNS

Dr Anastasios Karamanos[1]

[1]*City College, 13 Tsimiski Str, Thessaloniki, Greece, akaramanos@city.academic.gr*

This study examines how the pattern of a firm's alliance ego-network, as well as that of its partners, may have a contingent effect on the firm's patenting behavior for exploratory and exploitative innovation. It is a paper that integrates network theory, organisational learning theory, and a contingency approach to innovation management. The research data came from 2933 strategic alliances in the biotechnology industry and the patents by 455 firms in the period 1986-1999. The study employs a panel data negative binomial estimation model with random effects. It concluded that centrality in the whole alliance network was beneficial to patenting within many secondary classes (proxy for exploitation) because it enables experiential search for knowledge, whereas a focal firm's partners' centrality was beneficial to patenting across many primary classes (proxy for exploration) because it enables cognitive search for knowledge.

Keywords
Alliances; Biotechnology; Innovation; Networks; Patents

1. Introduction

The long-term competitive advantage of firms in technology-intensive industries depends solely on knowledge and networks that lead to innovation[1]. Evolutionary economics conceptualize a piece of knowledge as a recipe encompassing both physical components and processes as ingredients[2]. The conceptualization of knowledge as a recipe leads to thinking of innovation as a process of searching for new recipes[3]. In this paper, then, the terms 'knowledge' and 'recipes' are used interchangeably. While innovation research has primarily focused on where firms search for solutions (i.e. local vs. distant)[4], organisational learning literature[5] has emphasized how firms search: both experiential and cognitive searches guide a firm's quest for innovation[6]. In the case of experiential search, firms exploit their existing knowledge and this can lead to the development of efficient organizational routines[2] and positive, timely, and predictable returns[7]. In this rationale, forming strategic alliances is attractive as partners have a good understanding of the relevant issues at hand and alliances function as 'pipelines' through which knowledge flows between firms[8], enabling a rapid diffusion of recipes among partners and enhancing the efficiency and speed of collaboration[9]. This should be beneficial to exploitative innovation, as the rationale for entering a strategic alliance is formed by the possibilities of obtaining complementary knowledge and/or speeding up the R&D process in industries where time-to-market is critical[7].

However, integrating external knowledge through alliances can overcome limitations, but it is costly and less successful on average than deriving solutions from one's existing knowledge base[7] because receiving and building on knowledge frequently requires the recipient to fill in gaps and to correct transmission errors in what the sender conveys and the receiver may

misinterpret some of the information that is transmitted[3]. Alternatively, cognitive search can used to reduce the uncertainty and costs of using external knowledge, and it occurs when members of a firm cognitively evaluate alternative recipes, ingredients and combinations[10], and assess their implications for solution performance, which are subsequently investigated via experiential search[6]. Then, this cognitive process seems to invoke a broader set of alternative actions both local and distant at lower cost and higher expected value[6], so we infer that, for the purpose of exploratory innovation, firms may be putting emphasis on cognitive search for innovation[11] to filter for novel recipes of high expected value, which are subsequently investigated via experiential search. This argument points to a different role for a firm's strategic alliances, namely to produce novel recombinations of knowledge[12] rather than to function as 'pipelines' for the diffusion of knowledge.

2. Which ego-network pattern for exploitative and exploratory innovation?

Theorizing about networks and innovation can then be thought of as coming from two different but complementary levels of analysis: the view from the micro-level of the individual firm (ego-network) and the view from the macro-level of the 'whole' industry network[13]. Research[14] has identified a research gap and they urged researchers to explore whether some ego-network patterns are more efficient than other for firm's outcomes. So, as the empirical contributions have generated a mixed bag of findings, there is an increasing consensus that a contingency approach might be more effective[15][16].

2.1 Ego-network closure

A firm's network centrality explicitly affects a focal firm's capability to access or control the various resources and information in the network through its ties[17]. In an alliance ego-network, centrality is associated with two distinct kinds of network closure benefits[15], namely resource-sharing and information spillovers. Firms will look to their partners to provide the resources and technological capabilities they lack, maximizing firm value by effectively combining the partners' resources and exploiting complementarities[18]. Consequently, the implementation of additional capabilities from outside should have a positive effect on innovation achievement[19]. Then, a focal firm's ties hold knowledge that is novel to the firm, or the existing knowledge of a firm and that of its partners may be recombined through collaboration, yielding recipes that are new to the firm[15]. As a result, a centrally positioned firm is connected to different knowledge 'pipelines' in the network[20] and many other firms in the network must go through a central firm in order to access other firms' recipes[21]. Network centrality should then be an advantage for exploitative innovation through experiential search, as focal firms draw on their knowledge to exploit an increased number of potential recipes[10] that come through the network 'pipelines' due to the focal firm's ego-network closure pattern.

The second benefit is that collaboration with many partners may lead to reduced risk for the firms involved due to information spillovers, i.e. knowledge is probably shared a variable amount easier than otherwise[15] due to higher levels of perceived information accuracy and aligned partners' interests[22]. Exploitative innovation through experiential search requires a deeper understanding of specific information rather than a wider grasp of more general information[11]. For exploitation, a stronger emphasis is on central firms being willing and motivated to invest time and effort to share knowledge with partners[23]. Prior research has shown that central firms located in dense regions of a network through multiple ties share fundamental value systems[24], facilitate the diffusion of norms across the network[25], enhance communication effectiveness[26], provide shared meaning and understanding between network members[27], and nurture trust in the network[18]. Shared values and

norms develop the expectation that partners will proactively and voluntarily provide timely and tacit information necessary for successful alliances[28]. As such, central firms can control and exploit opportunities in the industry, as well as control the trajectory and direction of recipes created in the network[29]. Thus, central firms are expected to be able to delve deep into their technology fields, synergistically work on their specialized knowledge to generate patents within many secondary classes. Accordingly, I submit that, other things being equal,

Hypothesis 1. There is a positive relationship between the number of a focal firm's secondary patent classes and its centrality in the 'whole' alliance network.

2.2 Non-redundant ego-network

Opportunities for exploration entail the likelihood of a break away from the established way of doing things and the discovery of and experimentation with new knowledge[7]. Some authors[30] have noted that firms introducing innovations with a greater degree of novelty are more likely to use a wider range of recipe sources to develop or improve their products. Expanding into new domains and technological innovations novel to the firm most probably requires cognitive search, which can reduce the uncertainty and costs of using external knowledge in a search process[31] and increases the variance of potential solutions[6]. Cognitive search occurs when a focal firm's mental representations of the environment are used to identify potentially valuable combinations quickly and the combinations are subsequently investigated via experiential search[6]. Because a firm can evaluate a solution without directly implementing it, cognitive search is cheaper than experiential search, reduces the risks of experimentation and increases the efficiency of exploring external recipies[6].

As all knowledge is not equally accessible to a focal firm[32], Burt[22] introduced the structural holes argument, which is concerned with the notion of redundancy. A firm's ego-network that connects two otherwise disconnected subgroups in the 'whole' network is said to be non-redundant and bridges a structural hole. So a focal firm's ego-network has redundancy to the extent that the firm's partners are connected to each other as well. Firms bridging structural holes act as 'brokers' and the more structural holes a firm can bridge the wider the range and diversity of ideas, perspectives and recipes it comes along[33]. So this type of networking serves as a screening device[34] that allows for relevant developments in diverse technologies to be brought to the firm's attention. Alternately, faced with a specific problem, a firm can activate its network to identify the sources that are likely to be well informed about the specific issue at hand[35]. Because knowledge is developed partially through firm interaction, firms that bridge structural holes will be able to develop new understandings, not possible to those who do not bridge holes, through the recombination of previously isolated knowledge perspectives[15][29]. Moreover, because maintaining ties to many other firms is costly, firms that bridge structural holes enjoy improved efficiency in their ego-network pattern for bringing together otherwise isolated recipes, thus conserving scarce managerial resources[36]. These arguments lead to the suggestion that there is probably a positive relationship between a firm's ego-network pattern that spans structural holes and exploratory innovation, due to the associated enhanced cognitive search capability[31] that eventually leads to more efficient experiential search for novel recipes. Accordingly, I submit that, other things being equal,

Hypothesis 2. There is a positive relationship between the number of a firm's primary patent classes and the number of structural holes it spans in the 'whole' alliance network.

2.3 Alliance partner's ego-network closure

Alliances provide a firm with access to its partners' organizational routines (the terms 'partner' and 'alliance partner' are used interchangeably in this paper), which reduces ambiguity about a partner's knowledge and increases the efficacy of knowledge transfer and assimilation[37]. Accordingly, research on ego-network patterns as determinants of firm-level outcomes, such as innovation performance, has been augmented by considering partners' characteristics[38]. There are significant differences among the types of partners on how the collaboration is managed and what kind of innovation can be achieved[39]. Nieto and Santamaria[40] have also indicated that alliance partner characteristics are important because the specific characteristics and objectives of different partners would bring different innovation results. Recent research[31] has highlighted an innovative firm's knowledge spillover pool as a discrete knowledge element and a unique characteristic to each individual firm. In the context of a strategic alliance, a spillover is defined as an unintentional transmission of knowledge to others beyond the intended boundary. If knowledge is exchanged with the intended alliance partners, it is defined as "knowledge transfer", but any knowledge that is exchanged outside the intended boundary is a spillover. Thus, a firm's spillover knowledge pool represents all external recipes that have been linked directly to its knowledge base by partner firms through spillovers during the sum of its alliances[31]. As a partner firm's spillover knowledge pool grows larger with its increasing centrality in the 'whole' alliance network, it probably contributes a greater number of relatively accessible external knowledge components/recipies that can be used as inputs in the innovation process of focal firms through experiential search[41]. Also, larger spillover knowledge pools of partner firms provide focal firms with a large number of recipes as input to their cognitive search effort[7]. Firms learn vicariously by observing the behavior and associated performance outcomes of partner firms with large spillover pools, and then by modeling or imitating behaviors that seem successful and avoiding behaviors that seem unsuccessful[42]. By observing the innovative activities of partner firms and the outcomes of those activities, a focal firm can develop a cognitive model of how and why a new combination of recipes is formed without attempting the combination[42]. This cognitive model can be used by focal firms as a guide for future experiential search by identifying potentially valuable knowledge elements and combinations, detecting elements and combinations to avoid, and providing insight into the organizational routines[43] that led to the creation of the innovation[3]. Building on these arguments, I suggest that a focal firm tied to a partner with a large knowledge spillover pool, due to the latter's centrality in the 'whole' alliance network, may be in a better position to engage in exploratory innovation of vicarious learning with the partner and effective cognitive search may lead to subsequent efficiency in experiential search for novel recipes. Accordingly, I submit that, other things being equal,

> *Hypothesis 3. There is a positive relationship between the number of a firm's primary patent classes and its partners' centrality in the 'whole' alliance network.*

3. Research methodology

I tested the hypotheses using a large sample strategic alliances by dedicated biotechnology firms (DBFs) in the period 1986-1999. As I was interested in technical knowledge diffusion, I used only alliances with the purpose of technology licensing, research and/or development and/or commercialization, thus excluding marketing, manufacturing and distribution deals. Alliance data were gathered from the Historical Actions Database provided by BioAbility.com and I had data on 2933 alliances by 455 DBFs during the period 1986-1999. Following prior research, I coded the data based on the different types of technical alliances (e.g. licensing,

R&D etc.), as each type entails different tie 'strength' – defined as the level of interdependence that leads to differing levels of intensity of knowledge transfer[44]. Finally, I constructed 5-year alliance network moving windows between 1986 and 1999 (I had data for 1981 onwards), and each network was constructed as an undirected valued adjacency matrix. UCINET 6 was used to obtain measures on these networks, as I describe in the next section. All patenting data were retrieved from Delphion.com database, which reports US Patent Office data for all the firms in the sample, of which only a small proposition was based outside the USA.

4. Measures

4.1 Dependent variables

The first dependent variable, *Secondary_Classes,* was calculated as the number of secondary patent classes divided by the number of primary patent classes in which a firm filed for patents during a year of observation. The second dependent variable, *Primary_Classes,* is a count variable of the number of primary patent classes in which a firm filed for patents during a year of observation. As the propensity to patent may differ due to firm characteristics, I attempted to control for sources of heterogeneity using the control variable *Presample_Patents* (described below) and random effects in the estimations.

5.2 Independent variables

5.2.1 Centrality and partner centrality

The variable *Centrality* refers to the betweeness centrality score of a focal firm in any given 5-year window, and the variable *Partner_Centrality* refers to the average of the *Centrality* values of a firm's partners in any given 5-year windo*w.* The variable *Partner_Centrality* was transformed by taking the natural logarithm in order to address a lack of linearity.

5.2.2 Structural holes

The variable *Efficiency* assessed the presence or absence of structural holes in a focal firm's ego-network. The E*fficiency* measure[22] calculates the effective size of a focal firm's ego-network (essentially, the number of partners minus the average degree of partners within the ego-network, not counting ties to focal firm) divided by the number of partners in the focal firm's ego-network. I used the 'Network> Ego Network> Structural Holes' routine in UCINET.

5.3. Control Variables

5.3.1 Alliance experience

Prior experience would then reduce risks and costs by enabling quick mobilization and exploitation of knowledge between partners to increase a focal firm's innovative outcomes[15], and to control the pace and rate of change and innovation in the network[29]. Therefore, I used the variable *Alliance_Experience,* which is a count measure of the number of direct ties (degrees) that a focal firm had in any given moving 5-year window, as a proxy for alliance management capability. In order to take into account similar capabilities by a focal firm's partners, I used the variable *Partner_Alliance_Experience* as an equivalent measure. In addition, the data were valued (to reflect 'strength' of tie) so the measures consisted of the sums of these values.

5.3.2. Presample patents

To control for further unobserved heterogeneity in firms' patenting behavior, I used a random effects statistical model as well as following the presample information approach. A common method of controlling for unobserved heterogeneity is to include the number of times that the focal event (filling for a patent) has previously occurred for each firm: I calculated the variable

Presample_Patents as the sum of patents obtained by a firm in the five years prior to its entry into the sample (I had data since 1980).

5.3.3. Country of origin
Firms that are headquartered in different countries may differ in their propensity to patent. Moreover, Asian and European firms may be less inclined to patent in the USA even when the biotechnology industry is widely recognized as a global industry. The variable *Country* was introduced to control for such effects.

5.3.4. *Density*
I used the variable *Network_Density* to measure the 'whole' network density, calculated for each 5-year observation window. This variable measures the ratio of existing links in the network to the number of possible pairwise combinations of firms, with larger values indicating increasing density. For the valued networks used in this analysis, it is the total of all values divided by the number of possible ties. The variable was also transformed by taking the natural logarithm in order to address a lack of linearity.

6. Analysis
The dependent variables are count variables and take on only nonnegative integer values. A Poisson regression approach provides a natural baseline model for count data[45]. However, patent data often exhibit heterogeneity (overdispersion) where the variance exceeds the mean[45], which violates the Poisson distribution's strong assumption that the mean and variance must be equal. In this case, a commonly used alternative is the negative binomial model, which allows for heterogeneity by incorporating an individual, unobserved effect into the conditional mean. I used panel data implementation of random effects[45] in the context of a negative binomial model to account for unobserved heterogeneity. Moreover, negative binomial regression accounts for an omitted variable bias, while simultaneously estimating unobserved heterogeneity[45]. In the present study, unobserved heterogeneity refers to the possibility that unmeasured differences among observationally equivalent firms affect their patenting. The Hausman test was not significant in all models (χ^2 = 26.12; Prob> χ^2 = 0.0005) indicating that it is safe to use a random-effects specification. All models were estimated with Stata 10.0.

7. Results
Table 1 reports descriptive statistics and correlations between variables. Table 1 reveals on average low correlations between variables, except in the case of *Partner_Centrality* and *Partner_Alliance_Experience.* This can be an indication that multicollinearity is present, sometimes resulting in the signs of estimated coefficients to flip, so I decided to test these variables separately as well as together in a 'full' model.

Table 1 Descriptive statistics and correlations

	No of observations = 1894	Mean	Std Dev	Min	Max	1	2	3	4	5	6	7	8	9
1	Primary_classes	5.15	5.74	1	21	1								
2	Secondary_classes	1.57	1.48	0.19	15	0.14***	1							
3	Centrality	0.01	0.01	0.00	0.13	0.24***	0.20***	1						
4	Efficiency	0.52	0.31	0.00	1.00	0.11***	0.14***	0.31***	1					
5	Partner_Centrality	-4.65	1.05	-7.60	-2.09	0.06***	0.04*	0.11***	-0.43***	1				
6	Alliance_Experience	0.00	0.00	0.00	0.01	0.11***	0.04***	0.33***	0.08***	0.06**	1			
7	Presample_Patents	0.69	2.78	0	47	-0.01	0.01*	-0.05**	-0.07**	0.02	-0.02	1		
8	Network_Density	-3.20	0.50	-4.52	-2.64	-0.03	0.00	0.02	-0.04	0.02	0.05**	0.03	1	
9	Partner_Alliance_Experience	0.01	0.01	0.00	0.10	-0.02**	0.05**	-0.04***	-0.35	0.54***	0.07**	0.01***	0.06	1
10	Country	1.25	0.81	1	5	0.041**	0.05**	-0.08***	-0.03*	-0.05**	-0.05**	0.02	-0.02	-0.05**

*** - p < .01; ** - p < .05; * - p < .1

Table 2 reports the results of the analysis of the panel data for dependent variable *Secondary_classes,* and Table 3 reports the results for dependent variable *Primary_classes*.

Table 2 Panel negative binomial random effects regression models with one-year lag for dependent variable: Secondary_Classes

No of Observations = 1894	**Model I**	**Model II**	**Model III**	**Model IV**	**Model V**
Constant	0.18 (0.12)	0.15 (0.12)	0.15 (0.13)	0.44* (0.25)	0.27 (0.26)
Alliance_Experience	64.34*** (13.56)	60.78*** (14.01)	63.85*** (13.57)	64.04*** (13.78)	60.33*** (14.25)
Presample_Patents	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.02 (0.01)
Country	0.04 (0.04)	0.04 (0.04)	0.04 (0.04)	0 .02 (0.04)	0.02 (0.04)
Partner_Alliance_Experience	1.95 (1.83)	1.76 (1.85)	1.93 (1.84)	1.73 (3.20)	0.34 (3.23)
Network_Density	-0.02 (0.03)	-0.02 (0.03)	-0.02 (0.03)	-0.03 (0.04)	-0.03 (0.04)
Centrality	-	5.97*** (1.86)	-	-	5.77*** (2.04)
Efficiency	-	-	0.05 (0.06)	-	0.04 (0.12)
Partner_Centrality	-	-	-	0.04 (0.03)	0.03 (0.04)
Log likelihood	-7012.25	-7008.99	-7012.91	-5834.48	-5830.35
Wald χ^2	26.32***	37.38***	27.12***	25.27***	36.24***

Note: standard errors in parentheses

*** - p < .01; ** - p < .05; * - p < .10

All the models shown in Tables 2 and 3 were significant compared to the null model (chi-square test). In Tables 2 and 3, the first model (I and VI respectively) includes control variables only, the following three models test the hypotheses and the last model (V and X respectively) pools all the explanatory variables in one. Models V and X yielded empirical results that are consistent with previous models. For dependent variable *Secondary_classes*, Models II and V show that the coefficient for *Centrality* is positive and statistically significant, and it confirmed H1.

Table 3 Panel negative binomial random effects regression models with one-year lag for dependent variable: Primary_Classes

No of Observations = 1894	Model VI	Model VII	Model VIII	Model IX	Model X
Constant	0.96*** (0.12)	0.94*** (0.12)	0.89*** (0.13)	1.27*** (0.24)	1.11*** (0.24)
Alliance_Experience	39.96*** (12.59)	35.92** (13.26)	38.72*** (12.57)	40.77*** (12.82)	37.50*** (13.26)
Presample_Patents	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)	0.01 (0.01)	0.01 (0.01)
Country	0.05 (0.05)	0.05 (0.05)	0.51 (0.05)	0 .043 (0.05)	0.05 (0.05)
Partner_ Alliance_Experience	2.12 (1.74)	2.02 (1.75)	2.09 (1.74)	3.22 (3.00)	2.93 (3.03)
Network_Density	-0.04 (0.03)	-0.04 (0.03)	-0.04 (0.03)	-0.06* (0.03)	-0.06* (0.03)
Centrality	-	2.02 (1.75)	-	-	1.12 (1.76)
Efficiency	-	-	0.12* (0.06)	-	0.20* (0.12)
Partner_Centrality	-	-	-	0.07** (0.03)	0.08** (0.04)
Log likelihood	-5767.16	-5766.93	-5766.60	-4813.73	-4811.47
Wald χ^2	16.65***	19.16***	19.91***	19.15***	23.55***

Note: standard errors in parentheses

*** - p < .01; ** - p < .05; * - p < .10

For dependent variable, *Primary_classes*, Models VIII and X show that the coefficient for *Efficiency* is positive but not statistically significant to 95 percent confidence level. So, although the direction of the relationship between *Primary_classes* and *Efficiency* is confirmed, H2 cannot be accepted. Finally, Models IX and X show that the coefficient for *Partner_Centrality is* positive and statistically significant, thus confirming H3. Models III, IV, and VI indicate that not all network independent variables are important to the two dependent variables, thus strengthening the hypothesis development. In all the models the coefficient for *Alliance_Experience* was positive and statistically significant, and the remaining control variables were statistically insignificant.

8. Discussion

The results indicate that betweeness centrality in the 'whole' network is beneficial to patenting within many secondary classes (proxy for exploitative innovation), because a centrally positioned firm is better connected to recipe 'pipeline' flows in the network. Additionally, it enjoys an advantage for experiential search to exploit opportunities that lead to the development of efficient organizational routines and positive, timely, and predictable returns. Moreover, the results indicate that a focal firm's partner's centrality is beneficial to patenting across many primary classes (proxy for exploratory innovation) because of vicarious learning with a central partner with a large knowledge spillover pool. These results seem to overcome conflicts in previous research that stem from the assumption that a firm's access to diverse knowledge and the innovation benefits of network closure are mutually exclusive . If we adopt the contingency approach then network closure proves to be beneficial to innovation because, given the results of this paper, a focal firm's centrality in the 'whole' network is beneficial to exploitative innovation and centrality of the partner firm is beneficial to exploratory innovation.

Finally, the results of this study have managerial implications, as they advocate a more action-oriented view of alliance network, with the aim of orchestrating networks in such way that managers can extract more value out of them. The results indicate that firms with experience in making alliances have probably developed a well-honed alliance management capability that facilitates effective processes to access rich information and higher patent output. When firms combine their *internal* alliance management capability with a beneficial *external* network pattern that entails centrality in the 'whole' network and partners that are central 'gatekeepers', then they seem to be able to better exploit and explore knowledge and transform it into patents. For exploratory innovation, it seems then that the best way for a company to 'cast its net widely' in order to reach new technological fields is through 'gatekeepers', and that the more experience a firm has in alliances the more it will be able to produce exploratory innovation patents. For exploitative innovation, the study found that it is the combination of 'whole' network centrality and alliance experience that enables the focal firm to absorb and transform the in-depth knowledge from the partners into patents in many secondary classes. Also, the partners' alliance management capability does not seem to be significantly linked to the focal firm's patent output, indicating that the absorption and transformation of knowledge by the focal firm into patents is an internal affair.

References

1 Lichtenthaler, U. Outbound open innovation and its effect on firm performance: examining environmental influences, R&D Management 2009; 39(4): 317-330.
2 Nelson R., Winter S. An evolutionary theory of economic change. 1982. Harvard University Press, Cambridge, MA.
3 Sorenson O., Rivkin J.W., Fleming L. Complexity, networks, and knowledge flow. Research Policy 2006; 35: 994–1017.
4 Fleming L., Recombinant uncertainty in technological search. Management Science 2001; 47: 117–132.
5 Argote L., Organizational Learning: Creating, retaining and transferring knowledge. 1999. Kluwer, Boston, MA.
6 Gavetti G., Levinthal, D.A. Looking forward and looking backward: Cognitive and experiential search. Administrative Science Quarterly 2000; 45: 113–137.
7 March J. Exploration and exploitation in organizational learning. Organization Science 1991; 2(1): 71-87.
8 Owen-Smith J., Powell W.W. Knowledge networks as channels and conduits: the effects of spillovers in the Boston biotechnology community. Organization Science 2004; 15(1): 5-21.
9 Gilsing V.A. The dynamics of innovation and interfirm networks: Exploration, exploitation and co-evolution. 2005; Edward Elgar, Cheltenham, UK.
10 Rosenkopf L., Nerkar A. Beyond local search: Boundary-spanning, exploration and impact in the optical disc industry. Strategic Management Journal 2001; 22: 287–306.
11 Rowley T., Behrens D., Krackhardt D. Redundant governance structures, an analysis of structural and relational participation in the steel and semiconductor industries. Strategic Management Journal 2000; 21(3) (Special Issue): 369-386.
12 Obstfeld D. Social networks, the Tertius Iungens orientation, and involvement in innovation. Administrative Science Quarterly 2005; 50(1): 100-130.
13 Wasserman S., Galaskiewicz J. Advances in social network analysis: Research in the social and behavioral sciences, 1994. Newbury Park, CA: Sage.
14 Provan K.G., Fish A., Sydow J. Interorganizational networks at the network level: A review of the empirical literature on whole networks. Journal of Management 2007; 33(3): 479-516.
15 Ahuja G. Collaboration networks, structural holes, and innovation: A longitudinal study. Administrative Science Quarterly 2000; 45(3): 425-455.

16 Karamanos A.G. Leveraging micro- and macro- structures of embeddedness in alliance networks for exploratory innovation in biotechnology. R&D Management 2012; 42(1): 71–89.
17 Hoang H., Antoncic B. Network-based research in entrepreneurship: A critical review. Journal of Business Venturing 2003; 18(2): 165-187.
18 Gulati R. Does familiarity breed trust? The implications of repeated ties for contractual choices. Academy of Management Journal 1995; 38(1): 85-112.
19 Faems D., Van Looy B., Debackere K. Interorganizational collaboration and innovation: toward a portfolio approach. Journal of Product Innovation Management 2005; 22: 238-250.
20 Powell W.W., Koput K.W., Smith-Doerr L. Interorganizational collaboration and the locus of innovation, networks of learning in biotechnology. Administrative Science Quarterly 1996; 41(1): 116-145
21 Freeman L. Centrality in social networks: Conceptual clarification. Social Networks 1979; 1: 215–239.
22 Burt R.S. Structural holes and good ideas. American Journal of Sociology 2004; 110(2): 349-399.
23 Regans R., McEvily B. Network structure and knowledge transfer: The effects of cohesion and range. Administrative Science Quarterly 2003; 48(2): 240-267.
24 Huber G.P. Organizational learning: The contributing processes and the literatures. Organization Science 1991; 2(1): 88-115.
25 Oliver A.L. Strategic alliances and the learning life-cycle of biotechnology firms. Organization Studies 2001; 21(3): 467-489.
26 Dyer J.H., Singh H. The relational view: Cooperative strategy and sources of interorganizational competitive advantage. Academy of Management Review 1998; 23(4): 660–679.
27 Gulati R., Nohria, N., Zaheer, A. Strategy networks. Strategic Journal Management 2000; 21(3): 203-216.
28 Inkpen A.C., Birkenshaw, J. International joint ventures and performance: An interorganizational perspective. International Business Review 1994; 3(3): 201-217.
29 Koka B.R., Persott J.E. Designing alliance networks: The influence of network position, environmental change, and strategy on firm performance. Strategic Management Journal 2008; 29(6): 639-661.
30 Amara N., Landry R. Sources of information as determinants of novelty of innovation in manufacturing firms: evidence from the 1999 statistics Canada innovation survey. Technovation 2005; 25: 245 259.
31 Yang H., Phelps C., Steensma H.K. Learning from what others have learned from you: The effects of technology spillovers on the originating firms. Academy of Management Journal 2010; 53(2): 371-389.
32 Jaffe A.B. Technological opportunity and spillovers of R&D: Evidence from firms' patents, profits and market value. American Economic Review 1986; 76: 984–1001.
33 Reagans R., Zuckerman E. Networks, diversity and productivity: the social capital of corporate R&D teams. Organization Science 2001; 12(4): 502-517.
34 Leonard-Barton D. Inter-personal communication patterns among Swedish and Boston-area entrepreneurs. Research Policy 1984; 13(2): 101-114.
35 Freeman C. The economics of industrial innovation. 1982. MIT Press, Cambridge, MA.
36 Hagedoorn J., Duysters G. Learning in dynamic inter-firm networks, the efficacy of multiple contacts. Organization Studies 2002; 23(4): 525-548.
37 Jensen R.J., Szulanski G. Template use and the effectiveness of knowledge transfer, Management Science 2007; 53(11): 1716–30.
38 Gulati R. Alliances and networks. Strategic Management Journal 1998;19(4): 293-317.

39 Whitley R. Developing innovative competences: the role of institutional frameworks. Industrial and Corporate Change 2002; 11: 497-528.
40 Nieto M.J., Santamaria L. The importance of diverse collaborative networks for the novelty of product innovation. Technovation 2007; 27(6–7): 367–377.
41 Fleming L., Sorenson O. Technology as a complex adaptive system: Evidence from patent data. Research Policy 2001;30: 1019–1039.
42 Cyert R., March J.G. A behavioral theory of the firm. 1963. Prentice-Hall, Englewood Cliffs, NJ.
43 Zaheer A., Bell G.G. Benefiting from network position: Firm capabilities, structural holes, and performance. Strategic Management Journal 2005; 26(9): 809-825.
44 Koza M.P., Lewin A.Y. Managing partnerships and strategic alliances: Raising the odds of success. European Management Journal 2000;18: 146–151.
45 Hausman J., Hall B., Griliches Z. Econometric models for count data with an application to the patents-R&D relationship. Econometrica 1984; 52(4): 909-938.

COMMUNICATION AS THE BASIS FOR INNOVATION

Grzegorz Leszczyński[1], Magdalena Sapała[2], Marek Zieliński[3]

[1, 3] Poznań University of Economics, Faculty of Management, CentrumB2B
g.leszczynski@ue.poznan.pl, m.zielinski@ue.poznan.pl
[2]The Institute for European Studies, Vrije Universiteit Brussel, magdalena.sapala@vub.ac.be

Abstract

The main issue of that paper are communication barriers in the process of innovation in SMEs. We discuss the issue of linear and open models of innovation and barriers of transition between them. We deal with the role of communication in the innovation process, as well as barriers that might induce to communicate. The results of research project are presented to show communication behaviour, tools and quality to better understand the role of communication in innovation process. One might expect that internal communication in small enterprises should not cause any problems but our study results show that it is falling due to blurring responsibility tasks, lack of clearly defined division of tasks and coping with too many activities at one time.

Keywords: innovation, open innovation, communication, business-to-business

Acknowledgment

Project granted by the Polish National Science Centre (NCN) DEC-2011/01/B/HS4/02747

1. Introduction

Innovation has become a key word for all policies and investments performed in the European Union (EU). The conviction that the EU's future economic growth will increasingly have to come from innovation in products, services, jobs and business models has laid the foundations of the "Europe 2020" strategy and, consequently, the innovation has become an inherent goal of all EU policies. Importantly, in its documents and activities the EU promotes a broad concept of innovation that is going beyond technological research, its applications or freedom of movement of researchers. The European Commission clearly refers to the so-called 'free movement of innovative ideas' or the Open Innovation paradigm and supports genuinely open innovation which includes brokerage, intermediaries and networks in which all players can participate on an equal basis [1]. In practical terms, this approach is implemented on all governance levels: European, national, regional and local, via investments and projects entirely or partly funded from the EU budget[1].

[1] On the EU level those are the programs directly managed by the European Commission (roughly 22% of the total budget), such as 7th Framework Programme for Research and Technological Development, Competitiveness and Innovation Framework Programme or LIFE+. On national and lower levels, the EU funds for innovation are mostly distributed in the framework of the cohesion policy and its instruments (roughly 40% of the total budget).

Since 2004, an important part of EU funds has been allocated to Polish economy. On average, at least 63,9% (more than 42 bln Euro) of the EU contribution to investments in Poland in 2007-2013 has been directly related to the improvement of the innovativeness and innovations [2]. A project that serves in this article as an empirical illustration of a problem of communication in open innovation, is one of thousands similar, innovative projects implemented so far in Poland with co-financing from the EU budget. Certainly, such an investment has a potential to fill the gap in financing innovation in Polish enterprises, and reflects the importance of innovation policy, including the concept of open Innovation.

Traditionally, open innovation has been analysed mainly within the context of large, multinational, technology firms and only a small number of studies on open innovation within smaller firms exist. There is some empirical evidence that large firms could differ from small ones in their adoption of open innovation; firm size does influence the innovation strategy and value capturing ability of firms on new technology [3,4]. Moreover, small firms in less developed countries have to face in addition to the liability of their size, the limitations of an inadequate infrastructure. The study of innovation, including the obstacles to its successful implementation, while relatively well researched in the industrialized countries is rather neglected in less developed countries [5]. Thus in our study we analyse the notion of open innovation in SMEs to answer the question how small firms adopt to open innovation in context of Poland, as the post-transition economy.

The level of Polish innovativeness is one of the lowest among OECD countries [6] and below the European Union average [7]. Transition period finished in 2004 when Poland joined the European Union, however the social consequences of the change are still being felt. Many problems of Polish transition to market economy are being interpreted as the result of deterioration of rules, norms, trust and social capital [8]. We assume that under such conditions the communication can act as a factor significantly affecting the transition from linear to open innovation. Communication is the basis for interaction with the environment, and simultaneously affects the increase in confidence. Therefore, the main issue of our paper are communication barriers in the process of innovation in SMEs. In this way, the paper answers to the challenge posed by Gassmann [9] to investigate how firms can implement open innovation in practice.

The paper is organized as follows: at the beginning we discuss the issue of linear and open models of innovation and barriers of transition between them. Then we deal with the role of communication in the innovation process, as well as barriers that might induce to communicate. In the next part we put research questions and present the results of research carried out among enterprises. Finally we come to conclusions.

2. From linear to open innovation model

Innovation management is a specialized field of management research that aims at designing processes for introducing new technologies, processes, and products within organizations. Until today, many researchers and practitioners assume that innovations develop in a linear progression from basic research and applied science to the experimental stage and prototyping, followed by market introduction and market penetration. This process is seen as a very rational, proceeding within the boundaries of the company and its partners. In this process communication plays only a minor role. It is reduced to the last step of the linear model and conceptualized as a tool to support the diffusion of innovations, e.g., by addressing early adopters and opinion leaders [10].

Rothwell [11] studied the evolution of innovation models and he pointed out the shift from:

- intra-team model with a linear technology-push or demand-pull process and then to
- cross-team model where activities occur across the firm with cross-functional teams and then outside the firm and its links with others and finally and then to

- the open innovation concept that treats innovation as process, which requires integration of actors, activities and resources at intra- and inter-firm levels.

Nowadays, innovation management is rather understood as an integrated, co-operative, and iterative process that must be strategically planned, controlled and supported by communication in a very fundamental way [12]. Most of today's inventions and patents are no longer generated within a single company. Innovation networks between companies, their customers, and partners gain in importance. In this context, systematic cooperation and communication with various involved stakeholders becomes essential. In the 'open innovation' model firms use both internal and external pathways to exploit technologies and, concurrently, they scout different external sources of technology that can accelerate their innovation process [13]. In addition to internal R&D companies need to get access to external knowledge, such as start-ups, universities, suppliers, or even competitors to stay competitive in the long run. In this model communication may be referred to as the glue that holds together the inter-organizational relations [14].

3. Open innovation barriers

Searching for barriers is one of many approaches to innovation research in the field of management. The aim of such approach is to determine the essence, its origin and the meaning of factors, which slow down innovation [3]. Generally, the barriers are divided into the internal ones – related to the firm and remaining under its control and the external ones – related to the environment in which the given entity operates. Our study concentrates mostly on the first field, assuming that the barriers' identification is the first step to introduce changes in the range of factors remaining under control of the enterprise. Transition from linear innovation to the open one requires the company's transformation from the closed organization, which is focused on its inner part to the open one, directed outwards. It should facilitate the transmission of innovations and innovation factors through the borders of the company as if it was a membrane. This is a very serious change which usually encounters various obstacles on two levels of open innovation divided it in the following way [4]:

- from outside to inside : collecting external ideas and solutions existing in the environment, which involves a high level of learning orientation and openness to relations with entities/external actors in the innovation process,
- from inside to outside: making use of already existing solutions and entities to introduce own innovations to markets.

According to Chiaroni, Chiesa et al. [14] by undergoing change shift from linear to open innovations companies can open up to environment in both dimensions and to different extent. It is due to barriers encountered in both dimensions.

SMEs are said to face relatively more barriers to innovation than large companies even in developed countries. Inadequate internal resources, knowledge and expertise caused it. Those circumstances move them to open innovation model as they are in need to obtain resources and share risk [15]. Results reported by Van de Vrande et al. [13] indicate, however, that the realization of this model encounters diverse problems resulting from barriers in business-to-business cooperation, as well as problems related to corporate organization and culture.

In the process of open innovation most of the identified barriers in relations with environment can be related to information – its lack, information flow, its poor flow or wrong interpretation. Speaking of inappropriate marketing, market ignorance, and misinterpretation of customers' needs or wrong adjustments to business partners, we touch the communication issue. In terms of internal barriers, these issues reflected the communication problems, which are diagnosed within the organization and organizational culture. Transition from the linear to open innovation model changes the meaning of communication in the innovation process. If

communication doesn't provide the flow of information between a firm and its entities, it might strengthen the barriers identified Van de Vrande et al. [16].

4. Communication in innovation process

The primary task of communication with business actors is to ensure that partners' intentions and capabilities are understood and to lay the ground for relationship development. Communication along with the processes of interaction and the value creation is essential for the success of the relationships with the environment [17], because it affects: trust [18], with satisfaction and loyalty [19]. The role of communication is so great that there are claims to treat it as the basic indicator of the relationship lifespan [20].
Social theory has brought forward the most relevant link between innovation and communication. New technologies and processes cannot be defined and implemented rationally by an inventor or a single company, but they have to be accepted and incorporated by a broad network of relevant stakeholders. Communication has to be an integral part of the innovation process, supporting each phase from the generation of ideas to market penetration, building relationships with employees, research and development partners, customers, competitors, politics, nongovernmental organizations, journalists, and other [21].
The foundations for today's approach to communication lie in the persuasive act model and the mathematical model. Their focus is on who communicates what to whom and how, thus they exhibit a rather instrumental approach to communication. These concepts had a lasting effect on subsequent works on communication; therefore in the literature communication is often presented as transmitting information from one place to another. In that flow four types of interferences with effective transmission and reception of a message are generally considered [22]: process, physical, semantic and psychosocial barriers of communication. However when we move to inter-organizational communication that is required in open innovation model then – according to Mohr, Fisher et al. [23] - we should consider three groups of factors that may distract communication:

- communication behaviour – results from different conditions which influence a company and its units such as: communication capability (capability to transmit), communication readiness (motivation), communication climate (rules and attitudes) [24],
- information quality – is conditioned by relevance, accuracy, reliability and timeliness of the provided information [25],
- communication tools – can be synchronous (based on interaction) or asynchronous (enable knowledge transfer through technology-based communication) [26].

5. Research problem

Open innovation is described in the literature as an effective and a target-focused model for enterprises, which operate based on inward-oriented systems. To diagnose one of the three already distinguished innovation models, we should identify two dimensions: interaction in the innovation process and innovation initiator. Interaction usually takes place within a specified team, between teams or between teams and entities. Similarly, any initiative (tough it doesn't mean the idea itself) can evolve within the dedicated group, during the process of interaction between groups and as a result of a firm's interaction with entities.
A path directed towards open innovation encounters obstacles, some of which may have communication origin. That is why we tend to search for communication barriers in innovation processes, typical for open innovation. Developing barriers require from the internal communication not only new ideas, which go beyond the existing activity of the R&D unit, but also communication with external entities.

The communication should be focused on searching new solution and know-how (knowledge). It requires the maintenance of high social capital, which enables cooperation with different entities from business surrounding: mainly customers, but also start-ups, universities, suppliers, or even competitors to stay competitive in the long run. The issue discussed still require formulating the following questions:

1. What are communication barriers from the linear model to open innovation?
2. What the barriers result from: behaviour, quality or instruments?
3. How do they influence the transition from the linear model to open innovation?

Already discussed the Van de Vrande et al. [16] studies' results describe open innovation barriers of the companies functioning in developed economy. Our aim is to verify the existing data in comparison to post-transition economy, in which the conditions for cooperation with entities are different. In socialistic, centrally planned market environment, there were no economic incentives for companies to develop the abilities such as flexibility and innovativeness. As the result, the value added is still stagnating at a low level, return on capital is low and does not allow investment in new technologies [27].

6. Research method

The complexity of such raised issue required in-depth research to understand the situation in firms. There was a need of the collective reflection over the implementation of the theory, which had described innovation models in specific companies. Action Research has a long history and a huge literature that crosses many social science boundaries [28]. At its simplest it means researchers acting in the research situation. A central contention is that Action Research should have explicit theoretical implications beyond the situation in question and not simply create instruments and techniques. The ultimate goal of action research was to generalize the results and methods to the used theory of open innovation and finally to test and modify theory through action.

The project implementation[2] was initiated by selection of 10 companies, which met following criteria: had experienced serious communication problems and consequently negative impact on innovation. Next stage introduced diagnosing research whose aim was to evaluate the companies' level of innovation and characterize these fields of communication, which encountered problems. As a result, communication problems were diagnosed and a preliminary recovery plan dedicated to certain beneficent company was introduced.

Questionnaires, Cognitive Maps, in-depth and focus interviews were applied at this phase. Next stages focused on educational and tutorial features, but that part is not discussed here.

Thirty persons from the management staff participated in the project, representing ten small and medium-sized enterprises (three pers. from each firm), located in the *opolskie voivodeship*. Three persons responsible for marketing or purchasing, human resources and R&D unit represented each company. The companies' main field of activity was: production (2), services (6) and trade (2) on business-to-business market. They varied among each other in terms of number of employees, the revenue and the scope of business activity. They however shared the same background: they were still run by founders and invested capital was Polish. They also shared the same common feature: looking for possibility to increase its innovation capacity. Table 1., shows profiles of the companies, which participated in the

[2] The project "Creative management and communication as a development base for innovation and new technologies" has been co-financed by the European Social Fund in the framework of a measure "Support to cooperation of scientific environment and enterprises" (Operational Programme Human Capital, 8.2.1.) and was implemented by Wyższa Szkoła Zarządzania i Administracji w Opolu.

project. The research team consisted of a psychologist, sociologist, management and communication specialists.

7. Results

7.1. Innovation model

In most of the examined companies (A, B, D - G) innovations came from the collaboration work of a specified group of employees. They drew inspiration from different external sources, though they couldn't be treated as interactions with environment in the innovation process. Researchers encountered different approaches: from the specialized R&D units in the company, which conducted research for business, to short-term project teams.
Regardless the organizational form they shared the same lack of deeper interaction with external factors in the process of inventing new ideas. One of the striking examples concerned an advertising agency D, whose contact to a customer was limited to collecting essential information from him. A project team runs the whole solutions search process and next only the nominated team's representative submits proposals to the customer. The project team never meets a customer not to mention collaborative work.
Another vivid example provided company B, where the owner himself has been inventing, introducing new products to market, since he knows the ropes and predicts customers' preferences.

Table 1. Companies, which participated in the study according to the innovation model (scope of activity, main field of activity, number of employees)

		Interaction in innovation process		
		Intra-team	Cross-team	Inter-firm
Innovation initiative	inside the company	A. Protective clothing, trade, 14 B. Furnishing fabrics, manufacturer, 19	C. Professional cleaning, trade, 50	
	outside the company	D. Advertising, services 6+6* E. Ceramics, glass R&D, services, 57 F. Printing, services, 5 G. Advertising, services, 4+10*	H. Recreation Centre, services, 50	I. Advertising, services, 3+4* J. Windows and doors, manufacturer, 230

* freelancers

Respondents often paid attention to the fact that in small enterprises owners must be involved in the process of inventing new ideas though they could not give satisfactory explanation why. They however complained and criticized employees for insufficient involvement into inventory work. In this group, respondents often said that customers provide new ideas, but in the process of profound data analysis turned out that even though a customer often comes up with some new needs, in the innovation process he plays a role of a contracting entity; his role ends up in defining his needs.
In two cases (H, C) innovations resulted from work groups that deal with different group products or group services. Here, new ideas emerge from demonstrating different point of views and new solutions from joining activities at different areas. In case of two enterprises – window and door manufacturer (J) and advertising agency (I) innovation process is based on

the interaction with environment. In the first example the company operates in different countries and it helps to combine various experiences. Another example (I) turned out to be extremely interesting since the company had earlier operated according to linear model, but right before the study, it accomplished an innovative project, where customers and research institute took part. It turned managers perception towards an open innovation solutions.
In case of firms J and C, innovations result often from interactions with customers or other entities. The company J conducts purchasing based on the advisory model where J not only acquires a lot of information from customers but also engages him to develop new solutions. They are thus tailored to each customer's needs. While in C, company suppliers and customers take active part in developing new solutions.
In most examined cases we cannot even say about innovations; these are just some preliminary steps taken to that direction In case of 7 firms out of 10 linear approach to innovation was noticed, though generally the companies inspiration comes from environment. In two companies cross-team was noticed, in one company we can say about open innovation premise.
In the examined firms interactions with external actors in the innovation process occur from outside to inside. The adequate situation for the inside to outside model hadn't occurred.

7.1. Communication in innovation process

All the study participants underlined significant importance of communication for the successful innovation, however they mostly focused on the company's internal interactions.

Table 2. Communication barriers in innovation process

		Interaction in innovation process		
		Intra-team	Cross-team	Inter-firm
Innovation initiative	inside of the company	**Behaviour** • hierarchical structure deteriorates up-to-down communication • the accomplishment of running activities limits communication concerning long-lasting activities **Tools** • lack of instruments for market communication • lack of instruments for internal communication to work over projects	**Behaviour** • hierarchical structure deteriorates up- to- down communication	
	outside of the company	**Behaviour** • weak up-to-down communication, customer is not seen as a source of know-how in the innovation process • there is no rules concerning external communication **Tools** • lack of instruments for internal communication to work over projects • no idea banks **Quality** • too emotional communication • ineffective market communication	**Tools** • lack of structured marketing information system • no idea bank • no instruments to evaluate market communication **Quality** • ineffective market communication	**Behaviour** • weak up-to-down communication • communication is based on informal contacts **Tools** • no instruments for internal communication • no instruments for value presentation for customers **Quality** • information not adjusted to time and customers' needs and employees

Problems appeared in all the examined communication areas (Table 2). As it comes to communication behaviour research, the majority of companies reported the lack of communication- oriented innovation research. Since these are described to be non-standard activities, vertical communication fails while the linear one is informal and depends too much from the activity of individual employees.
Poor communication from down to up the organization destroys initiative of regular employees who are eager to submit own ideas. (A, C, E, G, H, J). There was also lack of defined rules of communication concerning working on new solutions (D, I). In the case of two companies (F, G) whose innovation process takes place within the intra team, respondents also noticed innovation barriers in perceiving customer; they are not seriously enough seen as a potential source of information or innovation ideas.
Information quality problem occurred in more than a half examined companies (B, F, G, H, I, J), but only these ones, whose source of information lays behind its own organization. The main weakness was associated with incompatibility of content and time of the transmitted information what had resulted from submission of running tasks over long-term ones. In the last examined field of communication instruments there revealed three problem categories, which cause innovation barriers. The first was the lack of information flow in companies. Informal contacts covered the gaps in current business activities but in case of innovation processes, which exceeded regular activities, such deficiencies in solutions were acute. Shortage of solutions affected information flow and consequently affected “loosing” information. Lack of system solutions influenced also the shortage of instruments, which were supposed to systematize companies’ internal communication. As a result, information is scattered and project work requires a constant need to meet personnel engaged in innovation.
The second problem of communication instruments was the lack of tools to management ideas. It concerns both idea banks and instruments allowing the evaluation of the new and implemented projects. Still, that information was related to certain employees but with no access for everyone engaged in the innovations. The final element of instrument sphere had a different nature, because it concerned from outside to inside model. Focusing on “producing” innovations causes communication challenges; communication concerning bringing these solutions to market fails. The companies’ employees neither had sales-skills, nor saw the need to employ experienced salespeople. They did not even think over cooperation with partners who could help in reaching customers.
There were numerous innovation barriers diagnosed which go beyond the issue discussed here. They mostly concerned the lack of development strategies and thus the role of innovation in development was not possible to evaluate.

8. Conclusions

Communication assures more or less specified environmental conditions for innovations.
By diagnosing communication barriers neither eradicate nor trigger innovative potential. It however determines new direction for changes in companies. Our deliberations help to understand the background of the discussed situation.
One might expect that internal communication in small enterprises shouldn’t cause any problems but displayed study results show that it is falling due to blurring responsibility tasks, lack of clearly defined division of tasks and coping with too many activities at one time. Frequent personal contacts don’t translate into smooth communication. It is however hard to expect communication with environment be effective without good internal communication, not to even mention implementation of open innovation ideas.
Communication with environment in the innovation process hardly appeared in the examined group. These enterprises totally “forgot” about an inside to outside innovation model. They didn’t recognize its environment as a network system, failed to see cooperation possibilities in the process of introducing innovations to market. They often experienced sales and promotion problems when trying to conduct these activities independently. It however still

didn't bring them to conclusion to look for cooperative partners. Probably it shows quite common in Poland aversion to cooperation and lack of confidence in business. These factors are the remnants of economic transition and slow down the pace of the open innovation implementation. Simultaneously, customer was often described as a source of the innovative inspiration. Such approach narrows the entrepreneur-oriented development where the entrepreneur or his collaborates serve as a source of innovations. Market innovations allow meeting customer's new needs but hardly appear to cross the expectations. Customers are thus not able to point out what can surprise them, because they usually focus on small improvements [29].

Gathered data indicates that inadequate quality of information became communication barrier only for those employees whose companies implemented interactions with external factors. Only when confronted with external entities one can understand disadvantages existing in the internal communication.

It is worth noticing that the majority commonly complained about the lack of supportive, structuring, network-based instruments to conceive communication. It is due to the fact that most of the examined companies perceive innovation as a process not related to current business activities. Consequently, communication barriers are connected to instruments, which help to standardize communication by entwining this process.

Conducted research emphasize the need to perform certain actions on three communication levels [12] as innovation facilitator:

- macro level: promotion of cooperation between companies in order to share resources and risks for example by explaining and tutoring cluster ideas, trade organizations or "*coopetition*"; trust reinforcement,
- meso level – implementation of tools and programs for institutionalized communication to create an understanding of innovations in interactions of organizations with stakeholders;
- micro level – building vertical and horizontal communication and strengthening the ideas of resource potential available in the relations beyond the company's boundaries.

Taking into account the above identified aspects and problems that enterprises encounter in the process of implementation of innovation, it is highly recommended to focus available, European organizational and financial support on programs and projects aimed at development of open innovations. In fact, it is expected that the future generation of EU funds for years 2014-2020, for instance Horizon 2020 SME's dedicated programme, will be even more innovation oriented and will promote an inclusive approach, development of stakeholders networks and open innovation platforms.

9. Limitations

There are two different kinds of limitations: substantive and methodical ones.

Substantive limitations concern innovation barriers research. Apart from the cognitive value there arises question concerning applying consequences of the limitations identification. If they were abolished, would innovation rise? Could however the existence of barriers release the energy to fight against odds and consequently search for finding new solutions, at least organizational and marketing ones?

Our deliberations were limited to SME in post-transition environment. That is why it should serve as a voice in discussion over innovation barriers and should also be carefully thought over before applied to different fields. The possibility to extend comments, limits the qualitative nature of the study and the size of the test group, chosen on the basis of self-selection.

The test diversification allowed apprehending the examined issue in a broader perspective but the lack of homogenous structure impedes forming conclusions. It is not known to what extent the study results reflect the specificity of the examined companies.

References

1. Europe Flagship Initiative. Innovation Union. European Commission Communication; 2010.
2. Cohesion Policy 2007-13: Poland. The European Commission; 2007 [January 24, 2013]; Available from: www.ec.europa.eu/regional_policy/atlas2007/fiche/pl_en.pdf.
3. Christensen JF, Olesen MH, Kjaer JS. Thei ndustrial dynamics of open innovation—evidence from the transformation of consumer electronics, ResearchPolicy. 2005;34:1533–49.
4. Chesbrough H, Vanhaverbeke W, West J. Open innovation: Researching a new paradigm. London: Oxford University Press; 2006.
5. Hadjimanolis A. Barriers to innovation for SMEs in a small less developed country. Technovation. 1999;19:561–70.
6. OECD. Science, Technology and Industry Scoreboard 2011: Innovation and Growth in Knowledge Economies.: OECD2011.
7. Hollanders, H., Es-Sadki, N. Innovation Union Scoreboard 2013. Brussels: European Union 2013.
8. EBRD. Law in transition online 2006, Focus on central Europe2006.
9. Gassmann O. Opening up the innovation process: towards an agenda. R&D Management. 2006;36[, 1996 #444]3):223–6.
10. Rogers EM. Diffusion of innovations. 5th ed. New York: Free Press; 2003.
11. Rothwell R. Towards the Fifth-generation Innovation Process. International Marketing Review. 1994;11(1):7-31.
12. Zerfass A, Huck S. Innovation, Communication, and Leadership: New Developments in Strategic Communication. International Journal of Strategic Communication. 2007;1(2):107–22
13. Chesbrough H. Open Innovation: The New Imperative for Creating and Profiting from Technology. Boston, MA: Harvard Business School Press 2003.
14. Chiaroni D, Chiesa V, Frattini F. The Open Innovation Journey: How firms dynamically implement the emerging innovation management paradigm. Technovation. 2011;31(1):34-43.
15. Rothwell R. External networking and innovation in small and medium size manufacturing firms in Europe. Technovation. 1991;11(2):93–112.
16. Van de Vrande V, Jong JPJ, Vanhaverbeke W, Rochemont MD. Open innovation in SMEs□: Trends , motives and management challenges. Technovation. 2009;29:423–37.
17. Grönroos C. The relationship marketing process: communication, interaction, dialogue, value. Journal of Business & Industrial Marketing. 2004;19(2):99-113.
18. Mohr J, Nevin J. Communication Strategies in Marketing Channels: A Theoretical Perspective. Journal of Marketing. 1990;54(4):36-51.
19. Ball D, Simões CP, Machás A. The role of communication and trust in explaining customer loyalty: An extension to the ECSI model. European Journal of Marketing. 2004;38(9/10):1272-93.
20. Mohr J, Spekman R. Characteristics of partnership success: partnership attributes, communication behavior and conflict resolution techniques. Strategic Management Journal. 1994;15.
21. Zerfass A, Sandhu S, Huck S. Innovationskommunikation – Strategisches Handlungsfeld für Corporate Communications. In: Bentele G, Piwinger M, Schönborn G, editors. Kommunikationsmanagement Neuwied, Germany: Luchterhand; 2004. p. 1–30.
22. Rothwell JD. In the Company of Others: an introduction to communication. New York: Oxford University Press; 2010.
23. Mohr J, Fisher R, Nevin J. Collaborative Communication in Interfirm Relationships: Moderating Effects of Integration and Control. Journal of Marketing. 1996;60(3):103-15.
24. Fischer C, Hartmanna M, Bavorova M, Heinrich H, Suvanto H, Viitaharjuc L, et al. Business Relationships and B2B Communication in Selected European Agri-food Chains – First Empirical Evidence. International Food and Agribusiness Management Review. 2008;11(2):73-100.
25. Low G, Mohr J. Factors Affecting the Use of Information in the Evaluation of Marketing Communications Productivity. Journal of the Academy of Marketing Science. 2001;29(1):70-88.
26. Eppler MJ. The Concept of Knowledge Communication and Its Relevance to Management. USI Research Note. Lugano: University of Lugano, Faculty of Communication Sciences.; 2005.
27. Bastic M. Success factors in transition countries. European Journal of Innovation Management. 2004;7(1):65-79.
28. Huxham C, Vangen S. Researching Organizational Practice Through Action Research: Case Studies and Design Choices. Organizational Research Methods. 2003;6(6):383-403.
29. Todorovic ZW, Ma J. Entrepreneurial and market orientation relationship to performance: The multicultural perspective. Journal of Enterprising Communities: People and Places in the Global Economy. 2008;2(1):21-36.

CO-CREATION: EXAMPLES AND LESSONS LEARNED FROM SOUTH-EAST EUROPE

Anja Orcik[1], Teodora Stojanova[2], Robert Freund[3]

[1]University of Novi Sad, Faculty of Technical Sciences, Trg Dositeja Obradovica 6, Novi Sad, Serbia, a.orcik@uns.ac.rs

[2]Ss. Cyril and Methodius University Skopje, Faculty of Mechanical Engineering, Karpos II bb, Skopje, Macedonia, stojanovat@gmail.com

[3]Finkenweg 6, D-35099 Burgwald, Germany, info@robertfreund.de

The purpose of this paper is to show examples of customer co-creation used by companies from South-East Europe (SEE) and define their most important characteristics. They are compared with the world's best practices through the framework that integrates four dimensions: customers' motives for co-creation, stage of product life cycle in which co-creation is initiated, co-creation types and platforms used for co-creation initiatives. The case study approach is used to reveal insights about the state-of-the-art in customer co-creation in SEE. The research includes studies of web-based content related to co-creation. The exploratory nature of the research means that the findings are tentative and need to be confirmed by quantitative large-scale studies. The overview of co-creation initiatives from SEE is given by highlighting the potential co-creation offers to SMEs and large enterprises. Although customer co-creation is known approach in the world, it is not commonly used by companies from the region. This study makes an original contribution by presenting lessons learned from examples of best co-creation practices in SEE. The results of the study provide management with guidelines for successful co-creation projects with an innovation- and market-oriented approach.

Keywords
Customer co-creation, Case study, Innovation potential, South-East Europe

1. Introduction

Over the years, the degree of customers' involvement in new product development is getting higher - from the customer left outside the creation of product value to product customization and, most recently, value co-creation. The information and communications technology, the Internet in particular, is forcing companies to think differently about value creation and to be more responsive to customers' experiences [1]. Nowadays perceptions and opinions about products and services are being shaped real time among customers via social networks, virtual communities, chat rooms and the ubiquitous instant messaging. The role of the individual customer is becoming more important and companies have to form close relationships with them in order to understand their needs and incorporating those needs in their product and/or service offering [2]. Companies need to invent new competences and business practices in order to engage their customers in value co-creation processes [3].

According to Vargo et al. (2008), value is always co-created, jointly and reciprocally, in interactions among providers and beneficiaries through the integration of resources and application of competences [4]. Customer perceived value is considered fundamental to

company's competitive advantage [5]. Customers' needs, experience and knowledge are crucial for the process of joint value creation with customers and other stakeholders in the integrated value network. In this view, innovation can be defined as a co-creation process within social and technological networks in which actors integrate their resources to create mutual value [6]. Doing innovation with customers rather than just for customers can help shift value creation and business concepts away from the product towards holistic solutions, as well as strengthening service provision and non-material values [7].

The purpose of this paper is to show examples of co-creation used by companies from South-East Europe and compare them to world's best co-creation initiatives. The study, based on framework that integrates four dimensions, makes an original contribution by identifying weaknesses and introducing potentials of customer co-creation in South-East Europe.

2. Framework

In this section the four dimensional framework is presented. It is used in this study to analyze the available evidence about customer co-creation practices according to customers' motives for co-creation, stage of product life cycle in which co-creation is initiated, co-creation types and co-creation platforms.

2.1 Motives for co-creation

There are numerous benefits that come from co-creation, but how to engage and motivate customers to get involved in this process? Fueller (2010) was dealing with motives for co-creation. He named six motivation factors for customers' involvement into co-creation processes: curiosity, dissatisfaction with existing products, intrinsic interest in innovation, gaining knowledge, showing ideas, and monetary awards. This motive structure was the basis for the distinction of four customer types [8]: (1) reward-oriented customers, (2) intrinsically interested customers, (3) curiosity-driven customers, and (4) need-driven customers. *Reward-oriented customers* are highly motivated to get engaged in co-creation. Their motivation is driven by monetary awards, and very little by their interest in innovation and gaining knowledge. *Intrinsically interested customers* are highly motivated by their interest in innovation activities. There are very skilled novelty seekers, who like problem solving. Monetary award is not so important for them. *Curiosity-driven customers* are highly involved in co-creation, although they usually had little previous innovation experience. They are curious about the process and its result. *Need-driven customers* participate in co-creation because they are not satisfied with the current products/services on the market. They are highly demanding and very interested to adapt existing offer to their own needs.

2.2 Co-creation throughout the product lifecycle

Focusing on radical and incremental innovations, it can be proposed that levels of co-creation are connected to different levels of innovation activities throughout the product lifecycle [9]. The first stage of the product lifecycle is *product development*. It includes radical innovation processes in which customers are usually not involved, because these innovations are based on unarticulated customer requirements. However, companies can engage field experts and lead users into co-creation, who are found through active selection processes, or establish collaboration through idea and knowledge sharing with their partners. *The introduction and growth stage* are characterized by the high-level of co-creation in the continuous product improvements usually through online communities and crowdsourcing. Incremental innovations can help extend life and drive differentiation and growth, by adding

minor features and functionality to create greater variation and options, and adapting existing technology to create the "next iteration" of products [10]. In the fourth stage, *maturity*, the sales growth slows down, they reach their highest point, new competition appears and innovation pace decreases. Companies have to focus promotion activities on the differentiation and draw the customers' attention on their product. Co-creation in the maturity stage is used as marketing initiative. In this way, they companies maintain their product on the market, until it becomes saturated and the sales and the profit begin to *decline*, because all possible products improvements are made and there is low level of co-creation. Other scenario is that companies focus again their research activities on radical innovations to create the *product extension*. The product enters its another cycle and has its new market introduction and growth, where again co-creation activities in product improvement take place.

2.3 Types of co-creation

Frontier Strategy has defined four types of co-creation (Figure 1) based on two criteria: openness and ownership. Initiators of the co-creation process determine if anyone can join the process or there is a selection process. On the other hand, the ownership on the co-creation outcome has to be defined – owners are just the initiators or initiators and contributors. These types of co-creation are [11]: (1) club of experts, (2) coalition of parties, (3) crowd of people, and (4) community of kindred spirits. The first two types are related to the co-creation of breakthrough solutions, when experts' knowledge and skills are needed. Another two types are related to the co-creation of product or service improvements and ideas of all customers are welcome.

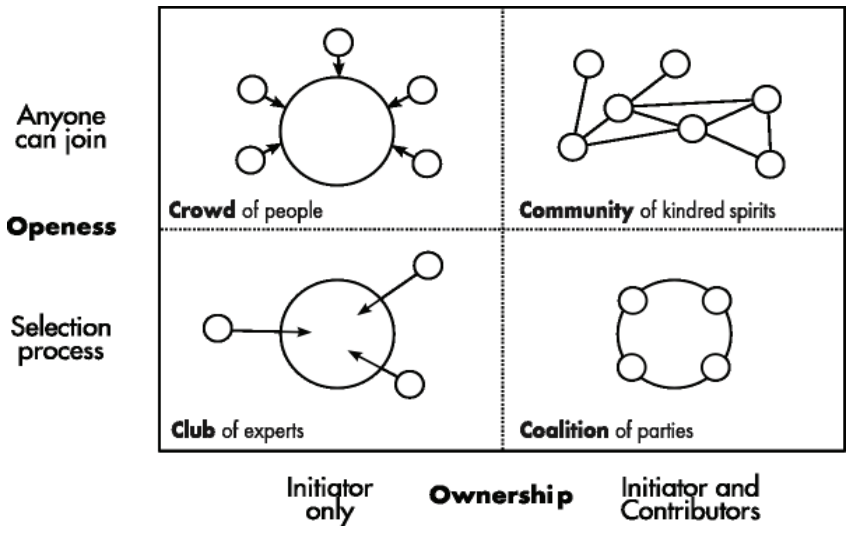


Figure 1 Four types of co-creation [11]

Club of experts is a type of co-creation suitable for radical innovations and breakthrough ideas. There is selection process to involve lead users and experts who meet certain specific participation criteria. Contributors who think "out-of-the-box" are crucial for the success of this kind of co-creation projects. World examples of this co-creation type are Jeppesen Sanderson Inc. (Co-creation award for 2012), Philips co-creation expert team, living labs (Amsterdam living lab, Flemish living lab, etc.). *Coalition of parties* represents collaboration between organizations that share their expertise, knowledge and skills in order to create a common competitive advantage. Multiple parties often collaborate to achieve technical breakthroughs or to reach a specific goal. World examples of this co-creation type are Nike+ (partnership between Nike and Apple), Common Platform (IBM, Globalfoundries and Samsung

Electronics), CityNet (Asia-Pacific local government network), etc. *Crowd of people* is a type of co-creation also known as "crowdsourcing". It is based on online co-creation platforms, where people can suggest their ideas, vote for other suggestions and propose their potential improvements. Its goal is to find the best solution, and generate the pool of ideas for the future development activities. A marketing objective is often linked to this type of co-creation (e.g. Coca-Cola's competition - Energizing Refreshment of Coke, My Starbucks Idea, Henkel Adhesive Packaging Design Contest, etc.). *Community of kindred spirits* is a group of people with similar interests and goals, who want to create together something for greater good. This type of co-creation usually integrates people with certain level of expertise in the field of interest. These communities are widespread in the world in the field of software and automobile development (Linux, Opel's Car Design Contest, Local Motors, BMW Co-Creation Lab, etc.).

2.4 Co-creation platforms

Companies have to empower and challenge customers to create ideas and solutions by themselves, providing them with social networks, forums, blogs, idea competitions, workshops, consumer opinion platforms, innovation toolkits or communities for social product development [12]. Idea competitions are usually supported by social networks (e.g. Facebook), companies' own platforms (e.g. My Starbucks Idea) or co-creation communities (e.g. eYeka). To gather people with similar interest and expertise who want to collaborate and co-create a solution that is of greater good, companies develop specific co-creation platforms that provide necessary innovation toolkits. On the other hand, radical innovation processes are usually managed offline, in idea or living labs. The largest possibility to come to breakthrough ideas is in close collaboration in the team of experts, through exchange of experience and competences.

3. Methodology

To reveal insights about the state-of-the-art in customer co-creation in SEE the case study approach is used. The research includes studies of web-based content related to customer co-creation. Authors have used the following key words in the internet search: customer co-creation, creative competition, design contest, idea sharing, etc. The research is focused on Serbian, Macedonian, Croatian, Bosnian and Montenegrin co-creation examples, because of the language barrier with other countries of SEE. The nature of the research is exploratory and qualitative, and the findings are tentative and need to be confirmed by quantitative large-scale studies.

4. Co-creation cases from South-East Europe

Based on the case study approach, this section provides the insights about the state-of-the-art in customer co-creation in five countries of South-East Europe.

Milk and yoghurt packaging. Imlek is a large food company from Serbia, specialized in processing milk and dairy products. One of its most recognizable brands is *Moja kravica*, with well known little cow on milk and yoghurt packaging. In order to refresh the packaging with new design, Imlek had to gather customers' ideas to get some feedback from the market. The company has challenged its customers to design their own personalized cow and send their designs. Considering that more than 67,600 people have "liked" this brand on Facebook, this social network has been used as a platform for this contest. Anyone could participate by submitting their own designs or by voting for them.

Car souvenirs. Company Fiat Automobiles Serbia and Cultural Centre of Belgrade started a design contest in 2012. They offered awards for best design ideas of four car souvenirs – T-shorts, magnets, key tags and car fresheners. The design topic was Fiat 500L - Proudly made in Serbia and anyone could participate this creative contest. In January 2013, thirty-five most creative solutions were represented in the Cultural Centre of Belgrade. The winner has the opportunity to visit Centro Stile design center in Turin, Italy [13]. Through this contest, the company and the brand Fiat 500L drawn the attention of customers and involved them into value co-creation process.

Great cooking adventure. In April 2011 Chipsy, a crisps producer from Serbia, started with competition named "Which one is your Chipsy flavour?". In the period from 1st of April to 15th of June, the company collected more than 120.000 creative proposals. Customers could participate also by voting over sms and web-site for their favorite and best flavour. Three new flavours were selected and produced in 2012 [14]. This co-creation competition was followed by great marketing campaign, focused on enhancing the brand, making it closer to customers and making it more attractive to new ones. Anyone could join this competition by sharing their creative proposals and be the one from the crowd of people who would be the creator of new Chipsy flavor.

Figure 2 Co-creation cases from Serbia

Communications. Makedonski Telekom and T-Mobile are the biggest companies in communication industry in Macedonia. In 2012, these companies organized Innovation Partner Competition in order to invite other companies or private individuals regardless of what country they come from, to join them in building better future through advanced connected life and work [15]. Participants were given the opportunity to develop new ideas and concepts mainly focusing on three categories: interactive media applications, e-government application and services, and social networks and mobility. Creators of the winning projects got a chance to play a direct role in furthering the communications of the future in partnership with Makedonski Telekom and T-Mobile Macedonia, and along with it - experience, implementation support and reputation.

Logo design. Youth Entrepreneurial Service (YES) Foundation (Macedonia) with its main component, business incubator for supporting micro, small and medium enterprises in the ICT field, offers the access to services for accelerating their growth and development [16]. In 2012, the foundation organized a competition for most creative logo for the web site pretpriemac.mk. Designs were submitted by e-mail and the best ones were uploaded on Facebook page for voting. Anyone who was interested to participate learned more about this foundation and shared their ideas. Through this kind of co-creation, this foundation succeeded to turn the attention of young people towards entrepreneurship and innovation [17]. The best design is approved as the logo of the web site and also awarded by YES Foundation.

New ice-cream taste. Ledo is the biggest Croatian ice-cream and frozen food producer. In 2012, this company made a platform for co-creation of the new ice-cream called "Ledonardo". Customers made different combinations of more than fifty tastes and aromas, and had the possibility to choose from four different ice-cream shapes. Ice-creams were

evaluated by customers and the jury. At the end of the contest, in addition to the most popular ice-cream, the company had the valuable statistics that showed that the taste of the chocolate (chosen 27,702 times) and that the shape called "dream-come-true" (chosen 15,422 times) are the favorite ones [18]. The winning ice-cream is planned to be produced and integrated "voices of the customers" this co-creation contest will represent the inspiration for future products. In this way, company Ledo engaged the crowd of people in the co-creation of new ice-cream, while increasing their devotion to this brand, strengthening customers' loyalty, as well as, attracting potential customers to its products.

Fan photo. FC Sarajevo invited their fans to participate in a creative contest. Fans, who have the membership of this football club, could participate by sending their photos, where they, with their friends or family, wear or hold items from FC Sarajevo Fan Shop. The winner was chosen in accordance with the number of "likes" on their official Facebook page. The award for three best photos is half-year ticket for season 2012/2013 [19]. This contest is focused on a crowd of people, who are fans of this football club and who are already or potential customers of FC Sarajevo Fan Shop. Its goal is to enhance the affiliation to this club, by challenging people to express their feeling and devotion through a photo.

T-Shirt design. In 2012, brewery Trebjesa from Niksic, Montenegro, organized a creative contest called "What kind of artist are you?". Participants were challenged to design a Niksicko beer T-shirt with the focus on socializing or music. This contest was organized on brand's official Facebook page and anyone who was interested could participate. Three best designs were awarded iPad3 tablet, iPhone 4 and iPod Touch, and the best design is going to be the official Niksicko beer T-shirt [20]. This co-creation contest involved people who share their preferences towards this beer brand and who have professional or amateur experience in design.

5. Lessons learned

According to the characteristics of co-creation examples from SEE (Table 1), there are certain lessons to be learned related to motives for co-creation, stage of product life cycle in which co-creation is initiated, co-creation types and platforms used for co-creation initiatives.

Table 1 Characteristics of co-creation examples from SEE

Example	Motives	PLC stage	Type	Platform
Milk and yoghurt packaging	Reward, Curiosity	Maturity	Crowd of people	Facebook
Car souvenirs	Reward, Curiosity	Introduction	Crowd of people	e-mail
Great cooking adventure	Reward, Curiosity	Maturity	Crowd of people	company's web platform
Communications	Innovation, Reward	Growth	Crowd of people	e-mail
Logo design	Reward, Curiosity	Maturity	Crowd of people	e-mail and Facebook
New ice-cream taste	Reward, Curiosity	Maturity	Crowd of people	company's web platform
Fan photo	Reward, Curiosity	Maturity	Crowd of people	Facebook
T-Shirt design	Reward, Curiosity	Maturity	Crowd of people	Facebook

5.1 Lesson 1: Motives for co-creation in SEE

Co-creation initiatives in SEE countries are usually in the form of contest, where companies offer reward for the winning solution. These awards are not only financial but very often in-kind. It seems that customers who get involved in these contests are highly motivated with the prize they will possibly get and usually curious about the co-creation and the final result. On the other hand, authors have found only one example of co-creation initiatives focused on developing new solutions. The need for better and different products or services could not be tracked as a motive for co-creation. Intrinsically interested and need-driven customers like to innovate and see problems as challenges. They see lacks of the market offer and find ways to improve it, while monetary awards are not so important for them. Future co-creation initiatives of the companies from SEE should be primarily focused on these types of customers in value co-creation. However, in order to have greater customers' response to co-creation, but still have the high quality input, companies should make their co-creation initiatives attractive and balance motives according to customers in focus.

5.2 Lesson 2: Co-creation in product life cycle

Companies from SEE region usually use co-creation as a marketing strategy. They start with their co-creation initiatives when their products are in the maturity stage and need high level of promotion activities to remain attractive for customers. Customers know the products very well and they are challenged to join to fun co-creation process and share their creative ideas for certain incremental changes. There are no examples of co-creation that is used to develop products at the beginning of their life cycle or to improve them in their introduction and growth stage. It seems that companies do not see nor understand potential to develop new products using co-creation. Companies from SEE should focus on the co-creation of completely new products with lead-users and field experts, as well as to involve customers into product improvement after their introduction to the market. Customers co-creation should be based on real collaboration among them, by challenging them to work together on a specific solution.

5.3 Lesson 3: Types of co-creation in SEE

It can be noticed that all co-creation examples represented in the previous section belong to the "crowd of people" co-creation type. These are usually creative contests organized to collect large number of ideas from people who are motivated almost only by promised reward and fun. However, even though there are no selection criteria for participation, authors could not find any online example of the "community of kindred spirits" co-creation type originally started in one of the SEE countries. Potentials for this type of co-creation can be seen on the example of Wikipedia, originally started in the United States. People from SEE co-create and give their contribution to the development of Wikipedia in their languages. There are 3094 active contributors from Turkey, 1020 from Bulgaria, 963 from Greece, 869 from Serbia, 647 from Croatia, 275 from Albania, 269 from Macedonia and 197 from Bosnia Herzegovina [21]. However, this co-creation practice is imported and it is a part of global initiative. There is a question to be asked – Does the lack of communities of kindred spirits in SEE can be connected with unreadiness of people from this region to work without wage for greater goals? In addition, clubs of experts and coalition of parties, usually offline initiatives that gather carefully selected contributors in the co-creation process, are not widespread in SEE either. Quality input and competence sharing are crucial for new product development processes. SEE has the unused potential for breakthrough innovations, whether through living labs or through strategic coalitions between partners with needed expertise. As it can be seen on the Figure 3. the concept of living labs in SEE region is not spread as in the rest of the continent.

Figure 3 Living labs in South-East Europe [22]

5.4 Lesson 4: Co-creation platforms in SEE

The internet, especially social networking, offers a rich context in which to analyze customers' resource integration activities independent of service providers. As it can be seen, most of the co-creation competitions in South-East Europe are supported by Facebook social network. Facebook is not specialized co-creation platform, but it has more than a billion monthly active users as of December 2012, and 618 million daily active users on average in December 2012 [23]. Companies' own co-creation platforms are another way to reach the crowd of people and challenge them to share their ideas. Companies develop them to be more attractive for customers and offer some creative tools. However, there are some companies that use just e-mail as a channel for idea submission. There is a large potential to improve co-creation in SEE region by creating co-creation communities, that will integrate all creative contests in a certain country and gather people who are willing to create new things and share their ideas. On the other hand, companies should have in mind the power of specialized co-creation platforms with toolkits that enable people to innovate and work together on solution development. This kind of platforms gather people with similar interests and expertise that is crucial for building a co-creation community in a specific field of product or service development.

6. Conclusion

This paper reviews the examples of co-creation in South-East Europe through the framework that integrates four dimensions: customers' motives for co-creation, stage of product life cycle in which co-creation is initiated, co-creation types and platforms used for co-creation initiatives. According to these dimensions, authors have represented lessons learned from co-creation practices in SEE. Companies from this region use co-creation usually as a marketing strategy in the maturity stage of the product life cycle to draw attention of their customers. With the conclusion that the most common kind of co-creation in the SEE countries are co-creation contests, focused on gathering ideas from the crowd of people motivated primarily by reward, companies from this region should turn their focus to other co-creation types. Establishing the "community of kindred spirits" has tremendous potential for any kind of product and service development, while it gathers large number of customers with similar interests and expertise, who work together and co-create solutions. On the other hand, co-

creation with carefully selected contributors, such as field experts and coalition partners, should be the focus of these companies for breakthrough innovations, while customers are usually not visionary and cannot realize their need unless they had the first-hand experience.

Global Innovation Index 2012 [24] just confirms that South-East Europe is characterized by low innovation performance in comparison to EU countries. One way to recompense this lag is the adopting co-creation practice and involving customers earlier in the product and service development process. Co-creation as a powerful engine for innovation, through cumulating customers' knowledge, creativity and experience, increases value for customers and their devotion to a certain brand. The emergence of social media, Web 2.0 and living labs has empowered customers to communicate their ideas and become equal partners in product and service development. On the other side, there are companies that are now able to reach to creative individuals and co-create innovative products and service with them.

References

1 Prahalad C. K., Ramaswamy V. Co-creating unique value with customers. Strategy & Leadership 2004; 32 (3), 4-9.
2 Mukhtar M., Nazul Ismail M., Yahya, Y. A hierarchical classification of co-creation models and techniques to aid in product or service design. Computers in Industry 2012; 63, 289–297.
3 Ramaswamy, V. Co-creating value through customers' experiences: the Nike case. Strategy & Leadership 2008; 36 (5), 9 – 14.
4 Vargo S. L., Maglio P. P., Akaka, M. On value and value co-creation: a service systems and service logic perspective. European Management Journal 2008; Vol. 26, pp. 145-52.
5 Aarikka-Stenroos L., Jaakkola, E. Value co-creation in knowledge intensive business services: A dyadic perspective on the joint problem solving process. Industrial Marketing Management 2012; 41, 15–26.
6 Russo-Spena T., Mele, C. "Five Co-s" in innovating: a practice-based view. Journal of Service Management 2012; 23 (4), 527-553.
7 Rahbek K. Co-creation makes demands on the organisation. Copenhagen co'creation: Designing for change 2009.
8 Fueller J. Refining Virtual Co-Creation from a Consumer Perspective. California Management Review 2010; 52 (2), 98-122.
9 Orcik A., Tekic Z., Anisic, Z. Customer Co-Creation throughout the Product Life Cycle. International Journal of Industrial Engineering and Management 2013; 4 (1), 43 – 49.
10 Kaplan S. Innovation Lifecycles: Leveraging market, technology, and organizational S-curves to drive breakthrough growth. www.innovation-point.com/Innovation_Lifecycles.pdf 2012 December
11 Pater M. The 5 guiding principles of co-creation. Fronteer Strategy 2009, Amsterdam.
12 Piller F., Vossen C., Ihl C. From social media to social product development: The impact of social media on co-creation of innovation. Die Unternehmung 2012, 66 (1), 7-27.
13 Automagazin. Proudly made in Serbia – kreativni konkurs. http://www.automagazin.rs /vesti/1/12627/zavrsen-kreativni-konkurs-proudly-made-in-serbia 2012 December
14 Chipsy. Velika Chipsy kulinarska avantura. http://www.chipsyukusi.com/nagrade.html 2012 December
15 Telekom. Innovation partners. http://www.telekom.mk/mk/?z=1296 2012 December
16 YES. Foundation. http://www.yesincubator.org.mk/Default.aspx?r=6&l=63&c=22 2012 December
17 Nagradni igri. Kreativni logo. http://www.nagradniigri.com.mk/index.php/arhiva/686-pretpriemacnagradna 2012 December
18 Ledo. Ledonardo. http://www.ledonardo.hr 2013 January
19 Nagradne igre. Bordo ljeto. http://nagrade.ba/index.php/arhiva/157-bordo-ljeto 2013 December
20 Niksicko pivo. Kakav si umjetnik? http://www.niksickopivo.com/ 2013 January
21 Wikipedia. Statistics. http://wikistats.wmflabs.org/display.php?t=wp 2013 February
22 The European Network of Living Labs (EnoLL). http://www.openlivinglabs.eu 2012 December
23 Facebook. Company Info. newsroom.fb.com 2013 January
24 Global Innovation Index. Global Innovation Index 2012 Ranking. http://globalinnovationindex.org /gii/main/fullreport/files/Global%20Innovation%20Index%202012.pdf 2013 January

IMPORTANCE OF DIRECT AND INDIRECT SALES CHANNEL IN MODERN BUSINESS OF A BH LEASING COMPANY

Saša Vujić, Ph.d[1], Slobodan Vujić Ph.d [2], Aida Abduzaimović [3]

[1]University "Vitez" Travnik, Bosnia and Herzegovina, Školska 23, 72270 Travnik, sasa.vujic@unvi.edu.ba, +387 61 183 410, vujic.sasa1@gmail.com

[2]University "Vitez" Travnik, Bosnia and Herzegovina, Školska 23, 72270 Travnik

slobodan.vujic@unvi.edu.ba, +387 61 488 998, VB Leasing BH, Direktor

Fra Anđela Zvizdovića 1, 71000 Sarajevo, slobodan.vujic@vbleasing.ba

[3]University "VITEZ" Travnik, Bosnia and Herzegovina, Školska 23, 72270 Travnik, aida.abduzaimovic@unvi.edu.ba

ABSTRACT

The paper is aimed at analyzing the leasing company relationship with end customers of leasing service, and the relation impact on the volume of leasing service sales. The paper points to the significance of direct and indirect sales channel in modern business, where permanent innovation in relations with leasing service end customers gain en exceptional significance when the customer makes the final decision to agree to use the leasing service.

A specific of leasing service is reflected in resolving the issue of financing. The sales of lease is typically made through the indirect sales channel, The paper is aimed at providing the answer to the question as to how much the innovation in the methods of leasing service sales affect the sales of these services using indirect and direct sales channels. The leasing company must answer the question as to what will stimulate the customer to buy a product through their leasing company when at the same time a number of similar or same products are offered by other leasing houses as well. From this aspect, raising the level of service quality is a basis for creating long-term bonds with clients, which is the only way to achieve the planned business results, and continuous efficiency of operation over the years.

The study will use primary research with leasing service users. Scientific analysis will establish which factors these are and what their impact is on the overall image of the leasing company.

Key words:
Direct and indirect sales channel, image factors, image management, leasing leasing service sales.

1. Introduction

The leasing business has been known for years across the world, While in B-H it has been developing only over the past seven to eight years. The first specialized leasing company was established in 1952 in the USA, while Europe saw the development a dozen years after the USA. In 2012, the volume of leasing business in B-H is decreasing compared to previous years, and reaches the volume of about 158 million KM (Information about leasing sector in B-H, 2012) (1).

'Leasing' is an English word and implies renting, granting the temporary possession or use of. Leasing can be defined as a contractual relationship between two parties, the user and the owner of asset which is the subject of the leasing package, whereby the user (lessee) acquires the right to use the assets and at the same time is bound to make a series of monthly payments to the owner (lessor), i.e. the leasing company during the lease term. When the lease term has expired, the lessee returns the asset to the leasing company, or can buy it out upon a different agreement, or make a new leasing contract and continue to use the asset in a new agreement term, paying the agreed compensation.

"From the economic viewpoint, leasing is a special financing technique which has, over the past thirty years, developed into a fairly strong economic activity. Leasing as a financing mechanism implies the trade in product where the user buys the right to use the given good by paying a given periodical price. It a actually rent, i.e. leasing is a form of renting the given product. The leasing subjects may include technological equipment, machinery, medium-term assets, and various kinds of durable consumer goods." (2 Backović, 1997.) (2)

2. Leasing service sales channels

Two channels are present in the leasing service sales: direct and indirect sales channel. The direct leasing service sales channel implies that the leasing service is directly offered and sold by a leasing company to the end customer. The indirect leasing service sales channel implies that the leasing service sales is made indirectly, through a dealer, who is typically a retailer and who sells certain machinery, equipment, cars, etc. However, the sales is accompanied by the sales of leasing services.

The basic problem in leasing service sales is how to make one's offer accessible to target customers. The number of target and potential customers is fairly large, which makes the sales organization considerably more complex. The ways of leasing service sales, as stated, include direct and indirect channels, whereby the indirect sales channel is more frequent. Starting from the way of sales in the indirect sales channel, problems in sales arise. In the indirect sales channel one can witness a fairly "passive" way of selling leasing services, where the seller usually waits for the potential customer to come of his own and ask for a leasing service.

For leasing companies, there are two sales channels (ways), as well as a larger number of participants, which results in complex conditions and the necessity to qualitatively and quantitatively define impacts in sales channels, in order to increase the volume of leasing service sales through an efficient corporate marketing strategy.

The following participants appear in the leasing service sales channels:

- manufacturer of the leased property (cars, freight trucks, cranes, construction machinery, manufacturing machinery and equipment, etc.),

- merchants (dealers), who sell leased property,
- customers – legal persons (registered companies) – lessees,
- customers – natural persons (citizens, individuals) – lessees,
- leasing companies – lessors.

2.1 Direct leasing service sales channel

The direct channel of leasing service sales is one where the leasing company offers and sells leasing services directly to the end customer. Only two participants appear in this channel: seller as the leasing company and end customer, who can be either a legal or natural person, but without participation of a dealer.

In the direct sales channel, direct contacts between the leasing company and potential leasing service buyer are established. This channel is extremely important for the leasing company since through direct communication it can better present its offer, eliminate ambiguities, adjust to customers' requirements and achieve higher efficiency in sales. However, the direct sales channel has a limited power of action since it is practical only in larger customers, for which it can be assumed that they want to use the leasing system when purchasing equipment.

For the needs of this paper, primary research was conducted in 7 leasing companies, out of the total of seven registered leasing companies in BH. The volume of collected primary data is fairly large, and was useful for reaching appropriate conclusions. The survey, i.e. questionnaire methodology was used in the stage of data collection.

To the question about the importance of direct sales channel (Table 1), the surveyed leasing companies provided the following gradations for the direct sales channel:[1]

Table 1 Importance of sales channel[2]

No.	RESPONSES	DIRECT SALES CHANNEL	
		NUMBER	SHARE
1.	UNIMPORTANT	1	14.3%
2.	SOMEWHAT IMPORTANT	2	28.6%
3.	IMPORTANT	1	14.3%
4.	VERY IMPORTANT	1	14.3%
5.	EXTREMELY IMPORTANT	2	28.6%
	TOTAL	7	100%

The previous chart reveals that a certain number of leasing companies does not use the system of sales through the direct channel at all, and claim that it is unimportant (14.3.%), or

[1] *Vujić S.(2012)*.own research, . Importance of sales channels
[2] Responses to this questionnaire were provided by leasing companies

somewhat important (28.6%), while all the other leasing companies claim that it is important (14.3%), very important (14.3%), and extremely important (28.6%).

Leasing companies provided similar responses to the question as to what advantage they attach to the direct sales channel [3] (Table 2) compared to the indirect sales channel:

Table 2 Which channel do you give preference to

No.	RESPONSES	DIRECT SALES CHANNEL		INDIRECT SALES CHANNEL	
		NUMBER	SHARE	NUMBER	SHARE
1.	MINIMUM PREFERENCE	1	14.3%	0	0.0%
2.	SIGNIFICANT PREFERENCE	4	57.1%	2	28.6%
3.	VERY HIGH PREFERENCE	2	28.6%	5	71.4%
	TOTAL	7	100%	7	100%

For the assessment of the importance of direct sales channel, a great attention should be paid to primary research indicators ranking individual elements related to the direct sales channel.[4] As the most important elements related to the direct sales channel, the respondents (leasing companies) single out:

1. direct communication with customers,
2. visits to customers,
3. fast customer's response,
4. removing customer's dilemmas,
5. explaining the advantages of leasing service,
6. interactive relationship,
7. better explanation of the offer.

However, the respondents claim that communication with customers by mail (letters) or over the phone is less important in the direct sales channel.

2.2 Indirect leasing service sales channel

The indirect leasing service sales channel proceeds through a dealer. In this variant, the sales of leasing service on behalf and on the account of a leasing company is made by a dealer, typically a retailer. Such a dealer gives priority to the sales of machinery, equipment, cars etc., while selling the leasing service as a complementary sale.

In the Primary research, the question about the importance of indirect leasing service sales channel (Table 3) resulted in the following gradations for the indirect sales channel:[5]

[3] *Vujić S.(2012)*.own research, Which channel do you give preference to
[4] *Vujić S.(2012)*. own research, Importance of individual elemenst related to direct sales channel
[5] *Vujić S.(2012)*. own research, Importance of sales channel

Table 3 Importance of sales channel

No	RESPONSES	INDIRECT SALES CHANNEL	
		NUMBER	SHARE
1.	UNIMPORTANT	0	0.0%
2.	SOMEWHAT IMPORTANT	0	0.0%
3.	IMPORTANT	0	0.0%
4.	VERY IMPORTANT	4	57.1%
5.	EXTREMELY IMPORTANT	3	42.8%
	TOTAL	7	100%

The responses above indicate that all the surveyed leasing companies attach a special importance to the indirect sales channel, whereby as many as 57.1% point out that this channel is very important, and 42.8% that it is extremely important. On the contrary, no leasing company claims that the indirect leasing service channel is unimportant, somewhat important or even important. Most leasing companies give greater preference to the indirect sales channel[6] compared to direct sales channel.

From the aspect of significance of individual elements related to the indirect sales channel, the respondents ranked elements by significance as follows:[7]

- advertising material,
- fast application processing,
- resolving conflicts in distribution channel,
- training of participants in the channel,
- good cooperation with participants,
- participants' stimulation, and
- place of providing leasing service.

When developing the corporate marketing strategy, companies should take into account the previously described significance of individual elements for the indirect sales channel.

3. Relations with end customers

For a leasing company, it is extremely significant to establish, nourish and develop relations with final leasing service customers. The role of leasing service sellers in also significant, particularly in the direct personal sales, which can gain more extent and expertise, since the leasing service seller both contacts the customer's purchasing officer and gets involved with other experts on the customer's side, those in the area of finance, accounting and law. "They are faced with aggressive, competitive sales representatives, have an inferior status compared to the customers, frequently do not have authority to do what is necessary to

[6] *Vujić S.(2012)*.own research, . Which channel do you give preference to
[7] *Vujić S.(2012)*.own research, Significance of individual elements related to indirect sales channel

attract the customer, and it sometimes happen that they loose large orders they took so much trouble about." (W.Verbere & R.Bagozzi, 2000, p.88) (4) Prof. Kotler points out that, "By means of various approaches and sales training, the seller is transformed from a passive person that takes orders, into an active person who receives orders and participates in resolving customers' problems. An active seller who receives orders learns how to listen and research, in order to be ale to identify customers' needs and reach good solutions. He starts from the assumption that the customer has latent needs, which actually generate possibilities, and that they will be loyal to those sales representatives who can analyze their needs and who are primarily interested in a long-term mutual interest (P.Kotler, 2006, p.625 – 626) (5)

For the paper needs, primary research was conducted among end customers. A total of 446 questionnaires were returned by end customers, who included:

- 274 natural persons as customers,
- 141 legal persons as customers through the indirect sales channel, and
- 31 legal persons as customers through the direct sales channel.

The sample size corresponds to research goals, and responses can be considered relevant for the analysis of end leasing service customers. The primary data were collected for four groups of questions:

- customers' satisfaction with the cooperation with the leasing company,
- importance of individual elements for customers,
- satisfaction with the leasing company sales force, and
- satisfaction with other elements of leasing company marketing.

3.1 Customers' satisfaction with the cooperation with the leasing company

End leasing service customers are satisfied with the kinds of leasing service packages: a total of 91.5% respondents expressed positive satisfaction (satisfied, very satisfied and extremely satisfied), while only 8.5% expressed negative satisfaction (very dissatisfied and dissatisfied).

Responses to the second question, how satisfied are you with the speed of processing applications, are similar to those to the first question. As many as 8.7% are positively satisfied with the speed of application processing, while 10.3% are not satisfied with the speed of application processing. In the positive satisfaction group, the extreme satisfaction prevails with 43.3%, followed by 'very satisfied' – 29.6%m and 16.8% satisfied.

In the third question, related to the flexibility of offer, customers also revealed satisfaction – with 94.4%, although there are 5.6% who are dissatisfied.

The fourth question, pertaining to the simplicity of forms points to the high degree of customer satisfaction – 100%, and there were no responses that customers are dissatisfied with the simplicity of forms. A total of 36.7% respondents is extremely satisfied, 42.2% are very satisfied, while 21.1% are satisfied with simple forms.

In the fifth question as well, that about the term of payment, customers are satisfied – 90.4%m while 9.6% are dissatisfied. By structure, 33.6% customers are extremely satisfied with the term of payment, 45.1% are very satisfied and 11.7% satisfied.

The last, sixth question, which pertained to satisfaction with the kind of collateral, revealed the dispersion of responses: very dissatisfied 16.4%, dissatisfied 18.8%, satisfied 23.5%, very satisfied 20.9%, and extremely satisfied 20.4%. It can be seen that positive satisfaction is represented with 64.8% and negative – with 35.2%.

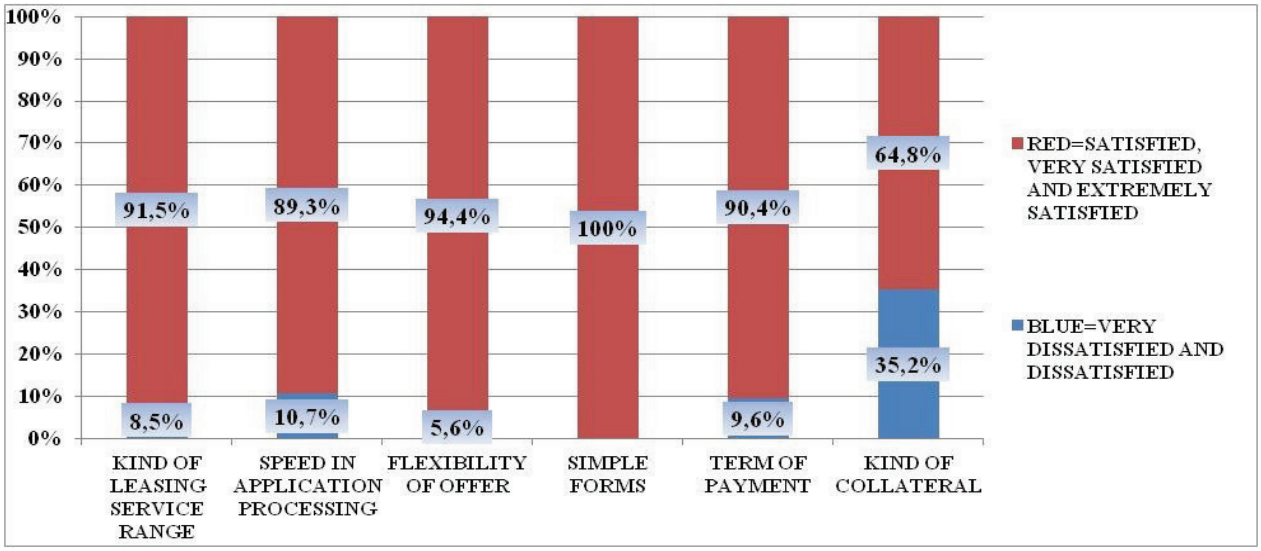


Figure 1 End customers' satisfaction with leasing companies (Vujic S.2012).

3.2 Importance of individual elements for customers

Primary research presented customers with five elements as important for leasing company relations with end customers, and respondents were supposed to make the gradation of their importance into: unimportant, somewhat important, important, very important, and extremely important.

To the first question, the importance of direct communication, only 3.4% out of 446 responses pointed out that it is somewhat important, while all the others – 96.6% pointed to the importance of this element, by the following gradation: 47.3% claimed that it is important, 37.0% that it is very important, and 12.3% that it is extremely important.

To the other question, which pertained to the simplicity of acquiring the desired equipment, 100% customers responded that it is important, very important or extremely important, while no customer responded that this issue is unimportant or somewhat important.

With respect to the third question, pertaining to the importance of paying installments from future income, all 100% of customers claimed that it is a particularly important issue, while no customer responded that it is unimportant.

The fourth question, pertaining to the importance of maintaining liquidity, customers believe that this element is important (23.8%), very important (34.1%), ane extremely important (24.9%), i.e. it is important for 82.8% customers and unimportant or somewhat important for 17.2%.

In the responses to the last, fifth question, pertaining to the possibility to increase the leasing package from the aspects of end customers, 80.9% believes that the issue is important, and 19.1% that it is unimportant.

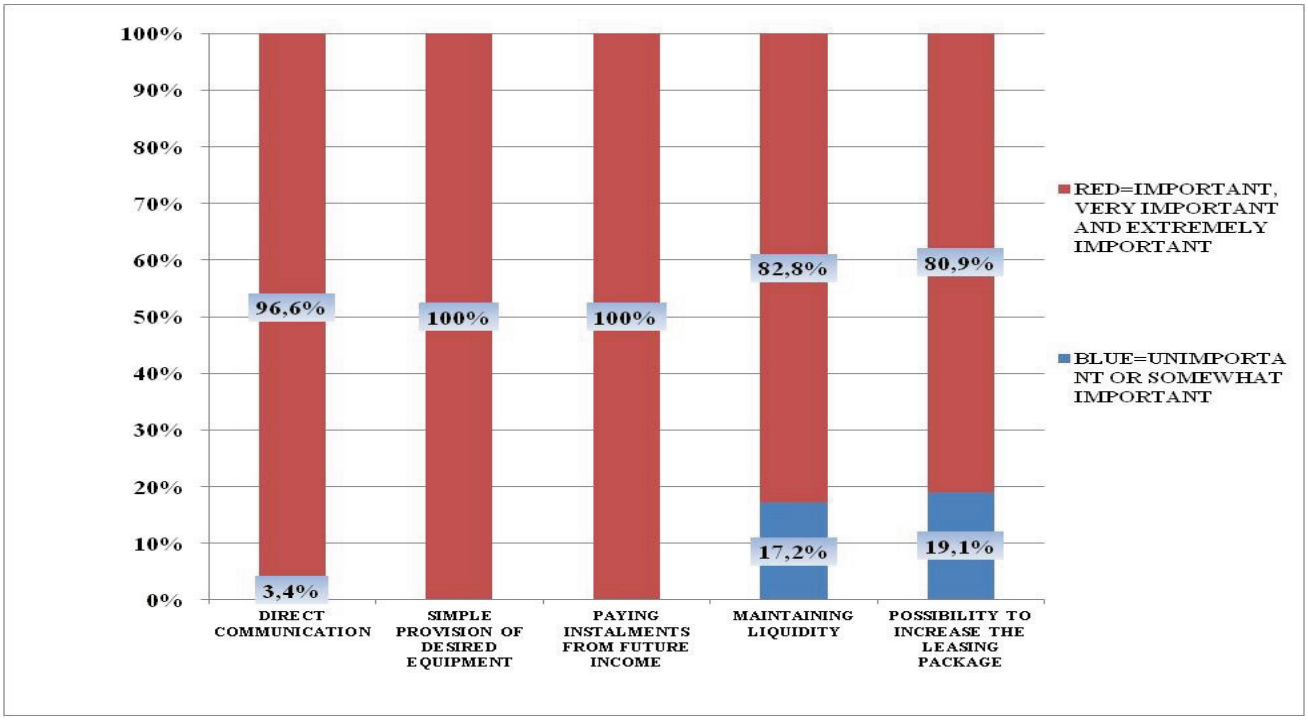


Figure 2 Importance of individual elements for end customers (Vujic S.2012).

3.3 End customers' satisfaction with the leasing company sales force

For each leasing company, it is important to know how satisfied their end customers are with the company's sales force.

In their responses to each question, end customers could grade there vies as: very dissatisfied, dissatisfied, satisfied, and extremely satisfied.

To the first question, that about the trust in sales representative, end customers responded that they are satisfied (40.4%), very satisfied (43.0%), and extremely satisfied (11.9%), while only 4.7% were dissatisfied and very dissatisfied.

In the responses to the second question, related to direct contacts between the leasing company sales representative with end customers, respondents are mostly satisfied – 96.2% (satisfied, very satisfied and extremely satisfied), while only 3.8% expressed dissatisfaction (very dissatisfied and dissatisfied).

With respect to the leasing company's sales force expertise, which was the topic of the third question, most end customers are extremely satisfied – 97.1%, while only 2.9% responses claim that they are not satisfied with the leasing company's sales force expertise.

To the fourth question, one that pertained to honesty (openness in communication), 88.8% customers responded that leasing company's sales representatives are honest, i.e. that they are open in communication, while 11.2% claim that they are dissatisfied about the honest intentions by leasing company's sales force.

In the responses to the fifth question, which pertained to end customers' satisfaction with the knowledge of leasing company sales force, end customers' satisfaction prevails (94.4%),

with 47.1% being satisfied, 29.1% very satisfied and 18.2% extremely satisfied. On the other hand, a total of 1.8% end customers are very dissatisfied and 3.8% dissatisfied with the sales force knowledge.

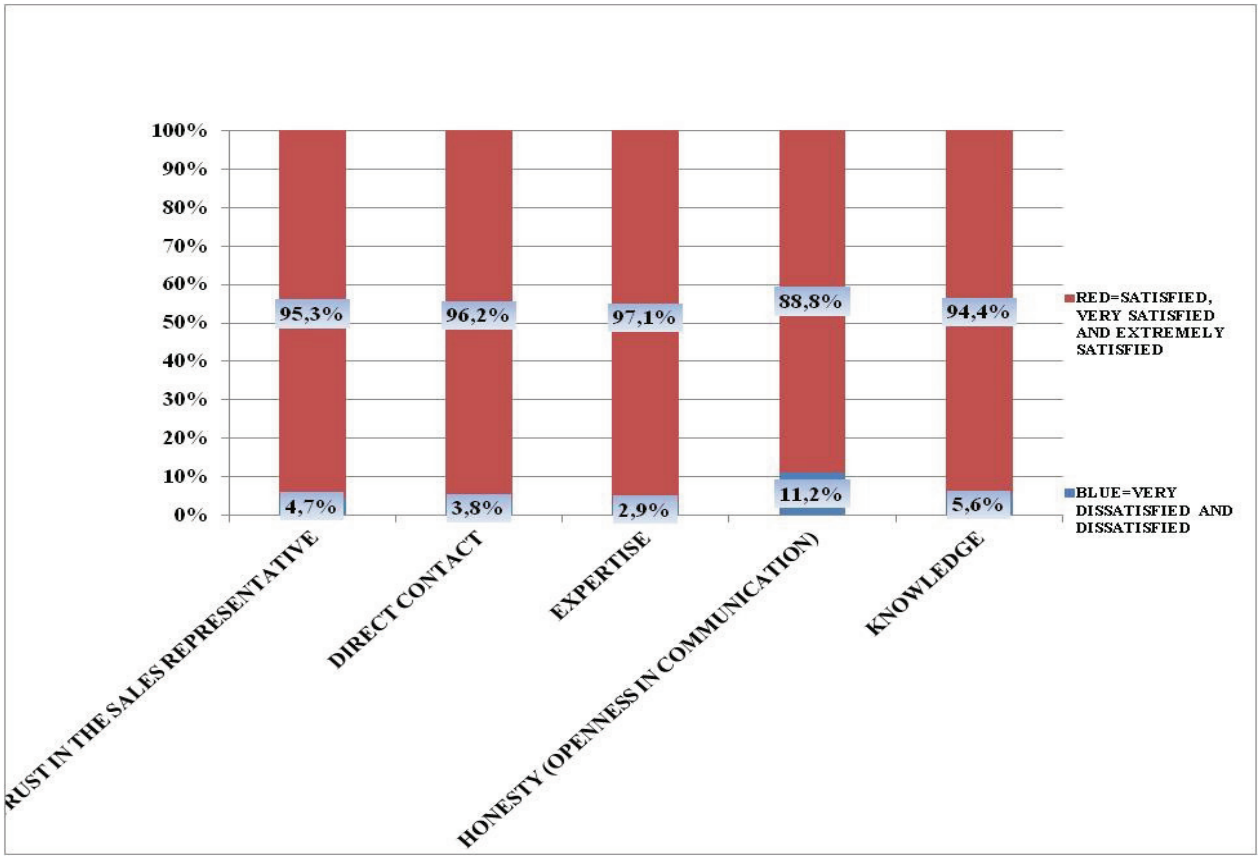


Figure 3 End customers' satisfaction with leasing companies' sales force (Vujic S.2012).

3.4 End customers' satisfaction with other elements of leasing company marketing

A total of 446 end customers returned the filled-in questionnaire; they were suppose to grade responses to the previous questions from the aspect of satisfaction, to five gradations: very dissatisfied, dissatisfied, satisfied, very satisfied and extremely satisfied.

To the first question, as to how satisfied end customers are with leasing company prices, we obtained fairly dispersed responses. Thus, 10.7% are very dissatisfied with prices, 11.7% is dissatisfied, but most responses reveal satisfaction with prices: 41.0% are satisfied, 32.5% very satisfied, and 4.0% extremely satisfied with prices.

To the second question, about customers' satisfaction with the grace period, 91.7% end customers expressed satisfaction in all gradations, while the remaining 8.3% claimed they are dissatisfied with the grace period.

Most responses to the third question, which pertained to end customers' satisfaction with leasing company sales channels, also revealed satisfaction – 95.%, with 41.3% being satisfied, 36.3% very satisfied and 17.4% extremely satisfied. On the other hand, 5.0%

customers are dissatisfied, including 1.6% very dissatisfied and 3.4% dissatisfied with leasing company sales channels.

The fourth question pertained to end customers' satisfaction with promotion carried out by the leasing company. 89.% responses by end customers reveal satisfaction with the leasing company promotion, while 11.0% claimed they were dissatisfied with the leasing company promotional activities.

To the fifth question, as to how satisfied end customers are with the leasing company's promotional material, 78.4% responded that they were satisfied, very satisfied or extremely satisfied. On the other end, 21.6% were dissatisfied or very dissatisfied with the advertising material that leasing companies have.

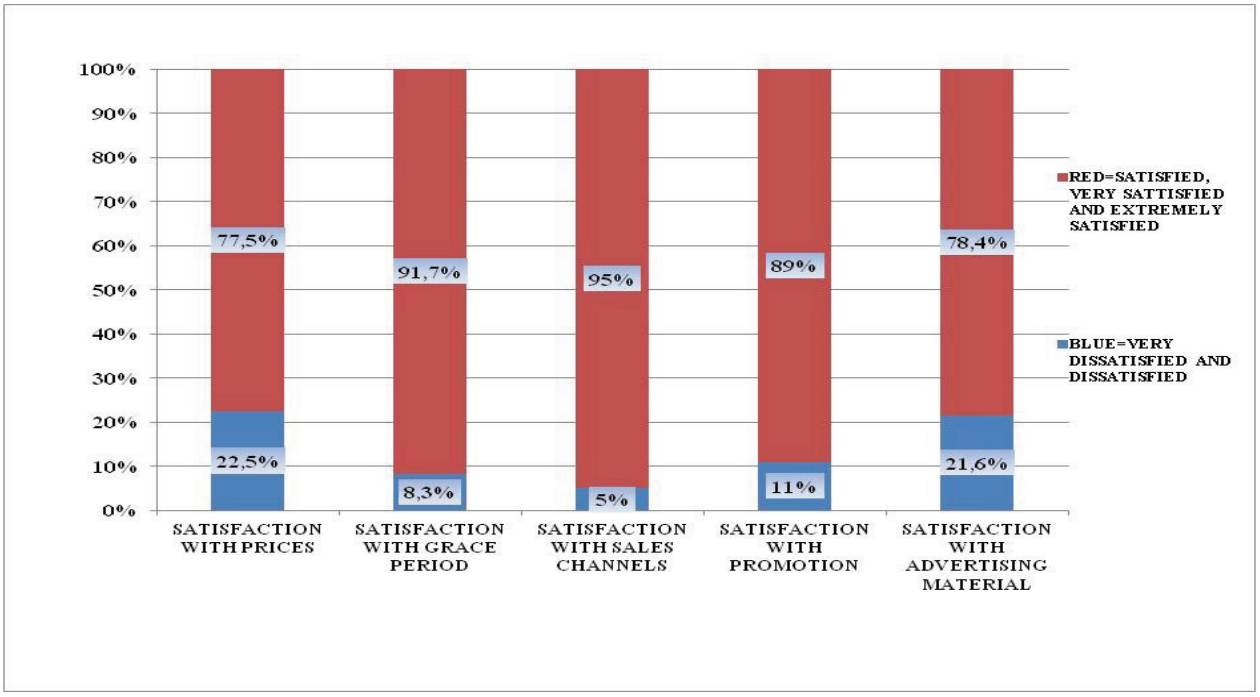


Figure 4 End customers' satisfaction with other elements of leasing company (Vujic S. 2012).

4. Conclusion

Based on the above-described indicators that were obtained through primary research, the end customers' overall satisfaction with their dealings with leasing companies can eb assessed. Based on the presented facts, leasing companies can develop and nourish relations with end customers, particularly in the following direction:

- generating and expanding the database of end customers and potential customers,
- attracting, retaining and developing end customers,
- building end customers' loyalty to the leasing company,
- decreasing end customers' drain, and
- building strong bonds with end customers.

Marketing strategy should be based on building customer loyalty to the leasing company. Building loyalty to the leasing company is based on partner relations with larger customers, or those that renew the purchase of leasing service. Partner relationship is built on direct communication, frequent visits to the customer, introduction of innovations in offers that

pertain only to larger customers, etc. Building loyalty by customers – natural persons is possible with the expectation that the customers will renew the purchase of a leasing service in the foreseeable future. Messages to such customers are based on reminding the buyer that the previous leasing service was successfully completed and encouraging them to renew the purchase.

Specifics of marketing to natural persons as leasing service customers are still based on the traditional marketing concept. It uses the marketing mix, a significant form of advertising directed to a large number of unknown customers. Messages must be focused on informing and reminding that potential customers as natural persons can acquire the necessary equipment, machinery, car, etc. through an actual leasing company's leasing package.

Marketing focused on legal persons as leasing service customers is expressed through messages' focus on the organizations that want to acquire certain equipment through a leasing package. This type of marketing, as well as its focus, is considerably more narrow than traditional marketing since it is directed toward professionals, who are already familiar with the possibility of leasing.

The third type of marketing is focus only on large customers. Since large customers' needs are known or can be learned, leasing company marketing toward them must be as personalized and direct as possible. The offer should be adjusted to an actual large customer and developed on building good business relations with the customers.

The marketing strategy concept should include nourishing and developing customer relations. Within these activities, a particular attention should be paid, and activities taken on attracting and retaining customers. Attracting is expressed through the increased number of customers, increased volume of leasing services (in value terms), and the increased share of sales in the total market. However, the mere increase in volume does not guarantee an increase in profitability. Therefore, besides monitoring the increase in sales volume, monitoring must also include trends in profitability compared to the same period of the previous year and to competition.

Developing good customer relations may result in a decrease of customer drain. However, if a major drain is registered, it is necessary to study its causes and remove them, if they are the result of customers' dissatisfaction with the leasing company services.

References

1 Polugodišnji izvještaj Udruženja Leasing društava BiH (2012.)
2 Prof. dr. Enver Backović, (1997) „Poslovne finansije", editorZijad Njuhović, Svjetlost, Sarajevo,
3 Sally Dibb, Lyndon Simkin, William M. Pride, O. C. Ferrell, (1995) „Marketing", Mate, Zagreb.
4 Willem Verbere i Richard P. Bagozzi, (2000), «Sales call anxiety exploring what it means when fear rules a sales encounter», Journal of marketing,
5 P. Kotler «Marketing menadžment», 12th edition, translation 2006, Belgrade,

USAGE OF UNIQUENESS OF THE REGIONS AS ECONOMIC ADVANTAGE: A NEW TOOL TO INCREASE REGIONAL ECONOMIC RESILIENCE

Zivile Gedminaite-Raudone

Vilnius Gediminas Technical University, Sauletekio al. 11, LT-10223, Vilnius, Lithuania, zivile@laei.lt

This paper aims at analyzing uniqueness of the regions as a tool to increase regional economic resilience and economic advantage. Economic and social challenges within the EU member states influence a necessity to find new tools to ensure regional prosperity and economic advantages of the region by using existing cultural, natural, human and other resources that are important for regional economic development. Unique features of the region can be used as a tool to increase regional economic growth.

The uniqueness index methodology was developed for the assessment of the cultural uniqueness as economic advantage of the region. The results revealed that regional uniqueness index can be used for identification of typologies of the regions within a country that can serve as a basis for creation regional support strategy that can be applied by various governmental institutions. This analysis has been conducted at the national level. From a policy perspective, recommendations for the regional policy to define important insights for the next programming period 2014–2020 in the EU can be applied.

Keywords
Uniqueness of the region, regional development, regional policy, economic advantage, assessment, economic resilience.

1. Introduction

The end of the 20th century and the beginning of 21st century is particularly important by new emerging economic, social, cultural, environmental and other circumstances, globalization and regionalization processes that have significant impact on the environment of the society and nations. These processes brought new challenges for the counties, regions and citizens as each of them had to find new role in this environment and solutions that help to adapt to this situation and implement sustainable development solutions.

Regions can be listed as very important object influenced by these new social and economic challenges and the results of the globalization and regionalization. This impact is measured by increased significant economic, social and territorial disparities that still exist between Europe's regions. Disparities are apparent not only at the regions within one country but also between the EU member states regions. These disparities would undermine some of the cornerstones of the EU and the "Europe 2020" strategy which identifies the EU to become a smart, sustainable and inclusive economy [1], [2], [3]. These three mutually reinforcing priorities should help the EU and the Member states deliver high levels of employment, productivity and social cohesion [4].

Regional development of the regions is usually affected by different socio-economic situation within the regions, different quality of infrastructure, remoteness of the regions, social and economic changes, social deprivation, high unemployment, the results of planned economy and other factors. These reasons explained why regional policy in the EU played very important role from the establishment of the EU.

In recent years regional policy paradigm had changed significantly [5]. New paradigm is based on the concept that regional policy should assess new economic and social features of the 21st century that can have a significant influence on the further development of the region's leading to the successful development and reducing disparities of the regions [6], [7], [8], [9], [10], [11]. New phase of regional policy at the EU level have been implemented based on the principles of the post-industrial economy where knowledge is considered as the main resource [12], [13], [14]. This paradigm emphasizes the importance of "learning region" concept, networking and cluster formation, innovation and the most importantly – *to support not the lagging regions but to exploit regions "basic skills" and to use "competitive advantage of the region*". State policy should attempt to mobilize the strengths of the region rather than trying to decrease only negative elements. Regions must be differentiated by the factors that enhance the region's competitiveness, and other important social-economic development criteria: level of education, level of innovation, entrepreneurship level, living standards, etc.

The new regional policy paradigm will lead to the necessity to develop new assessment methods that would help regions to shift their activities for creation of economic advantages by using "basic skills" of the region instead of eliminating negative impacts that exist within the region. Various unique features of the region can be taken as a new way for developing economic activities in the region and the use of this for the economic advantage.

Why uniqueness is important for creation of regional prosperity? And why it should be used for getting economic benefit when the new success factors emerged in the 21st century? The first reason is that uniqueness itself can be named as a reason that can help to get an economic advantage by using special features of the region, the strengths of the regions that exist at the moment or region basic skills which can also be unique. Secondly, these unique elements of the region used in the economic activities can make the region very specific and thus reaching its competitive advantage not in a reckless way but based on sustainable development, cooperation and responsible environment principles.

Measures used for the implementation of the regional policy within the EU in some cases lack to reflect adequately the above mentioned elements. In most cases regional policy is used to reach a certain level of infrastructure, investments and indicators for the regions that might be not the most important to get the best results for the region and can be not important that the certain level of economic results would be reached or in order to increase the region's economic strengths. In some cases there might be needed different types of investments or indicators for the region to have economic advantage and not by reaching the indicators set up from outside.

Recently many scientist and experts in regional policy in various international scientific conferences and meetings are discussing about possibility to use regional uniqueness as economic advantage rather that attempts to highlight the dimensions of competitiveness [15], [16], [17], [18], [19], [20].

2. Methodology

The uniqueness index methodology was developed for the assessment of the various types of uniqueness as economic advantage of the region (as cultural uniqueness, geographical

uniqueness, uniqueness of social and economic structure within the region, etc.). In this paper methodology of cultural uniqueness is developed.

According to the needs of the institutions assessment can be implemented by 2 levels (see Figure1):

- Assessment of the chosen type of uniqueness of the regions at the country or union level (for example, the EU level) by ranking regions from the highest to the lowest ranking points given for the region by this type of uniqueness for creation economic advantage of the region.
- Assessment of the different type of uniqueness within one region with the aim to rank various uniqueness types by highest to the lowest points given for each uniqueness type for creation economic advantage of the region.

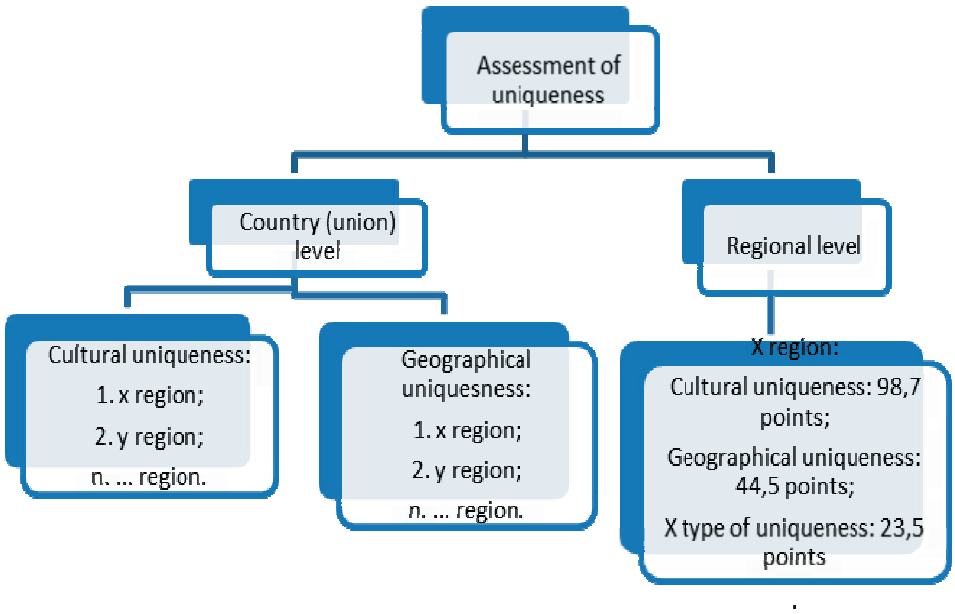


Figure 1 Levels of assessment of uniqueness.

Uniqueness index was created by using SAW (Simple Additive Weighting) multicriteria evaluation method. Multicriteria evaluation methods have been increasingly used in theoretical research and practical decision making as it helps evaluate quantitatively any complicated phenomenon described by a set of criteria [21], [22], [23].

Assessment of the uniqueness of the regions:

1. Setting of the components for the chosen type of uniqueness:

    1.1. Groups of components are defined including all dimensions needed for the assessment of this type of uniqueness.
    1.2. Indicators are defined for each component.

Developing the groups of components for the cultural uniqueness index the holistic approach was applied to ensure that all dimensions and indicators would operate as a system rather than a set of its components. The following groups of components and indicators have been identified for the assessment of cultural uniqueness (see Figure 2).

	Index of cultural uniqueness of the region			
Components	*Objects of cultural uniqueness*	*Human resources in cultural and tourism sector*	*Infrastructure*	*Visitors*
Indicators	- Cultural objects	- Human resources in museums	- Accommodation facilities	- Visitors of museums
	- Museums	- Human resources in theatres	- Travel agencies	- Visitors of theatres
	- Theatres	- Human resources in travel agencies	- Catering services	- Visitors of tourism information centres
	- Events	- Human resources in tourism information centres	- Tourism information centres	- Number of accommodated persons

Figure 2 Components and indicators of cultural uniqueness index.

Indicators of first three components (objects of cultural uniqueness, human resources in cultural and tourism sector and infrastructure) reflect to the *supply side* and indicators of the last visitors' component reflect to the *demand side*. The system is based on four dimensions essential for the creation of economic advantage of cultural uniqueness of the region: base of cultural uniqueness (cultural uniqueness objects), human resources, infrastructure and the users of these services.

2. Calculation of uniqueness index for each region for the chosen type of uniqueness by using SAW (Simple Additive Weighting) multicriteria evaluation method:

$$S_j=\sum \omega_i r\tilde{}_{ij,}$$

S_j – index value for j type of uniqueness; ω_i – weight of component i group; $r\tilde{}_{ij}$ - normalized value of component i for j type of uniqueness.

2.1. Firstly normalization of each indicator was applied where actual value of indicator and minimum and maximum values of the regions within a country (union) are required:

$$r_{ij}=\frac{r_{ij}-r_{min}}{r_{max}-r_{min}}$$

r_f - the actual value of the indicator, r_{max} – maximum value of the indicator of the regions within a country (union), r_{min} – minimum value of the indicator of the regions within a country (union).

2.2. Secondly a value of each component group is calculated by using normalized values of indicators of this group.

$$S_{1,\dots,k}=\sum \omega_y \tilde{r}_{ij,}$$

Weight (ω_y) for each indicator was equal.

2.3. Value of all components is calculated by using each component group values.

$$S_j=\sum \omega_i S_{k,}$$

Weight (ω_i) of each component group was equal (1/4) for the cultural uniqueness index calculation, k – number of components.

2.4. Value of uniqueness index (UI) of the region:

$$UI_t = \frac{S_j}{k}$$

UI_t – value of uniqueness index, S_j – value of all components, k – number of components.

3. Ranking of the regions by chosen uniqueness type:

3.1. At state level: regions of the state (union) are ranked by chosen uniqueness type ranking regions from the highest to the lowest index rate.
3.2. At region level: index values of various types of the region uniqueness are ranked from the highest to the lowest index rate.

3. Empirical results

The uniqueness index methodology was applied for the assessment of the cultural uniqueness as economic advantage of the regions. This analysis has been conducted *at national level* to calculate uniqueness index for the Lithuanian regions with the aim to rank regions from having the highest potential in cultural uniqueness as region economic advantage to the lowest potential in cultural uniqueness.

Statistical data published by Department of the Statistics of the Republic of Lithuania, Ministry of Culture of the Republic of Lithuania and official data published by the Lithuanian tourism information offices had been used. Data is used of the year of 2011.

Results are provided in the table below.

Table 1 Grouping of Lithuanian regions by cultural uniqueness

Grouping of Lithuanian regions by cultural uniqueness potential	Number of Lithuanian regions in the group (ranking place and index value)
Significant resources	8 regions Ranking place from 1 to 8 Ranking values from 9.10 to 0.91
Moderate resources	31 region Ranking place from 9 to 39 Ranking values from 0.81 to 0.42
Insignificant resources	21 region Ranking place from 40 to 60 Ranking values from 0.39 to 0.04

Ranking results of cultural uniqueness of the Lithuanian regions we used for dividing regions into 3 groups by having significant, moderate and insignificant resources of the cultural uniqueness. Territorial distribution of Lithuanian regions into these 3 groups is shown in Figure 3.

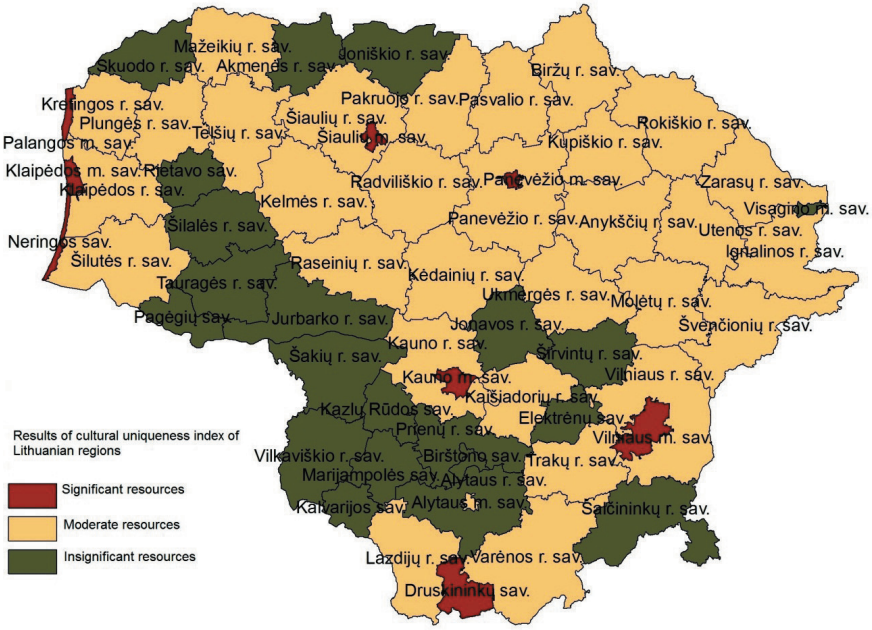


Figure 3 **Mapping of Lithuanian regions by cultural uniqueness index.**

Significant cultural uniqueness resources that can give economic advantage for the region are placed in the Vilnius and Kaunas city regions where two largest Lithuanians cities are located as cultural uniqueness value of these regions enormously differs from the remaining regions of Lithuania (5 to 9 times). Other regions of Lithuania that have big cities and resort status cities also have a great potential successfully utilize unique cultural resources of the region for increasing economic benefits (in the table marked as regions having significant resources: Klaipeda city region, Panevezys city region, Siauliai city region, Palanga region, Druskininkai region and Neringa region). 51,6 percent of Lithuanian regions have moderate cultural uniqueness resources that can be used for increasing economic advantage of the region. 5 percent of Lithuanian regions have insignificant cultural uniqueness resources.

Territorial distribution of Lithuanian regions that have significant, moderate and insignificant cultural uniqueness resources is uneven.

The results revealed that regional uniqueness index can be used for identification typologies of regions within a country that can serve as a basis for creation regional support strategy that can be applied by various governmental institutions.

4. Conclusions and Policy Implications

Uniqueness of the regions should become an important element in the 21st century in the implementation of new regional policy paradigm by using unique features and strengths of the region to achieve competitive advantage rather than supporting lagging activities within the region. The uniqueness of the region should be a tool to help the region to use economic advantage. The unique features of the region can exist at the time of assessment or the unique elements can be constructed.

Uniqueness assessment methodology by using uniqueness index can help for the region to identify existing or potential unique elements that can be used as a tool to increase economic advantage of the region by using knowledge of favorable regional situation, various circumstances and conditions. Followed activities based on the results of the assessment would help to enhance the economic advantages of the region.

Regional uniqueness index can be used for identification typologies of regions within a country that can serve as a basis for creation regional support strategy that can be applied by various governmental institutions. From a policy perspective, recommendations for the regional policy to define important insights for the next programming period 2014–2020 in the EU can be applied.

Ranking of the regions by the cultural uniqueness index can serve as an additional tool for the setting of priorities to the measures of cultural activities development. Ranking results can help to identify regions that have significant resources and potential in this area rather than distributing resources to all regions that would not have any potential in developing cultural uniqueness. This assessment can increase effectiveness and give additional synergy effects.

References

1 Europe 2020 Strategy. [October 15, 2012]. Available via Internet: <http://ec.europa.eu/europe2020/index_en.htm>.
2 Baltic Sea region strategy. [November 20, 2012]. Available via Internet: <http://www.balticsea-region-strategy.eu/pages/what-is-the-eusbsr>.
3 Gothenburg strategy for sustainable development. [October 15, 2012]. Available via Internet: <http://europa.eu/legislation_summaries/environment/sustainable_development/l28117_en.htm>.

4 The Fifth Report on Economic, Social and Territorial Cohesion. 2010. The European Commission, Directorate-General for Regional Policy. Brussels, No. 10.2776/23085, 2010.
5 Melnikiene, R., Vidickiene, D., Gedminaite-Raudone, Ž., Ribasauskien□, E. 2011. Lietuvos region□ tipologij□ pagal kaimiškumą tinkamumas regioninei politikai. *Vadybos mokslas ir studijos – kaimo versl□ ir j□ infrastrukt□ros pl□trai*, Nr. 5(29).
6 Bessaoud, O. 2006. Rural governance in the Mediterranean: trends and new challenges, *CIHEAM analytic note*, No. 14. [October 24, 2010]. Available via Internet: <http://www.portail2.reseau-concept.net/Upload/ciheam/fichiers/ANP14.pdf>.
7 Diakosavvas, D. 2006. *Coherence of Agricultural and Rural Development Policies*. OECD Publishing, Paris.
8 Herrschel, T. 2005. "Competing Regionalisation" Through Territory and Cluster Networks: Experiences from Post-Socialist Eastern Germany, *GeoJournal*, Vol. 62, No. 1, p. 59–70.
9 O'Conner, D. 2006. *Driving rural development: policy and practice in seven EU countries*. Building Competitive Regions: Strategies and Governance, OECD Publishing.
10 OECD. 2006. *Rural Policy Reviews. The New Rural Paradigm: Policies and Governance*. OECD Publishing.
11 OECD. 2006. *Reinventing Rural Policy*. The OECD Policy Brief. [May 25, 2010]. Available via Internet: <http://www.oecd.org/dataoecd/18/9/37556607.pdf>.
12 Cooke, M. 2001. The First Nations Community Well-Being Index (CWB): A Conceptual Review. Strategic Research and Analysis Directorate Indian and Northern Affairs Canada. *Minister of Public Works and Government Services*. Canada, Ottawa.
13 Herrschel, T. 2005. "Competing Regionalisation" Through Territory and Cluster Networks: Experiences from Post-Socialist Eastern Germany, *GeoJournal*, Vol. 62, No. 1, p. 59–70.
14 Sepic, D. 2004. The regional competitiveness: some notions Russian–European Centre for Economic Policy. Moscow: RECEP.
15 Organisation for Economic Cooperation and Development (OECD). 2007. *Competitive regional cluster: national policy approaches*. OECD Rights and Translation unit (PAC), Paris.
16 Organisation for Economic Cooperation and Development (OECD). 2009. *How Regions Grow. Trends and analysis*. OECD Rights and Translation unit (PAC), Paris.
17 The IMD's World Competitiveness Yearbook 2011. [November 25, 2011]. Available via Internet: <http://www.imd.org/research/publications/wcy/World-Competitiveness-Yearbook-Results/#/wcc-products/>.
18 World Economic Forum. 2010. *The Global Competitiveness Report 2010-2011*. SRO Kundig, Switzerland.
19 2nd Annual Forum of the EU Strategy for the Baltic Sea Region. 13th Baltic Development Forum Summit. 2011. *New ambitions for the Baltic Sea Region*. Gdansk, 24-26 October 2011.
20 Baltic Sea Region Programme Conference. 2010. *The power of the Baltic Sea macro-region*. Jyväskyla, 30 November – 1 December 2010.
21 Ginevicius, R., V. Podviezko. 2008. A Feasibility study of multicriteria methods application to quantitative evaluation of social phenomena. *Business: theory and practice*. Vol. 9(2). 81-87 p.
22 Hwang, C.L., Yoon, K. 1981. *Multiple attribute decision making – methods and application. A state of the art survey.* Springler Verlag, Berlin, Heidelberh, New York.
23 Figueira, J., Greco, S., Ehrgott, M. 2005. *Multiple criteria decision analysis: state of the art survey.* Springer.

MODEL OF COST ESTIMATING IN PROCESS PLANNING OF INNOVATION

Piotr Chwastyk

The Opole University of Technology, Prószkowska 76, 45-758 Opole, Poland, p.chwastyk@po.opole.pl

The paper presents the problem of estimating the cost of innovation processes. The objective to develop a model of cost estimation was to identify places in innovation process, in which is required an economic analysis allows the evaluation of the profitability of the ongoing process. This paper presents the reasons to build a model and indicates the selected methods for cost estimation. The model was developed based on the Cooper's Stage Gate model with special consideration to the Front End phase. Beside the well known classification of innovation in the Oslo Manual also includes distinguish of innovation in terms of time horizons proposed by Moore. The prepared model is complementary to model of innovation process planning. It was based on the analysis of dozens of innovation processes implemented in Polish enterprises belonging to the leaders in innovation and representing various business sectors. The idea of the proposed approach is to help the managers in designing and implementation of innovation processes.

Keywords
cost estimation, innovation process, model of innovation

1. Introduction

Innovation processes are business opportunity for gaining a competitive advantage in the market. It is also an important element in the development by adjusting their production to the highest standards using the latest achievements of world science and technology. Innovation is not only a modern approach to market requirements and consumer demands, but above all it is a way to overcome their weaknesses in the area of business processes conducted. Innovation processes have a very unique and special character. They are accompanied by uncertainty in the tasks and achieve the benefits of risk [1]. It is necessary to constantly monitor the innovation processes and rapid response to situations that may interfere with their progress. Decision making is always present in the innovation processes [2], [3].

Innovation processes require changes in operations that have become routine as a result of repeated operations for the current production. Managers should not only focus on the ongoing processes. It is necessary to look at the company from the point of view of business environment. See its weaknesses and find ways to overcome them with innovative solutions.

This is a difficult task that requires creativity and courage in making risky decisions. Creativity is essential to create innovative solutions. Courage in decision-making allows efficient use of available opportunities and overcome emerging threats.

Creating the right conditions for the emergence of innovative ideas, their development and implementation of innovative processes requires four key elements described by Cooper as diamonds innovation [4]. One of these elements is to ensure effectiveness in the conduct of processes of innovation. The effectiveness is the result such management of the innovation processes, which enables an efficient implementation of the next phases of the processes.

An important role is the appropriate planning process as well as an assessment of cost-effectiveness.

2. Reasons For Development Of Models Of Innovation Process Planning And Costs Estimating

The distinguishing feature of innovation processes is the flexibility during the implementation, enabling modification of tasks to changing conditions in order to increase the certainty of getting the desired objectives. Therefore, these processes are carried out according to the Stage Gate model [5]. Its sequential nature provides security in the innovation process by analysis and evaluation of individual phases. Every phase of the process begins when the results will be accepted previous phase. Flexibility here concerns the possibility of changes in the implementation of subsequent phases taking into account the previous results.

Planning for process innovation is often seen as a stiffening of process. May limit the creativity and freedom in the decisions taken, which are important in achieving the desired objectives of innovation. Therefore, the issue of innovation planning often comes down to the level of operational planning that most accurately analyzed for New Product Development [6].

Often also the research are taken in planning at the strategic level, which is to determine the long-term activities in achieving objectives through innovative activities [7], [8]. A research gap exists with the lack of innovation process planning model that would consider non-linear course of actions within the process, their coordination and guarantee the resources for their completion. This fact became a reason to start work to develop the model of innovation process planning covering all stages of the innovation process, from the moment of goal definition to the task planning on the operational level.

Introduction of innovation, as a consequence of the modern market mechanisms aim through introduction of new constructions and technologies in products or implementation of modern processes to bring particular benefits - tangible or intangible. Not only the level of novelty is important, but also the economic benefits that will be achieved thanks to it. Having these benefits in mind, can not be forgotten the costs to be incurred as a result of the introduction of the innovation process. To think in perspectives of future profits, it is necessary to conduct economic analyzes of innovative project's cost-effectiveness. The success of the innovation process in a meaningful way is determined by the right approach to their planning, which also allows an assessment of future costs. Therefore the innovation process planning should be supplemented with components of cost estimation. This has become an important part of research.

3. Research Objectives

Carried out a research project involves two aspects. The first is to develop a model that would point the right way of planning processes of innovation to achieving the desired results and not undermine the qualities that guarantee the essential qualities of these processes. The second aspect is the preparation of a model to estimate the costs that would draw attention to the importance of cost-effectiveness analysis and cost control of the process of its implementation. This model should be consistent with the planning process, leading to adequate detailed cost estimate with the progress of the planning work.

The first of the objectives, the realization and the result in the form of the model was presented in the work [9]. In the planning of innovation processes was proposed three-stage approach. It ensures the preparation of detailed plans of innovation processes according with the progress of the work providing more and more new information.

This article focuses on the issue of moving the second problem - estimating the cost of the innovation process. When building a cost estimation model assumes that it should complement the planning model. For this reason the three-stage cost estimating was proposed, too. Each subsequent stage of estimating the costs should lead to more accurate results may be obtained on the basis of more accurate plans for innovation processes.

4. Research Method

To prepare models of innovation process planning and cost estimation had to be analyzed the innovations processes have been implemented with success. This proves the fact of a well-organized and managed the innovation process.

For this reason, for researches was selected a group of companies, which were included in the rankings of innovative companies in 2010 and they are among the leaders in innovation in the country. The study involved companies of all sizes and representing a variety of industries. Diversity of companies was necessary to collect data to prepare an universal model applying to any type of innovation regardless of the business potential. In researches used the method of direct interview conducted with managers of innovation processes and with persons direct involved in the implementation of these processes. Interview scenario was developed during the preliminary studies carried out in one of the IT companies. Preliminary studies have allowed to identify problems occur in the preparation of innovation processes, determine the range of managers knowledge about the innovation processes, as well as to assess the usefulness of well-known models of innovation processes in practice.

The innovation processes implemented in Poland are researches subject and are funded by the National Center for Science and. Therefore, the Polish companies were analyzed. After accession to the European Union, Polish companies have faced strong competition. Adapting to the new market conditions require development towards innovative activities. After years of changes in the Polish economy, there are a lot of new companies that try to enter the market and to face strong competition. This requires courageous decisions towards the new and effective ways to development. Without the implementation of innovative solutions this way is impossible.

The important element that affects the cost estimation process is the type of innovation process. Oslo Manual distinguishes four types of innovations: product, process, organizational and market. They concern different kinds of enterprise activities, their goals are different, their implementation plans will look different. The cost estimation processes will also be different due to differences of connections between the tasks and costs.

Innovation processes also depend on the time of their execution. The longer time the implementation the bigger changes may occur in the environment. This affects the complexity of the process, the scale of the expected results, an acceptable level of risk and expenditures, detail documentation, monitoring and control of the process.

So it was decided to accept the division of innovation due to the time horizon.

Taking into account the time criterion adopted classification developed by Moore, who distinguishes three time horizons of innovation [10]. In current project they are defined as:

- Innovation of current needs horizon - implemented in the short term and focused on a single area of activity.
- Innovation of potential development horizon - middle term innovation having an impact on a part of process or whole process.
- Innovation of creating new business horizon - long term range, which could create new possibilities for whole business e.g. a new product or technology.

The researches were divided into three main stages (Figure 1):

- Analysis of publications in the field of innovation processes, the development of research theses and assumptions and preliminary studies in IT company.
- Analysis of successful innovation processes based on direct interview in polish enterprises.
- Verification of models carried out in the companies representing groups, which were analyzed in the previous stage.

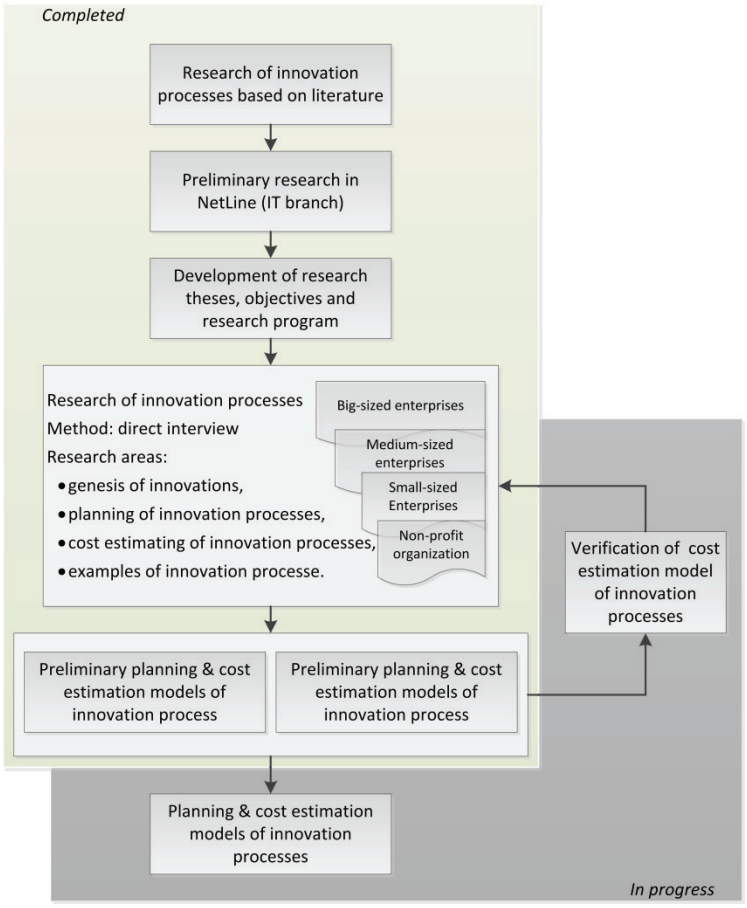


Figure 1 Research scheme of innovation processes in Polish enterprises.

5. Main Research Findings

More than 60 successful innovation processes was analyzed so far. The repetitive ways of assessment the profitability of innovation processes was observed. Usually determine the cost of innovation processes are carried out in the early stages of the process. Such behavior is related to the assessment of the financial resources that must be reserved for the implementation of the innovation process. But estimating the cost in the initial phase of the process does not give accurate results. Based on the general framework of the innovation process adopted on the basis of the aim of innovation, its nature and time horizon, it is possible to estimate the costs only in an intuitive way. The accuracy of the results in this case is dependent only on the knowledge and experience of the person performing the estimation. The individual character of each of the innovation processes means that the difficulty in cost estimating leads to a large discrepancy between the projected costs and

actual costs. During the interviews, managers pointed to discrepancies of up to tens of percent. Being aware of this uncertainty, the cost of innovation processes are often overestimated. It is safer to overestimate costs than underestimate. Underestimate the value of the expected costs may be associated with the need to interrupt the process of innovation in relation to:

- Exceeding the budget for innovation process.
- The delay of the process associated with the need to complete the missing funds.
- Quality reduction due to lower funds for tasks.
- Inability to implement all the objectives.

These situations occur mainly in the implementation of long-term innovation with higher levels of uncertainty and risk.

Overestimation of the cost is less dangerous. However, it may be the cause of the lack of acceptance of such large of expenditure and thus no agreement to start the process of innovation. For these reasons, estimating the cost of innovation processes should be carried out using methods that reduce the size of errors. Decisions on starting or continuing the innovation processes are often made on the basis of the level of costs estimated. The accuracy of its determination is reflected in the quality of decisions. It is therefore necessary to estimate the cost at the right time, which allows to obtain reliable results with the required accuracy.

These observations allow to formulate the following guidelines to develop a costs estimation model:

- Due to the uncertainty of the results of the different phases the innovation processes is necessary to make decisions based on the estimated cost accepting the established level of accuracy.
- In order to obtain reliable results for costs estimating, the appropriate methods should be used for obtaining the best possible results using according to currently available information.
- Sequential innovation process indicates the need for costs estimating for each phase of the innovation process separately.

6. Estimating The Cost Of Innovation Processes

Due to these mentioned characteristics of innovation processes, especially because of the need to make decisions that involve changes in the implementation of the process, depending on sub-targets, the planning must be progressively detailed [9]. Each subsequent stage of creating a plan introduces new information that will in turn complement the knowledge on costs. Therefore, along with obtaining further degrees of details on the level of process planning, the cost evaluation must be carried out.

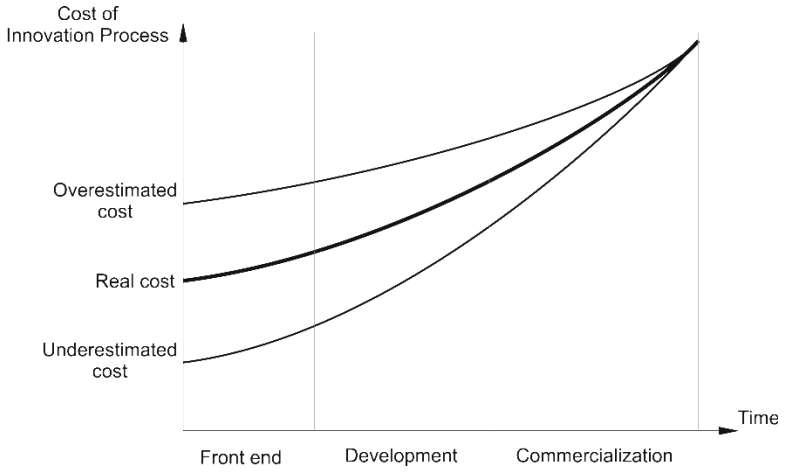


Figure 2 The accuracy of cost estimating in innovation processes.

Estimating costs is the more accurate the more data we have. This number is increasing with the progress of the work. If the cost estimate will be made later the discrepancy between the result and the real costs are lower (Figure 2). Each project requires financial security before it starts, so it is necessary to estimate the costs at the beginning of the process and therefore must accept the discrepancies stemming from overestimation or underestimation. The initial phase of the innovation process does not provide sufficient information to estimate the future costs. Nonlinearity in Front End phase [11] and uncertainty in tasks performance and results in R&D are the main reasons affecting the errors in costs estimating. But if the cost estimation is performed only once, at the beginning the process, we decide to accept a wide disparity during the whole process of innovation. This is the wrong approach. Differences in costs can be reduced by re estimating the costs as soon as new information containing data that affect the cost of the innovation process.

In order to provide accurate cost estimation of innovation processes, which refer to the moments of enhancing the plan in details, a cost estimation model was developed. This model complements the existing planning model of the innovation process [9]. Due to the close relation between planning and cost estimating, both models are integrated with one another and reflect the correct procedure in this regard of the work on the innovation process.

Model for cost estimating of the innovation process, includes three levels of cost estimation (Figure 3). They are distinguished by the moment of conducting cost estimation and the accuracy of obtained results .

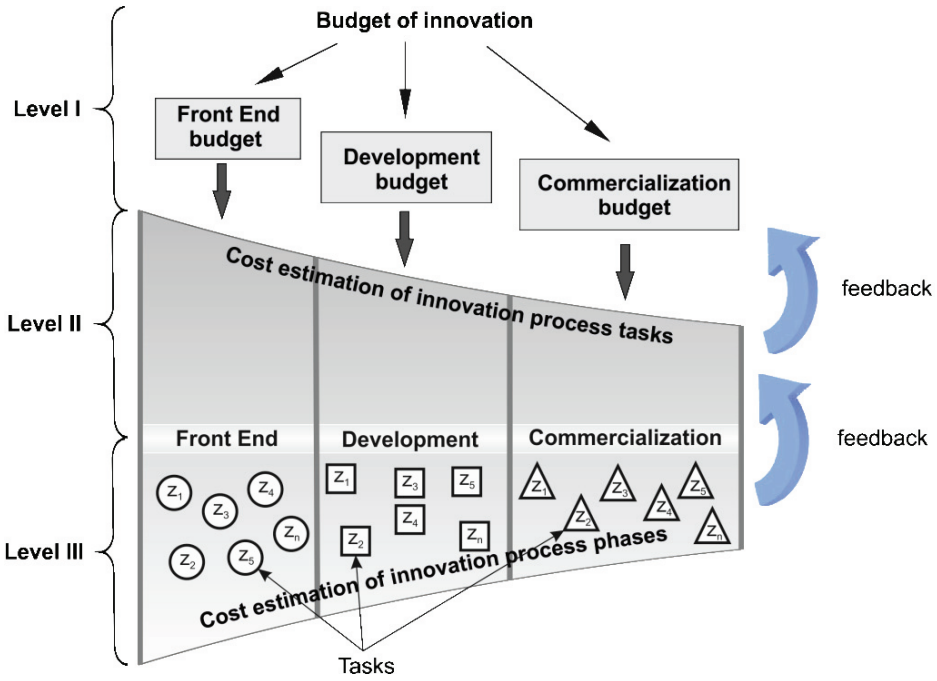


Figure 3 Model of cost estimating in innovation processes.

Determining the budget for innovation process is an important element in the decision to initiate the process of innovation. It also allows to secure funding to ensure the safe conduct of the process. Freezing of big funds for a long period of time often restricts ability to pursue other jobs in the company. Proposal is to define the separate budgets for each of the innovation process phases. In this way there is a longer time to gather the necessary funds. Do not locks out large funds allowing rational financial management of the company. Budget for innovation process should be flexible. It should provide for adjustments in the budget, if warranted by changes in the tasks differs from the established plan.

There are three methods for preparing project budgets: from bottom to top, from top to bottom, and the method of budgeting from zero level (Figure 4). The method of bottom-up can be used when there are specific plans taking into account the division of tasks, their duration and the resources allocated with them. Budgeting is in this case concerns summing up the estimated costs of all tasks. Innovation processes are not included in this type of projects, due to the inability to develop precise plans of the process.

Thus two other methods can be used. Method from top to bottom allows the use of a similar project budget. In the case of process innovation, appropriate documentation of completed innovation processes is required. One can benefit from their own experience in the field of innovation or use similar processes carried out by the partners. In this method, a similar project budget is taken as a base, to which are added or subtracted additional costs related to the differences between projects.

Zero level budgeting method is a method that is often used in innovative projects. It is applied if it is not possible to benefit from similar projects. In this case, the budget is determined on the basis of the knowledge and experience of managing the innovation process (expert method). In this method, you can also use the knowledge of external experts.

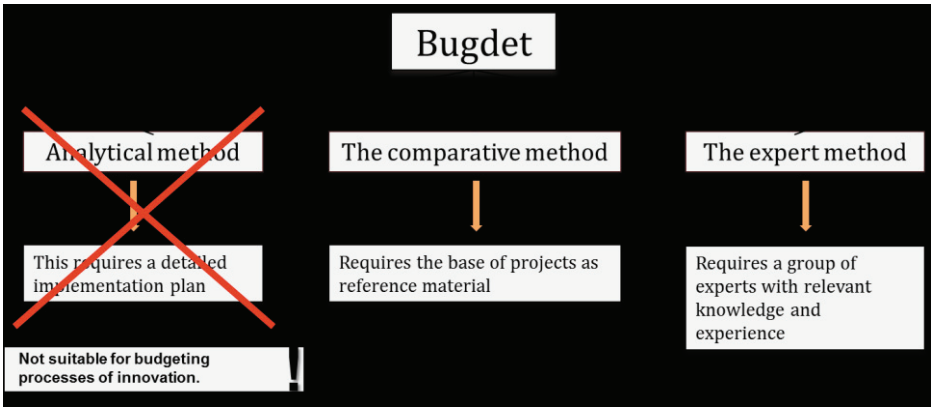


Figure 4 The budgeting methods.

The development of plans for different phases of the innovation process is the basis for the next cost estimation. At this stage to define the main tasks of the process, indicating the effects to be achieved, a main framework of the process should be prepared. At this point no complete information on the process of innovation is obtained, but already is he knowledge available, which can be used to estimate the costs. In the front-end phase is known the number of ideas that will be analyzed, in the development phase are known the key innovation features indicating its level of novelty, in the commercialization phase is planned the extend of innovation commercialization, such as the area of market that will be included in the range of interest. These features are the basis for the development of plans, but also may allow an initial estimate of costs.

A similar situation can be found in relation to the early stages of designing new products, where on the basis of certain characteristics are made attempts to estimate own cost. In this situation is applied the parametric method [12], by establishing a relation between the attributes of the product and the cost. These relations can be presented in the form of mathematical notations on the basis of regression analysis. The obtained results are verified by the use of data from similar projects completed in the past. In a similar way, you can perform a preliminary cost estimate for the process of innovation (Figure 5). A limitation of this method is the necessity of having historical data on similar processes.

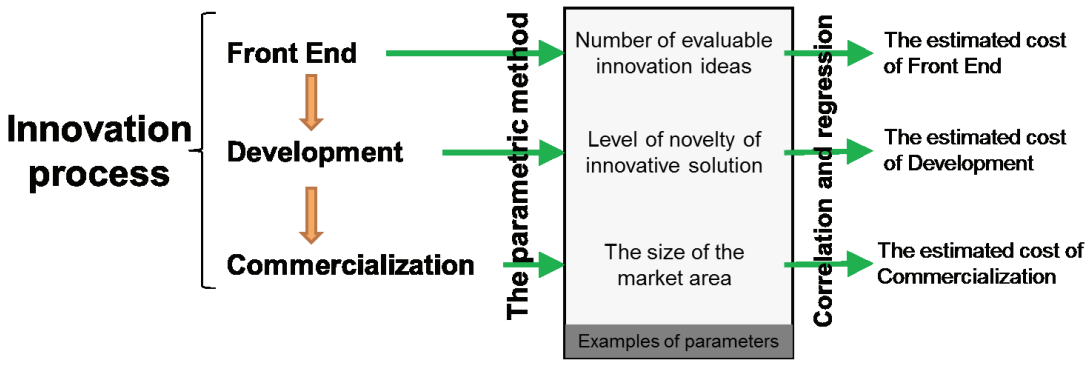


Figure 5 The idea of parametric cost estimation methods in the planning phases of the innovation process.

Much more detailed information about costs can be obtained during the planning of tasks within the phases of the process. Here takes place the operational planning, in which are

developed following tasks to be performed together with division of operations, allocation of resources, specification of their duration. The sequence of their implementation is also determined together with their priorities to obtain the desired effect. Having this information it is possible to estimate the cost with a high accuracy. In scientific studies on costs of innovation processes, the most often quoted cost estimation method, which is characterized by a high degree of accuracy, is the ABC task cost method (Activity Based Costing) [13], [14]. It is a method which, according to its supporters, reflects the nature of innovation processes. By dividing the process of estimating the cost to the smallest steps, allows for a very detailed analysis of each element of the planned process for the costs evaluation. It allows for the estimation of the costs of the processes, which were not similar to the previously executed. And certainly it is a distinctive feature of innovation processes.

It should however be borne in mind that the ABC method is due to its high accuracy, very laborious. This method requires a vast knowledge on costs vehicles, which must be constantly updated and adapted to the changing conditions of the company. The development of suitable tools for this process and their maintenance is time consuming and therefore costly. Innovations are the more valuable the sooner they are introduced, in case of implementing such a meticulous process of estimating costs may cause a delay in the implementation of innovations. Obtaining accurate information on costs, may in this case be less important. The application of long procedures of cost estimation can not be introduced at the expense of longer execution time of the innovation process. Mainly for this reason it is better to use a method that may not give as accurate results but due to its speed does not delay the process of innovation.

Another method that can be recommended to estimate the costs of the innovation process is the FBC method of elementary costs (called Features Based Costing) [15]. The aim of this method is to describe a set associated tasks as elementary objects, being a fragments of tasks (Figure 6). In these objects are included the information about the costs. Creation of the elementary cost objects is dependent on the level of company's organization, and they are built on the basis of historical data from tasks performed in the past. Elementary cost objects may relate to individual activities, groups of activities, or even entire task. Development of a database of elementary cost objects allows for its use for scheduling the tasks by creating the appropriate configuration to obtain different values of costs. Different options of solutions can be also obtained, which further can be subjected to analysis and optimization.

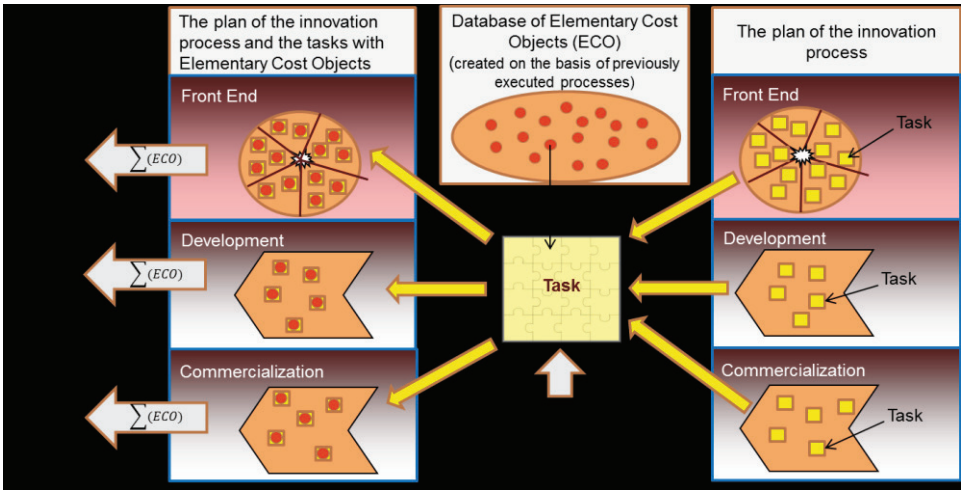


Figure 6 The idea of Features Based Costing method for estimating the cost at the stage of the innovation process tasks planning.

7. Directions For Further Research

Prepared model of cost estimation innovation process is the result of the second phase of the study. In the next stage this model will be verified. This will consist of comparing the model with the real processes of innovation in the next group of companies. It will be important if the approach to cost estimating is so flexible that it allows estimation of any type of innovation, regardless of the time horizon. An important element of further research will be also the selection of estimation methods for each level to provide a more reliable result. For this purpose, the estimation methods and results will be compared with real cost of innovation process in companies. Speed, efficiency and reliability of these methods will be assessed.

8. Conclusion

The need to develop a model was dictated by observations, which indicated that Polish companies lack templates, according to which they could successfully implement innovation processes. Despite the intense activity in the field of innovation, innovation process designing is carried out in an intuitive and informal way. Processes are not conducted efficiently, which would provide an appropriate speed in their organization and implementation.

Costs together with the time are one of the most important criteria for deciding on the implementation of the innovation process. Their deficiency may cause interruption of the process. Therefore, it is important to estimate their value at the right time. Uncertainty and risk are still elements of the processes associated with innovation. Unfortunately, traditional accounting is still not able to include them. Regarded as undesirable, is identified with the failure and incurring large financial losses. Therefore, it is important to skillfully secure funding to carry out the process of innovation. Greater confidence in the processes of innovation is achieved by performing them in sequentially, starting each following phase when the results from the previous phase have been accepted. Therefore, in the presented model, the planning, and thus cost estimation must be held in several stages of the process which gives a greater sense of security.

The cost estimation model of innovation processes is a result of analysis and observation of innovations implemented in Polish enterprises. It is a response to the need for structuring activities in area of cost estimating in innovation processes. The proposed model allows the efficient and flexible management of the innovation funds by:

- Identify places for estimating the costs in innovation process.
- Use several methods to estimate allowing to compare results.
- Progressive cost estimation based on the available data in order to obtain more accurate results.

This will allow managers to more accuracy in decision making and more efficient monitoring and controlling the cost of the innovation processes. It is also important to achieve repeatability in management of innovation processes. This will enable the standardization of innovation processes in the enterprise and improve the quality and effectiveness of these processes.

Acknowledgement

The project funded by the National Science Center in the scope of the research project No. 4025/B/H03/2011/40 Fri: "Developing a model of planning and estimating the cost of innovation"

References

1 Jalonen H. The Uncertainty of Innovation: A Systematic Review of the Literature. Journal of Management Research 2012; Vol. 4; No. 1; E12.
2 Rogers E M. Diffusion of Innovations. Free Press, New York 1995; 4th ed.
3 Chwastyk P. The use of Multi-Criteria Analysis to Evaluate Innovative Solutions. Proceedings of the 7th European Conference on Innovation and Entrepreneurship, Edited by Dr Carla Vibas and Dr Fernando Lucas, Published by Academic Publishing International Limited Reading, UK, 2012: 90-96.
4 Cooper R G. Product Leadership: Pathways to Profitable Innovation. Reading, MA; Perseus Books New York 2005; 2nd edition.
5 Cooper, R. G: Winning at new products: Accelerating the process from idea to launch. Basic books, New York 2001.
6 Cooper R G. Kleinschmidt E J. Screening New Products for Potential Winners. Long Range Planning 1993; vol. 26; no. 6: 74–81.
7 Moingeon B, Lehmann-Ortega L. Strategic innovation: how to grow in mature markets. European Business Forum 2006; (24): 50-54.
8 Wood R. How strategic innovation really gets started. Strategy & Leadership 2007; 35 (1): 21-29.
9 Jurczyk-Bunkowska M. Model of innovation process planning based on research of polish enterprises. Proceedings of the 13th International CINet Conference: Continuous Innovation Across Boundaries, Rome, Italy, September 2012.
10 Moore G A. To Succeed In the Long Term, Focus on the Middle Term. Harvard Business Review July-August 2007.
11 Koen P, et al. Providing clarity and a common language to the "fuzzy front-end". in: Research Technology Management 2001, March-April 2001, pp. 46-55.
12 Cost Estimating and Assessment Guide. U.S. Department of Energy, GAO-09-3SP, Washington, D.C., March 2009.
13 Askarany D, Smith, M., Yazdifar, H.: Technological innovations, activity based costing and satisfaction. Journal of Accounting-Business & Management, No. 14, 2007.
14 Kaplan R S, Anderson S R. Time-Driven Activity-Based Costing, Harvard Business Review November 2004.
15 Rush Ch, Roy R. Analysis of cost estimating processes used within a concurrent engineering environment throughout a product life cycle. Advances in Concurrent Engineering CE2000, Seventh ISPE International Conference on Concurrent Engineering: Research and Applications, Lyon, France 2000, Technomic Publishing Co. Inc., Lancaster, USA, 2000.

COMPETITIVE INTELLIGENCE IN SMALL AND MEDIUM ENTERPRISES: THE PURSUIT OF COMPETITIVE ADVANTAGE AND THE DESIGN OF INNOVATION

Jihene Chebbi Ghannay[1], Zeineb Ben Ammar Mamlouk[2]

1 ESCT, Tunis, Tunisie, Jihene.ghannay@yahoo.fr

2 ESSEC, Tunis, Tunisie, zbenammar@yahoo.fr

Competitive Intelligence (CI) is a business tool that helps organizations and especially small and medium enterprises (SMEs) to innovate in order to survive and create competitive advantage through knowledge creation, internal communication and strategic management. CI is the process by which organizations gather actionable information about competitors and the competitive environment and, ideally, apply it to their decision-making and action plans aiming at enhancing the competitiveness and overall innovation capacity. This article attempts to provide useful insights into the benefits of CI for SMEs as one of the most important pieces in strategic management in order to sustain and enhance competitive advantage and discusses the implications of the framework for managing the CI process. In summary, this study provides two contributions to academic literature. First, it crystallises the relationship between innovation capacity, competitive advantage and CI in SMEs. Second, the result deepens the existing literature by providing a detailed view of the characteristics of CI in SMEs, the reality of innovation capacity in SMEs and proposing also a conceptual model with special focus on the relationship between CI, innovation and competitive advantage.

Keywords
Competitive intelligence, small and medium enterprises, innovation, innovation capacity competitive advantage.

1. Introduction

In the era of globalization, competitors need to incorporate new approaches in managing their intelligence processes. Globalization of market, resulting from advances in communication and transportation, has rapidly changed political climates and ideologies, which has led to the reduction in trade barriers opening doors to new international opportunities for business.

These fundamental mutations are prompting the far-sighted organizations to realize major changes in how they deploy their strategic resources to compete in the knowledge economy. Small and Medium Enterprises (SMEs)are not aloof from these pressures. Drihlon et al [1] argued that improving competitiveness is now an imperative for small and large business alike. Therefore, to survive in such aggressive competitive environment, an organization requires a better understanding of its competitors and competitive forces that affects its success. SMEs are forced to rethink how to anticipate and react to changes that occur. In order to manage such an achievement, SMEs should have a process for turning data into

actionable intelligence, from which strategic and tactical decisions can drive. The utilization of such knowledge is known as competitive intelligence (CI).

CI is a business tool that helps organizations in the process of strategic management and increasing business performance through enhancing knowledge sharing, internal communication and strategic plans quality.

Nonaka[2] states that knowledge and its strategic use is one sure source of sustainable competitive advantage for the organization, therefore CI can create the ability to develop, use retain and transfer knowledge to become the lifeblood of the organization. Knowledge is considered to be the only resource that increases in value, so is worth of great effort in managing it. Creation of knowledge can not only lead to innovation[3]; [4]; [5],, competitive advantage [6];[7];[8] as many researchers have discovered but also to value creation|9]; [5].

in fact, organisations are constantly faced with the challenge of gaining competitive advantage over competitors. Developing that special edge may mean survival for some or a way to stay on top of competition for others. A critical ingredient for staying on top is innovation.

Innovation has become the key to building sustainable competitive advantage for organization. Innovation and competitive advantage are connected to each other. Innovation is “the successful exploitation of new ideas” [10]; the successful application of knowledge or techniques in new ways or for new purposes. It is also about organising a business to exploit new opportunities profitability. Innovation involves an attitude of mind that is always seeking to improve, responds to customer needs, aims to get ahead of competition.

Recent literature on both sustainable competitive advantage and innovation focuses mainly on large, often multinational companies. Because of this focus, they are overlooking the significant contribution from SMEs. However, given that the argument about the effect of fi rm size on the effectiveness of innovation is still ongoing, it is worth addressing the issue from an SME perspective. (1) What is the importance of CI for SMEs and in which way it influences the innovation capacity and competitive advantage of these firms? (2) What factors contribute to the development of innovative capacity in SMEs?

2. Evaluating CI in SMEs- an overview

In current competition environment, SMEs are confronted with unprecedented challenges. In order to sustain themselves and defeat the bigger rivals, SMEs must adopt various measures to gain competitiveness. The presence of CI in SMEs as a formal activity is essential, since they need to be aware of their competitor’s behaviour. It is, therefore, necessary to understand the forces that drive companies to be knowledgeable and analytical towards competitors and dedicate resources to practise CI.

Sun Tzu theorized "if you are ignorant of your enemy and yourself, then you are a fool and certain to be defeated in every battle".

2.1 The importance of CI

CI has undergone a raising interest in recent years as a result of the information explosion and the sharpness of information technologies. CI is the analytical process that transforms scattered information about competitors and customers into relevant, accurate and usable strategic knowledge on market evolution, business opportunities and threats. Fuld and Co[11]. a high profile CI consulting firm, takes an inclusive approach in defining the function of CI: *"Competitive intelligence can mean many things to many people. A research scientist sees it as a heads-up on a competitor's new R&D initiatives. A salesperson considers it insight on how his or her company should bid against another firm in order to win a contract.*

A senior manager believes intelligence to be a long-term view on a marketplace and its rivals" [12].

The Society for Competitive Intelligence Professionals (SCIP), gives a little more precise definition: “A systematic and ethical program for gathering, analyzing, and managing external information that can affect your company’s plans, decisions, and operations. Put it another way, CI is the process of enhancing marketplace competitiveness through a greater-yet unequivocally ethical-understanding of a firm’s competitors and the competitive environment” [13].CI contributes more value to the tactical and strategic goals of a company [14], [15]. Rothberg and Erickson [16] stressed the importance of CI. They claimed that an informative or actionable CI product fills the following gaps in an organization:

a) Knowledge gaps

b) Where to find what needs to be known

c) How to act with the information once it is provided

CI enables senior managers in companies of all sizes to make more-informed decisions about everything from marketing, R&D [research and development], and investing tactics to long-term business strategies. Kenneth Sawka(1998)[13] found through the investigation that the primary role of CI is the early warning and to avoid " surprise" is the most important expectation of the business managers [14]. Fred Wergeles(2005) points out that providing senior managers with early warning is one of the primary objectives of CI[17].

2.2 The role of CI in SMEs

More and more multinational corporations have adopted a formal process for collecting and analyzing information on competitive environment, also known as CI [18];[19]. These businesses use CI to develop strategies that address opportunities and threats and allow them to gain or maintain competitive edge.

SMEs often miss the business opportunity and even be defeated in the market due to its limited resources and poor information processing ability. With the help of CI, SMEs can have a good knowledge of competitive environment and quickly respond to environment changes. CI is more important to SMEs than to their large counterparts. The role of CI is as follows.

• CI serves as a warning system, which can anticipate various changes to avoid emergent crisis (risks). The warning function includes monitoring business environment, discovering competitor, and so on.

• CI serves as a decision support tool for decision-making level. The function includes investment, merging, market exploitation, production decision, technology development...

• CI serves as an effective enterprise learning tool. In the first place, the system integrates a great deal of information and knowledge. Added to that, the system provides benchmark comparison, technology reference, advanced management methodology, thus accumulate valuable experience for the company.

CI offers a real strategic advantage for many businesses [20]. Gilad (2000) argues that some of the largest corporate organizations have dedicated CI department, while smaller businesses often practice CI on an ad hoc basis [21]. They do so by informally collecting information from a variety of internal and external sources such as the Internet, conferences, networking meetings and publicly available data.

The CI is deployed with the intention to better coordinate internal processes and activities of organizations, primarily, to reach market effectively.

In other words, CI is the foundation on which organisation objectives, strategies, and tactics are built, assessed and modified. They permit organizations to assess both their industry life cycle and the capabilities of current and potential competitors in order to maintain or develop

a competitive advantage. CI programs provide input for such decisions as far as products, markets and business lines are concerned either to invest and develop or not.

3. Determinants of innovation capacity in SMEs:

CI cycle that is used, including planning, collection, analysis, publication and evaluation, can be effective in creating innovation in organizations. Studies of Michak Lysin [22], show, organizations which have developed systems for monitoring the activities of their competitors are better able to create competitive advantage through innovation. In fact, innovation can improve companies' competiveness, but in order to do so, it requires a different set of management information, knowledge and skills from that used in running the firm's day-to-day operations [23]. This set of knowledge and management skills may be considered as the companies' innovative capacity, which is defined as the internal potential to generate new ideas, identify new market opportunities and implement marketable innovations through exploration of the company's existing resources and capacities [24] distinguished from dynamic innovation.

3.1 Innovation capacity of SMEs:

It has been recognized in many countries that SMEs are important to economic growth and significantly essential to generate employment [25]; [26]. Encouraging innovation in SMEs has been at the heart of policy incentives owing to the important role that SMEs play in economic development. However, innovation in SMEs has received only scant attention. Relatively, little work has been published on the innovation capacity of SMEs, but there are lots of studies that have examinated developed innovations in the context of small business[27];[28];[29].
We define innovation capacity as the ability or propensity to innovate. Within a chain context, innovation capacity encompasses the entire innovation process occurring both within and among the member SMEs. Innovation capacity is the ability of enterprises to identify trends and new technologies, as well as to acquire and exploit this knowledge and information [21]. Szeto (2000) defines innovation capacity as a continuous improvement of capabilities and resources that an enterprise possesses in order to explore and exploit opportunities for developing new products to meet market needs [30].
The innovation capacity of a firm is dependent on both its internal and external resources because they are considered as complementary for the innovation process [31[; [32]; [33] This innovation 'capacity' concept needs to be clearly distinguished from dynamic innovation 'capability'; the latter deals with the firm's specific ability to continuously transform knowledge and ideas into profitable innovations. Capabilities, on the other hand, refer to the capacity to deploy the resources of an organization, so the capabilities have an impact on innovation capacity.
Absorptive capacity is a commonly used concept to describe the ability of an enterprise to recognize the value of new external knowledge, to assimilate it and to apply it to commercial ends [34]; [35]. Branzei and Vertinsky, [36] have described absorptive capacity as a basis of dynamic capabilities for product innovations in small and medium-sized enterprises.

3.2 determinants of innovation capacity

According to Hii and Neely (2000), a company's innovative potential is not derived from a single specific skill, but rather from a set of skills termed innovative capacity, through exploration of the company's existing resources and capacities[37]. Four key criteria:

organizational culture, resources, competencies, and relationships with other organizations for analysing and improving innovation capacity will be discussed below :

3.2.1 Organizational culture:

Several individual, organizational and environmental factors are shown to affect innovation capacity of the organizations. One of the most important organizational factors- organizational culture- is less studied in the area of innovation . Organisational culture is an important construct that affects both individual and organisational related process and outcomes.
Organisational culture affects organisational innovation capacity and innovation. Edwards et al., (2002) reflected that the organisation culture with values, norms and beliefs is an invaluable enabler of innovation[21]. Martins and Terblanche (2003) argued that organisational culture appears to have an influence on the degree to which creativity and innovation are stimulated in an organisation[38].
In fact, organizational culture – comprising the set of knowledge valued and disseminated among employees – is what distinguishes a particular company from others in all aspects, including its innovation process. Seeking to better understand the generation and accumulation of knowledge within the company and how it may contribute to forming organizational culture, Lemon and Sahota (2004) listed the main repositories of knowledge in a company, namely: the environment; its mission, vision, and values; technology; knowledge structures; the management style and organizational structure; individuals; the collective; and organizational memory[39].

3.2.2 Resources

A resource is a physical entity that constitutes the means by which a company can conduct its business. Often, resources are scarce; the quantity, or even the availability of resources has an impact on the operations of a company. Similarly, the manner in which resources are used can affect the profitability of commercial organizations. Resources can include financial capital, human resources, and access to technology – but also access to markets and infrastructures.
According to Barney (1991), a company's resources may be divided into three separate categories: physical resources, human resources and organizational resources[40]. These constitute inputs to the productive process, and in this case ideas are generated, which can be classified as a fourth resource category. Resource constraints can motivate companies to come up with innovations that allow their survivability

3.2.3 Competencies

Allied to resources, competencies are for the most part responsible for the number of new products and services developed by the firm (HII; NEELY, 2000)[37]. Competencies are defined as a set of skills needed to coordinate and allocate company resources towards the fulfilment of tasks. They could be classified as a group of capacities or processes necessary for the conception and implementation of innovation. Distinguishing personal competencies from organizational ones is of utmost importance. Organizational competencies are the ones that identify an environment where innovations can easily be developed, identified and encouraged. Individual competencies are those, which identify an individual person's capabilities of being involved in the different innovation processes of the organization. Organisations are made up by people so it is essential that the people are capable of being innovative and producing something new, the learning of the organization is directly related

to the learning of its employees. [41];[42] Customers´ participation, interaction and networking.

3.2.4 Inter-organizational n*etworks*

The role of inter-organizational networks in innovation processes has become a key research area in the field of innovation studies [43], [44], [45], [46].
Adler and Shenbar (1990) use the term 'external assets' to characterize a company's connection to the environment[47]. They outline three types of relationships with external entities that can be a source of innovation:

1- Connections to consumers: relates to the extent of access the company has to consumers' decision-making process. Also includes what the company may learn from consumers, including new product ideas.

2- Connections to suppliers, sales teams, and sources of scientific and technical knowledge: relates to the quality of the company's connections to the best people in the field and to whether these relationships are sufficiently collaborative.

3- Horizontal connections through partnerships and alliances, trade associations and informal relationships: these connections can be a source of substantial knowledge to guide the development of the company's technological assets.

Fleury and Fleury (2000) also highlight the possibility of seeking extra-organizational resources to help in the firm's innovation process, after the company has learned to organize its own resources[48].

4. CI framework to grow innovation and sustain competitive advantage in SMEs:

4.1 Innovation capacity and competitive advantage:

Innovation is often claimed to be a cornerstone of competitiveness [49]; [50]; [51]. The role of innovation in firm's strategy is further said to contribute to competitive advantage[46], organizational performance [52] and market share [53]. According to Barney(1991), there are many ways that can be undertaken by the company to achieve competitive advantage[20]; however, the most important aspect required in a dynamic environment is success in generating innovation[40]. Therefore, innovation is a key factor for a company to survive and grow on the long run. So firms in the context of firm competitiveness, should consider innovation as an attempt to create competitive advantage by perceiving or discovering new or better ways of competing in an industry or service and bringing them to market.

As innovative capacity is a key element of companies' competitiveness in the current global scenario, companies and especially SMEs should be organized and managed in order to develop products, services, and processes that actually offer sustainable competitive advantage.

In fact, Sustained competitive advantage lies in the capacity to innovate continuously and to learn more rapidly than one's competitors [54]. It is no longer the technology itself that is a strategic resource, but rather the organisational, technological and cognitive processes underlying the capacity to innovate and learn. Hall (2007) defines this capacity (to innovate)[55] as:

"*The context-specific range of scientific and other skills and information held by individuals and organisations and the practices and routines (institutions), patterns of interaction and policies needed to create and put knowledge into productive use in response to an evolving*

set of challenges and opportunities. A large element of this capacity arises from learning-by-doing, whereby organisations engaging in the innovation process continuously adapt ways of working and routines — institutional learning — thus incrementally improving their ability to utilise knowledge and information".

4.2 The relationship between CI, innovation and competitive advantage

Organizations continually seek new ways to achieve sustainable competitive advantage and to counter aggressive competition .Proactive organizations recognize the advantage to be gained from an organized CI program. Britt (2006) states that Companies with using CI and analysis of competitor's strengths and weaknesses are able to predict opportunities of market development and having better performance rather than competitors[56].Studies of Michak Lysin [57] show, organizations which have developed systems for monitoring the activities of their competitors are better able to create competitive advantage through innovation. Porter (1996) states that a firm will only be able to obtain better results than its competitors if it manages to create a specific and durable differentiating factor, and that innovative behaviour being the principal means of creating this competitive advantage[58]. Pierce et al study [59]also states, that organizations which have intelligent employees are able to make competitive advantage through innovation better than others.
CI cycle that is used, includes planning, collection, analysis, publication and evaluation, can be effective in creating innovations capacity in SMEs.
The capacity to innovate is recognized today as one of the main aspects leading to a competitive advantage amongst firms. Innovation reflects the tendency of a firm to lend its support to new ideas, novelty experimentation and the creative processes that may result in new products, services or technological processes [60]. Mogollón and Vaquero (2004)[61] interpret firms' innovation efforts as evidence of their increasing awareness of innovation as a source of competitive advantage. Thus many authors see innovation, competitive advantage and performance as interconnected concepts and processes, and their inter-relationship has been studied and widely analysed [62];[63];[64];[65];[66].

5. Conclusion

This article has intended to provide insights into a better understanding of CI in SMES in what concerns the possibility of influencing innovation and competitiveness.

CI plays one of the most important roles in the preparation of company management's strategic decision when creating new conditions to guarantee the company's future success in the keenly competitive business environment, and it is considered one of the most powerful and prospective weapons in the hands of company management.

CI is a key factor for innovation and competitive advantage. One may say that innovation is a wide-ranging and complex process, the result of interactions between several factors, including individuals, customers and clients, competitors, suppliers, the market, research centers, and other knowledge producing institutions. Innovation may indeed improve corporate competitiveness; however, so as to come true, it requires a set of different management knowledge, practices and skills. This set may be called **innovative capacity of a firm,** as defined above. On the practical level, the findings of this analysis may point to new directions in the relationship between CI in SMEs and innovation and competitive advantage. A greater understanding of how the building of innovative capacity occurs across different industry sectors could assist companies in better allocating their resources to leverage their innovative capacity. Their impact on innovation and competitive advantage is, however, not yet well explored. But it seems to be a promising path for future research.

References

1 Drihlon, G. and Estime, E. , "Technology watch and the small firm", OECD Observations, 182(June/July), 31-34.1993

2 Nonaka, I., The knowledge creating company, Harvard Business Review, November/December. 1991.

3 Leonard B D.,Wellsprings of Knowledge: Building and Sustaining the Source of Innovation. Boston: Harvard Business School Press.1995

4 Leonard D., Sensipe E S. ,The Role of Tacit Knowledge in Group Innovation, California Management Review, vol. 40, no. 3, Spring. 1998

5 Von Krogh, G., K. Ichijo, et al. Enabling Knowledge Creation. New York, Oxford University Press.2000

6 Teece, D. F., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. Strategic Management Journal, 18, 509–533.

7 Spender, J. C., & Grant, R. M. (1996). Knowledge and the firm: Overview. Strategic Management Journal, 17, 5–9.

8 Carnerio A (2000). How does knowledge management influence innovation and competitiveness? Journal of Knowledge Management, 4(2) :87-98.

9 Davenport, T.H., De Long, D.W. and Beers, M.C. , "Successful knowledge management projects", Sloan Management Review, Vol. 39 No. 2,1998, pp. 43-57.

10 DTI (2003) "Competing in the Global Economy: The Innovation Challenge" (December 2003).

11 Fuld & Co, website

12 Fuld, L M., The New Competitor Intelligence. John Wiley & Sons, 1995.

13 SCIP., Society of Competitive intelligence professionals. (Online). http://www.scip.com.

14 Savioz , P., "Technology Intelligence, Concept Design and Implementation in Technology-based SMEs", Palgrave Macmillan, Basingstoke. 2004

15 Liebowitz J.," Strategic Intelligence- Business intelligence, Competitive Intelligence, and Knowledge Management", AUERBACH PUBLICATIONS Boca Raton, FL, 2006.

16 Rothberg, H N., Erickson, G S," From Knowledge to Intelligence: Creating Competitive Advantage in the Next Economy", Elsevier Butterworth-Heinemann, Woburn, MA, 2005.

17 Sawka, K., Early warning: The decision-maker's perspective. Comp. Int. Rev., 9: 63–65. 1998

18 Borrey D, Spencer H. OMR vs. Image based marks recognition competing technologies for the same market? http:/www.visionshape.com 1997 January

19 Fowkes F G R, Fulton P M. Critical appraisal of published research: introductory guidelines. BMJ 1991; 302: 1136-40.

20 Stephen H., (2006). Management Information Systems for the Information Age. Third Edition. McGraw-Hill Ryerson.

21 Gilad, B. (2000). "An Ad Hoc, Entrepreneurial CI Model," Competitive Intelligence Magazine, vol. 3, no. 4, pp. 33-39.

22 MICHAKLISIN M.D., "Strategic assets and firm performance: an empirical study of the resource-based views", doctoral thesis, Kent State University, Kent, OH. 1996.

23 TIDD, J.; BESSANT, J.; PAVITT, K. Managing innovation: integrating technological, market and organizational change. Chichester: John Wiley & Sons, 2001.

24 Hii, J.; Neely , A. Innovative capacity of firms: on why some firms are more innovative than others. In: INTERNATIONAL ANNUAL EUROMA CONFERENCE, 7., 2000, Ghent. Proceedings… Brussels: Euroma, 2000.

25 Harvie, C. and Lee, B-C.. Introduction: the role of small and medium-sized enterprises in achieving and sustaining growth and performance. In: Harvie, C. and Lee, B-C. (eds), (2005). Sustaining growth and performance in East Asia, Cheltenham: Edward Elgar, pp. 3-27. 2005 a

26 World Bank (2009). "Thailand Economic Monitor April-June 2009", online: http://www.worldbank.or.th, (Retrieved 31-01-2010).

27 Avermaete, T., J. Viaene, E. J. Morgan, E. Pitts, N. Crawford and D. Mahon, 2004b. Determinants of product and process innovation in small food manufacturing firms. Trends in Food Science & Technology, 15(10), pp 474-483

28 De Jong, J.P.J. and O. Marsili, „The Fruit Flies of Innovation: A Taxonomy of Innovative Small Firms" , Research Policy, 35, 213-229. 2006

29 Forsman, H.. Balancing Capability Building for Radical and Incremental Innovations, International Journal of Innovation Management, Vol. 13, No. 4, pp. 501-520. 2009

30 Szeto, E. Innovation capacity: Working towards a mechanism for improving innovation within an inter-organizational network. The TQM Magazine, 12(2), 149–157. 2000

31 Edwards T, Delbridge R, Munday M. Understanding innovation in small and mediumsized enterprises: a process manifest. Technovation 25:1119-1127. 2005

32 Avermaete T, Viaene J, Morgan EJ et al. (2004) Determinants of product and process innovation in small food manufacturing firms. Trends Food Sci Tech 15(10):474-483.

33 Cassiman B, Veugelers R," In Search of Complementarily in the Innovation Strategy: Internal R&D and External Knowledge Acquisition. Management Science 52(1):68-82.

34 Cohen, W.M., D.A. Levinthal. 1990. Absorptive Capacity: A New Perspective on Learning and Innovation. Administrative Science Quarterly 35, 128-152. 2006

35 Zahra, S. A. and George, G.. Absorptive capacity: A review, reconcepualisation, and extension.

Academy of Management Review, 27(2): 185-203. 2000.

36 Branzei, O., & Vertinsky, I.. Strategic pathway s to product innovation capabilities in SMEs. Journal of Business Venturing , 21: 75-105. 2006.

37 Hii, J.; Neely, A. Innovative capacity of firms: on why some firms are more innovative than others. In: International Annual Euroma Conference, 7., 2000, Ghent. Proceedings… Brussels: Euroma, 2000.

38 Martins, E.C., Terblanche, F., Building organizational culture that stimulates creativity and innovation. European Journal of Innovation Management, Vol 6 (1), 64-74. 2003.

39 Lemon, M. and Sahota, P.S.,. Organizational culture as a knowledge repository for increased innovative capacity. Technovation, 24(6): 483-499. 2004

40 BARNEY, J (1991), Firm Resources and Sustained Competitive Advantage, Journal of Management, 17, 99-120

41 Appelbaum, S.H. and Reichart, W. (1997), ``How to measure an organization's learning ability: a learning orientation (Part I)'', Journal of Workplace Learning, Vol. 9 No. 7, pp. 225-39.

42 Kohli, A. K., Shervani, T. A., & Challgalla, G. N. (1998). Learning and Performance Orientation of Salespeople: The Role of Supervisors. Journal of Marketing Research, 35(2), 263–274.

43 Breschi S. and Lissoni F. (2001) Knowledge Spillovers and Local Innovation Systems: A Critical Survey, Industrial and Corporate Change 10, 975-1005.

44 Hagedoorn J. (2002) Inter-firm R&D partnerships: an overview of major trends and patterns since 1960, Research Policy 31, 477-492.

45 Owen-Smith J. and Powell W.W. (2004) Knowledge networks as channels and conduits: the effects of spillovers in the Boston biotechnology community, Organization Science 15, 5–21.

46 Ahuja G., Polidoro Jr. F. and Mitchell W. (2009) Structural homophily or social asymmetry? The formation of alliances by poorly embedded firms, Strategic Management Journal 30, 941-958.

47 Adler, P.S., and A. Shenbar, 1990, "Adapting your technological base: the organizational challenge". Sloan Management Review, 25, 25–37.

48 FLEURY, A.; FLEURY, M. T. L. cité on INNOVATIVE CAPACITY AND ADVANTAGE: A CASE STUDY OF BRAZILIAN FIRMS RAI - Revista de Administração e Inovação, vol. 5, núm. 2, 2008, pp. 57-72 Universidade de São Paulo São Paulo, Brasil

49 Denton, D.K. (1999),'Gaining competitiveness through innovation', European Journal of Innovation Management Volume 2 · Number 2 · 1999 · pp. 82–85.

46 Johannessen J, Olaisen J, Olsen B (1999). Managing and organizing innovation in the knowledge economy. Eur. J. Innov. Manage., 2(3): 116-128.

50 Neely A. & Hii J. (1998), Innovation and business performance: a literature review, Research report, Judge institute of management studies, Cambridge.

51 Yamin, S., Gunasekaran, A. & Mavondo, F. T. 1999, 'Innovation Index and Its Implications on Organisational Performance: A Study of Australian Manufacturing Firms', International Journal of Technology Management, vol. 17, no. 5, pp. 495-503.

52 Robinson W. (1990), Product innovation and start-up business market share performance,Management Science, 1279-1289

53 De Geus AP. 1988. Planning as learning. Harvard Business Review Mar/Apr: 70–74.

54 Edmondson, A. and Moingeon, B. (1996) When to learn how and when to learn why: appropriate organizational learning processes as a source of competitive advantage. In: B. Moingeon and A,, Edmondson (eds), Organizational Learning and Competitive Advantage. London: Sage. pp. 17-37: 7-20.

55 Hall, A. 2007. Challenges to Strengthening Agricultural Innovation Systems: Where do we go from here? In UNU-MERIT Working Paper. Maastricht, the Netherlands: United Nations University/Maastricht Economic and Social Research and Training Centre on Innovation and Technology.

56 Britt P. (2006). The new competitive intelligence: Raising the confidence quotient. KMWorld, November/December:10-24.

57 Michaklisin, M.D. (1996), "Strategic assets and firm performance: an empirical study of the resource-based views", doctoral thesis, Kent State University, Kent, OH.

58 Porter, M. E. 1996. What is Strategy? Harvard Business Review 74(November-December):61- 78.

59 Piercy, Nigel F. and Kaleka, Anna and Katsikeas, Constantine S. (1998), "Sources of Competitive Advantage in High Performing Exporting Companies", Journal of World Business, 33 (4), 378-393.

60 Lumpkin, G. T. & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance: Academy of Management Review, 21 (1): 135-172.

61 MOGOLLÓN, R. M. H.; VAQUERO, A. C.(2004). El comportamiento innovador y los resultados de la empresa: un análisis empírico. In Congreso hispano-francês de aedem, 14.,2004, Ourense. Memorias… Madrid: Academia Europea de Dirección y Economía de la Empresa, p.739-750.

62 Porter, M.E. 1998a. Competitive Advantage: Creating and Sustaining Superior Performance, with a new introduction. New York: Free Press.

63 Teece, D. J. and G. Pisano (1994). 'The dynamic capabilities of firms: An introduction', Industrial and Corporate Change, 3(3), pp. 537-556.

64 Roberts, P.W., and Amit, R., (2003) "The dynamics of innovative activity and competitive advantage: the case of Australian retail banking, 1981 to 1995". Organization Science 14 (2), 107–122.

65 Short, J.C., Moss, T.W. & Lumpkin, G.T., (2009) "Research in social entrepreneurship: Past contributions and future opportunities", Strategic Entrepreneurship Journal, 3, 2, pp. 161-194.

66 Newbert, S.L. 2007, 'Empirical research on the resource based view of the firm: an assessment and suggestions for future research', Strategic Management Journal, vol. 28, no. 2, pp. 121–146.

EXAMINING COMPLEX INTERACTIONS OF FACTORS AFFECTING INNOVATION ACTIVITIES OF FIRMS: A FIELD STUDY OF SMES IN SIX EUROPEAN COUNTRIES

Avraam Papastathopoulos[1]

[1]*AKMI Metropolitan College, 74 Sorou Str, Athens, Greece, apapastathopoulos@amc.edu.gr, apapast@hotmail.com*

The aim of this exploratory study is to examine the complex interactions among variables that affect the innovation activity of European manufacturing SMEs by using a hierarchical log linear model. In this study, innovation is empirically measured in terms of development of new products or services. The raw data were drawn from an official survey conducted by European Commission's "*Sectoral e-Business Watch*" in 2009. This survey consists of 627 telephone interviews in 6 selected EU countries. The seven variables used in our study concern *employment of ICT practitioners, implementation of enterprise system, implementation of information system, e-commerce activities, sales in international markets, ICT investments and company size.* All these variables were found to be associated with the outcome variable *new products-services development* in a chi-square test analysis. The results revealed fifteen out of an original twenty-eight possible two-way interrelationships between the chosen variables that were identified as remaining in the hierarchical log linear model. It is hoped that this exploratory research has laid the foundation for further examination of innovation activity in the SME context.

Keywords

Hierarchical Log Linear Analysis, Information and Communication Technologies (ICT), Product Innovation, Small and Medium-Sized Enterprises (SMEs)

1. Introduction

Few would dispute that innovative activity allows companies to gain an edge over their competitors and to surpass them in the market. Indeed, designing and introducing new products or processes can offer new or existing companies opportunities for growth [1], [2], [3]. Freel[4] (2000) maintains that innovation is crucial to economic development, if a firm is to remain competitive. The importance of innovation cannot be underestimated in a highly competitive globalized economy, with decreased product lifecycles, increased technological capability, and constantly-shifting consumer demands. It would not be an exaggeration to say that the very survival of small companies may depend to a large extent on their capacity to be innovative. Those small companies able to incorporate innovation into their core business strategy may face the future optimistically with greater productivity and growth potential [5], [6], while those that do not will inevitably become uncompetitive, offering obsolete products and processes [7]. McAdam and McConvery[8] (2004) are convinced: firms incorporating innovation will out-perform the others.

As Spencer[9] (2001) supports, companies adopting basic and applied technological knowledge will bring considerable financial gain and offer a competitive edge. According to much of the literature, innovation and ICT act in a complementary manner [10]. In the past, larger scale innovation in the business sector was a time-consuming process that required considerable human and material resources. Today, however, ICTs allow the transfer and implementation of innovations across organizations, at a greatly-reduced cost and without compromising the quality of products-services [11]. In each unit, the new process is implemented as specified by the software [12].

The goal of this exploratory study is to expand our understanding of the complex interactions among variables that affect the product innovation activity of small and medium-sized European manufacturing enterprises (SMEs) by using a hierarchical log linear model. The research is based on an official survey conducted by the European Commission's[13] "*Sectoral e-Business Watch"* in 2009. This survey consists of 627 telephone interviews in 6 selected EU countries. Numerous statistical methods have been utilized to generate predictive models that identify factors affecting innovation of SMEs [14], [10], [15]. While these models provide an accurate statistical description between these variables and outcome, they do not readily lend themselves to presenting the complex interactions visually. This study contributes toward this direction and hopes to inspire those who want to investigate systematically all orders of interactions of factors affecting the product innovation-improvement of European manufacturing firms. Additionally, the analysis stresses that companies taking into account different factors can improve the chances of better implementing ICTs, and thus achieve better levels of product innovation-improvements.

The paper is organized as follows. First, an extensive review of the influential literature is presented. Secondly, a discussion follows of the methodological issues regarding survey development, sampling and data collection. Thirdly, the results of the research are followed by, first, an analysis and, then, relevant interpretations. The last section contains a discussion on these findings as well as conclusions. We will close with a discussion of the limitations of the research and its implications for future research.

2. Concepts and Literature

2.1 Product Innovation

Product innovations can be incremental or radical, and they result from both internal and external innovative activities. Such innovations aim to improve the quality and variety of goods and to create new opportunities for the company to develop, largely through production of larger quantities and better prices [15]. According to Qian and Li[16] (2003), many SMEs can be considered "resource-constrained" when compared to large companies. Many of these SMEs lack resources, but they make up for it with their flexibility, agility, and innovation. This innovation comes largely in the form of product modifications [17].

2.2 Sales Market

In recent years, more and more SMEs are facing international competition and are thus obliged to become more active in international markets. This internationalization affects all firms, large and small. Simply put, "internationalization" is when a company is active in one or more foreign markets and accordingly gears its activities to an international context. What this means for SMEs is that, in time, internationalization becomes a key determining force in their strategies [18], [19]. This increased international completion has affected global

business, particularly European companies, whether they are export-orientated or active in the domestic market [20].

2.3 Firm Size

Research has been contradictory as to the direction and intensity of the relationship between size and innovation. Some researchers have suggested a positive relation, stressing that company size can best indicate innovation [21], [22], [23]. However, others support that a negative relation exists between basic variables [24], while others find no relation at all [25]. Other studies have suggested that these contradictory results could have come about because important variables were measured incorrectly. Along these lines, Camisón[26] (2001) pointed out that the manner we use to measure organizational factors largely influences our conclusions about how size effects performance. In a similar vein, Damanpour[23] has suggested that it is the multidimensional character of innovation that may yield contradictory results as to the relationship between innovation and size.

2.4 ICT Practitioners

By "ICT practitioner skills" we mean the capabilities necessary for researching, developing, designing, strategic planning, managing, producing, consulting, marketing, selling, integrating, installing, administering, maintaining, supporting and servicing ICT systems [13]. Studying UK companies, Hwang[26] (2004) examined the relationship between ICT diffusion and changes in skills, concluding that employee education/training were of utmost significance in adjusting necessary skill changes to the broad expansion of ICTs. We can additionally argue that the adoption of innovation needs commitment and effort on the part of employees [27]. Empirical studies have shown that ICT is most productive when integrated with investments in working practices, human resources, and company restructuring [28].

2.5 Investments in ICT

As mentioned above, ICT is being increasingly used as a competitive resource that facilitates the implementation of strategic plans and other activities (e.g., [29], [30]. Today, ICT is crucial to the development of this capacity [31]. ICT is complementary to innovative activities and contributes to the company's development, facilitating the creation of new products and processes, taking care of customer needs, stimulating demand for other products, and opening paths for new products [32].

2.6 E-Business Activities

A significant objective for all manufacturing firms is the improvement of supply chain efficiency. ICT can contribute in this area as well by enabling data exchanges with suppliers and improving overall procurement processes [13]. Therefore, supplier relations are significant value chain factors that can influence innovation activities. These supplier, or "inter-firm," relations can be said to involve learning, as all the parties must, over time, get to know each other and adapt to whatever activities are involved in the collaboration. For example, companies will form closed networks among themselves in order avoid supply delays or other problems. Once again, ICT plays a central role, since it reinforces relations among companies [12].

2.7 CRM & CAD

Customer Relations Management is another critical tool today which helps to maintain customers as well as to elicit suggestions about product and service improvement [33]. CRM allows companies to enhance their knowledge about customer needs. In efficiently and effectively managing customer relations, CRM also contributes to a company's capacity for innovation [33], [34]

Computer Aided Design systems are used to design products. Most such systems provide sophisticated modelling and simulation software, which are necessary for visualising a product's possible physical appearance. Beyond the traditional drawing board, CAD systems enable the user to design products and other elements (e.g. a store front) graphically, with the assistance of a computer screen, often in 3D [35].

In the next section, we will discuss the methodology employed to test the theoretical model.

3. Research Design Methodology

3.1 Research Design

The raw data were drawn from an official survey conducted by the European Commission's "*Sectoral e-Business Watch"* in 2009[13]. The Sectoral e-Business Watch has been collecting data related to the use of ICT and e-business in European enterprises by means of representative surveys since 2002. This survey took place among SMEs from the "Glass, Ceramic and Cement" industries and consists of 627 telephone interviews with ICT decision-makers in six selected EU countries (UK, France, Germany, Spain, Italy and Poland).

3.2 Population and Sampling Frame

The survey population was defined as companies that had at least 10 employees, used computers, were active within the national territory of one of the six countries covered, and had their primary business activity in one of the sectors covered (see Table 1). The survey was carried out as an enterprise survey: data collection and reporting focus on the enterprise, defined as a business organisation (legal unit) with one or more establishments.

The final allocation of our sample (*n* = 627 SMEs) according to firm size, industry and country is illustrated as follows (Table 1):

Table 1 Industry and country distribution of the sample & sampling sources

			Firm Size 10 - 49			Firm Size 50 - 249			
			Survey Sectors			Survey Sectors			
			Ceramic	Cement	Glass	Ceramic	Cement	Glass	Total
Countries	Germany	Count	29	68	23	11	24	16	**171**
		% within sector	17,0%	39,8%	13,5%	6,4%	14,0%	9,4%	**100%**
	Spain	Count	12	57	13	16	20	4	**122**
		% within sector	9,8%	46,7%	10,7%	13,1%	16,4%	3,3%	**100%**
	France	Count	16	39	15	6	3	5	**84**
		% within sector	19,0%	46,4%	17,9%	7,1%	3,6%	6,0%	**100%**
	Italy	Count	10	29	19	6	22	8	**94**
		% within sector	10,6%	30,9%	20,2%	6,4%	23,4%	8,5%	**100%**
	United Kingdom	Count	12	18	21	4	3	3	**61**
		% within sector	19,7%	29,5%	34,4%	6,6%	4,9%	4,9%	**100%**
	Poland	Count	8	27	7	9	33	11	**95**
		% within sector	8,4%	28,4%	7,4%	9,5%	34,7%	11,6%	**100%**
Total		Count	87	238	98	52	105	47	**627**
		% within sector	13,9%	38,0%	15,6%	8,3%	16,7%	7,5%	**100%**

3.3 Measure Development & Statistical Method

In order to examine the complex two-way interactions among variables that affect the product innovation of European manufacturing SMEs, a hierarchical log linear analysis was applied. The major emphasis of log-linear analysis is to obtain a log-linear model that is linear in logarithms of the expected frequencies of a contingency table and that adequately describes or fits the associations and interactions that exist in the contingency table as closely as possible [36]. The principal reason for utilizing log-linear procedures in this study lies in the fact that interactions and interrelationships underlying categorical survey data can be analytically highlighted. A backwards elimination was used to remove non-significant two-way interactions between variables using a statistical significance cut-off of 0.05. Associations for each predictor against dichotomized outcome were tested using chi-squared test analyses.

In log linear models, all variables that are used for classification are independent or predictor variables and the dependent variable is the log of the number of cases in a cell of the

multiway cross-tabulation [37]. The outcome variable *product innovation* is empirically measured in terms of launching any new or improving products or services. The raw data were coded and analyzed using the PASW Statistics 18.

Table 2 Summary of Research Variables

Predictor Variables	**Abbreviations of Variables**	**Description – Operational Measure**	**Source**
Product Innovation (outcome)	PI	Respondents were asked whether they had launched any new or substantially improved products or services during the past 12 months(0 = yes and 1 = no).	European Commission 'SeBWSurvey 2009'
Implementation of CRM	CRM	Respondents were asked whether their firm had implemented an e-CRM system (0 = yes and 1 = no).	European Commission 'SeBWSurvey 2009'
Implementation of CAD	CAD	Respondents were asked whether their firm had implemented a computer-aided design system (0 = yes and 1 = no).	European Commission 'SeBWSurvey 2009'
ICT Practitioners	ICTP	Respondents were asked whether their firm had employed personnel with ICT qualification (0 = employment and 1 = non- employment).	European Commission 'SeBWSurvey 2009'
ICT Investments during Economic Crisis Period	ICT-Inv	Respondents were asked whether the economic crisis had an impact on their ICT Investment plans or on ICT Projects (0 = yes and 1 = no).	European Commission 'SeBWSurvey 2009'
E-Business Activities	eBus	Respondents were asked whether their firm had used used the Internet or other computer networks to order goods or services from suppliers online(0 = yes and 1 = no).	European Commission 'SeBWSurvey 2009'
Sales in International Markets	SIM	Respondents were asked to indicatewhich sales market is the most significant (0 = Regional-Country Market and 1 = International Market).	European Commission 'SeBWSurvey 2009'
Company Size	CS	Respondents were asked to indicate their size group (0 = 10-49, 1 = 50-249)	European Commission 'SeBWSurvey 2009'

This table lists the variables that were incorporated into the hierarchical log linear model, their abbreviations, the operational measures, as well as the sampling source.

4. Statistical Results

4.1 Analysis of Associations

Prior to testing the complex interactions among variables that stimulate the Product Innovation of European manufacturing SMEs, a Pearson's Chi-Square test was used in order to examine whether there is an association between response categorical variables and outcome categorical variable).

Before moving on to look at the test statistics themselves, we must first check that the assumption for chi-square has been met. The assumption is that in 2 X 2 tables all expected frequencies should be greater than 5 [38]. All values exceed 5, and so the assumption has been met. The test statistics are illustrated as follows:

Table 3 Respondent Profile and Chi-Squared Tests

			Product Innovation (outcome variable)			Chi-Square Test	
			Yes	No	Total		
Employment of ICT practitioners	**yes**	Count	63	76	139		
		% within PI	29,3%	19,0%	22,6%	***Value***	8.580**
		Adjusted Residual	2,9	-2,9			
	no	Count	152	325	477		
		% within PI	70,7%	81,0%	77,4%	***df***	1
		Adjusted Residual	-2,9	2,9			
Total		Count	215	401	616	***Sig.***	***0.003***
		% within PI	100,0%	100,0%	100,0%		
The Economic Crisis Impact on ICT Investment Plans	**yes**	Count	107	147	254		
		% within PI	49,8%	38,1%	42,3%	***Value***	7.726**
		Adjusted Residual	2,8	-2,8			
	no	Count	108	239	347		
		% within PI	50,2%	61,9%	57,7%	***df***	1
		Adjusted Residual	-2,8	2,8			
Total		Count	215	386	601	***Sig.***	***0.005***
		% within PI	100,0%	100,0%	100,0%		
Implementation of CAD system	**yes**	Count	116	148	264		
		% within PI	54,0%	37,2%	43,1%	***Value***	16.006***
		Adjusted Residual	4,0	-4,0			
	no	Count	99	250	349		
		% within PI	46,0%	62,8%	56,9%	***df***	1
		Adjusted Residual	-4,0	4,0			
Total		Count	215	398	613	***Sig.***	***0.000***
		% within PI	100,0%	100,0%	100,0%		
Implementation of CRM system	**yes**	Count	67	78	145		
		% within PI	30,9%	19,7%	23,7%	***Value***	9.700**
		Adjusted Residual	3,1	-3,1			
	no	Count	150	318	468		
		% within PI	69,1%	80,3%	76,3%	***df***	1
		Adjusted Residual	-3,1	3,1			
Total		Count	217	396	613	***Sig.***	***0.002***
		% within PI	100,0%	100,0%	100,0%		
E-Business Activities	**yes**	Count	132	201	333		
		% within PI	60,8%	50,1%	53,9%	***Value***	6.493*
		Adjusted Residual	2,5	-2,5			
	no	Count	85	200	285		
		% within PI	39,2%	49,9%	46,1%	***df***	1
		Adjusted Residual	-2,5	2,5			
Total		Count	217	401	618	***Sig.***	***0.011***
		% within PI	100,0%	100,0%	100,0%		
Sales in International Market	**International Market**	Count	59	56	115		
		% within PI	23,0%	15,5%	18,6%	***Value***	5.607*
		Adjusted Residual	2,4	-2,4			
	Regional-Country Market	Count	197	305	502		
		% within PI	77,0%	84,5%	81,4%	***df***	1
		Adjusted Residual	-2,4	2,4			
Total		Count	256	361	617	***Sig.***	***0.018***
		% within PI	100,0%	100,0%	100,0%		
Company Size	**10-49**	Count	150	269	419		
		% within PI	58,1%	73,9%	67,4%	***Value***	17.061***
		Adjusted Residual	-4,1	4,1			
	50-249	Count	108	95	203		
		% within PI	41,9%	26,1%	32,6%	***df***	1
		Adjusted Residual	4,1	-4,1			
Total		Count	258	364	622	***Sig.***	***0.000***
		% within PI	100,0%	100,0%	100,0%		

This table shows the count, percentage use, adjusted residuals andthe statistical results of the Chi-square test between firm performance (outcome variable) and response variables. In all above tests, there is no violation of the basic rule for using chi-square test (that the expected values in each cell be greater than 1 and that most cells have expected values greater than 5 (Norusis, 2008).

** The value is significant at the 0.05 level. ** The value is significant at the 0.01 level. *** The value is significant at the 0.001 level.*

As seen in above Table, using the chi-square tests, all the related *p*-values are less than the traditional threshold of .05. Thus, it can be verified that these values are highly significant, which indicates that the employment of ICT Practitioners, the impact on economic crisis in ICT-investments, the implementation of CRM and CAD systems, e-business activities, the firm's sales market and company size had a significant effect on whether a SME achieves product innovations.

4.2 Loglinear Analysis

The results reveal fifteen out of an original twenty-eight possible two-way interactions between the chosen variables that were identified as remaining in the hierarchical log linear model. Two-way interactions were investigated only because trying to make sense of three-way and higher-way interactions is notoriously difficult, so the reason for limiting to two-way was pragmatic, based on the need to keep any interpretations as simple as could be. Making the interactions any more complex does not help and may actually hinder interpretation of what the multivariate data are saying.

Table 4 lists the individual statistical inter-relationships between the various predictors, the chi-square value and the *p*-value. The inter-relationships are ranked with the strongest statistical association at the top of the table.

Table 4 Statistical Inter-Relationships between Parameters within Hierarchical Log Linear Model

Two-Way Interaction Parameters	Chi-squared	df	*P* value
CAD * CS	12.824	1	0.0001
ICTP * CS	22.688	1	0.0001
PI (outcome)* CAD	10.068	1	0.002
eBUS* SIM	9.609	1	0.002
ICTP * ICT-Inv	9.823	1	0.002
CRM*CAD	8.883	1	0.003
PI (outcome)* ICT-Inv	7.171	1	0.007
CRM * ICTP	7.029	1	0.008
CRM *eBUS	6.291	1	0.012
PI (outcome)* CS	6.281	1	0.012
CRM * ICT-Inv	5.876	1	0.015
PI (outcome) * eBUS	5.626	1	0.018
SIM * CS	4.865	1	0.027
CAD * SIM	4.581	1	0.032
CRM * CS	4.387	1	0.036

This table lists all the statistical inter-relationships between the various variables with a p-value <0.05.

At this point we have to make clear that the above statistical association does not in itself imply the direction of the relationship. For instance, the statistical relationship between CAD

x PI (outcome) in this model does not tell us whether the implementation of CAD of non-implementation is responsible for a firm's innovation achievement.

Figure 1 illustrates the model graphically by linking the various predictors by lines whose thickness is representative of the strength of association between the predictors. The predictors have been structured into a hierarchy to illustrate the directness of the impact of the variable on outcome.

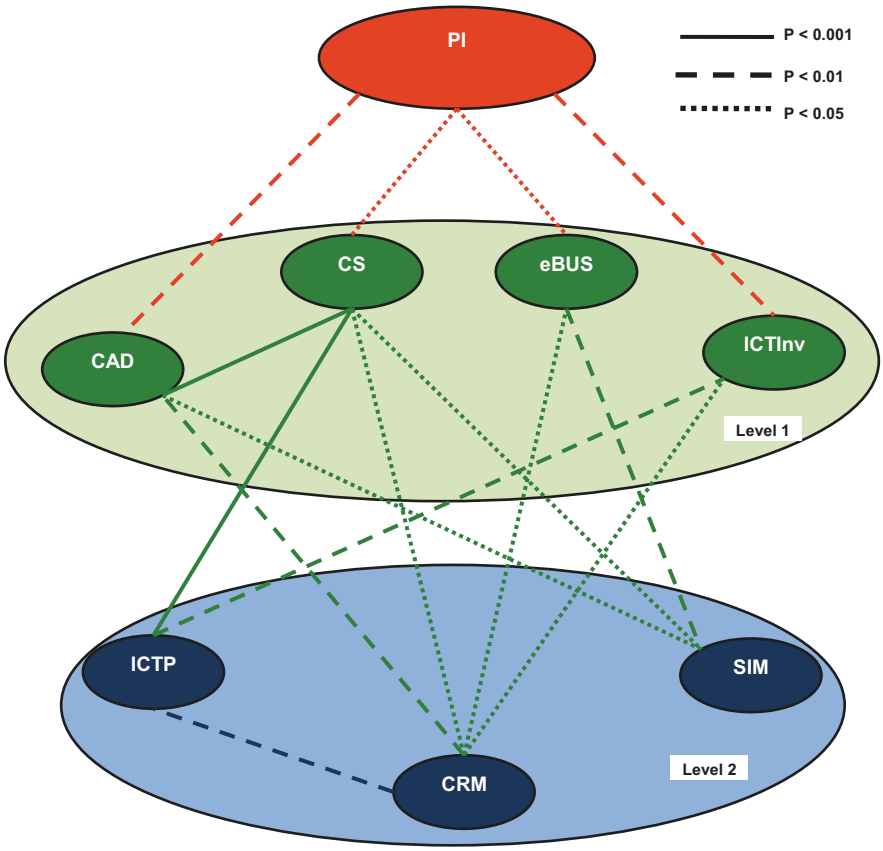


Figure 1 Hierarchy of Relationship between Outcome and Variables

As seen in the above figure, four variables within the hierarchical log linear model (implementation of CAD, size, e-Business activities and ICT Investments during economic crisis period) had a direct independent statistical relationship with product innovation. The remaining three variables (employment of ICT practitioners, implementation of CRM and sales in international market) only had a statistical relationship with business performance via at least one other variable. The thickness of the lines relates to the strength of statistical association in the model ranked by p-value.

Regarding the overall model's fit, two statistics were used; the Pearson and the likelihood ratio chi-square. The value for the first was 223.35 and for the latter, 235.12, and the related observed significance levels were 0.65and 0.43, respectively. This means that both indices

do not detect a significant lack of fit of the model. The overall goodness-of-fit test tells us if the model appears to fit the data.

6. Conclusion

The primary purpose of this multi-country empirical research was to provide an understanding of the factors that influence the product innovation activity of the European manufacturing firms. Moreover, a log linear model was developed that can be used to examine the complex interactions among variables that affect the product innovation activity of in EU manufacturing sector. All the seven variables were found to be associated with the outcome variable *new products-services development* in a chi-square test analysis. The results revealed fifteen out of an original twenty-eight possible two-way interrelationships between the chosen variables that were identified as remaining in the hierarchical log linear model.

Extending from the statistical results, the key findings of this study can be summarised as follows:

- A strong statistical association-interaction was discovered between the product-services designing systems (e.g. CAD system) and product innovation in the SMEs from the 'Glass, Ceramic and Cement' industries.
- An equally-significant statistical association-interaction was observed between investments in ICT during the period of economic crisis and product innovation. We can conclude that the economic crisis unfolded its impact on innovation as well.
- Statistical association-interaction was also found in the development of e-business activities between companies and product innovation. We can say that this association-interaction highlights the significance of the findings from the broader environment of the companies and especially the stakeholders.
- A very strong statistical association-interaction was discovered between the size of a company and the systems which contribute to designing new products-services (CAD systems), as similarly between company size and personnel with ICT qualifications. This proves once again that company size plays a significant role in all technological adoptions.
- Another strong interaction was found between electronic transactions of companies with their suppliers and the market within which they are active. Furthermore, the market in which a SME is active, is related statistically both to its size and to the implementation of computer-aided design systems.
- Finally, it is important to note the strong association-interaction that was found between investments in ICT during economic crisis period and ICT skilled personnel, as similarly between the CRM enterprise system and ICT Practitioners. The above statistical associations confirm once again the interrelation between technological systems, personnel and resources, as has also been pointed out in earlier studies [28], [39], [12], [13],[40]).

Although hierarchical log linear analysis is a well-established, powerful, multivariate statistical method, it has not been widely employed in business research. Numerous statistical methods have been utilized to generate predictive models that identify factors affecting performance of businesses. While these models provide an accurate statistical description between these variables and outcome, they do not easily lend themselves to presenting the complex interactions visually. This study contributes toward this direction, and it aims to

inspire those who want to investigate pictorially the complex interactions of factors affecting the product innovation of European manufacturing firms.

However, this work is not free of limitations. Taken that the findings in this study are based on Groups 23.1 to 23.6 (NACE Rev. 2 Division 23), which broadly comprise the manufacture of glass, ceramics, cement, concrete, lime and plaster, and of products made of these materials, they cannot be generalized to the entire manufacturing sector. Additionally, the particular statistical method reveals the complex associations between variables but does not reveal the direction of those associations. It would be interesting to see future research that would highlight these as well.

References

1 Frenken K. and Boschma, R. A. (2007), A theoretical framework for evolutionary economic geography: industrial dynamics and urban growth as a branching process, *Journal of Economic Geography,* 7, 635–649.

2 Tourigny, D., and C. Le (2004), Impediments to Innovation Faced by Canadian Firms. *Economics of Innovation and New Technology,* 13(3), 217–250.

3 Storey, J. (2000), The Management of Innovation Problem. *International Journal of Innovation Management,* 4(3), 347–369.

4 Freel, M. (2000), Barriers to Product Innovation in Small Manufacturing Firms. *International Small Business Journal,* 18(2), 60–79.

5 Madrid-Guijarro, A., Garcia, D. and Auken, H. (2009), Barriers to Innovation among Spanish Manufacturing SME. *Journal of Small Business Management*, 47(4), 465-488.

6 Cefis, E., and O. Marsili (2006), Survivor: The Role of Innovation in Firm's Survival, *Research Policy 35*, 626–641.

7 Cotec (2006),Tecnología e Innovación en España. Ed. *Informe Cotec 2006*. Madrid: Fundación Cotec para la Inno-vación Tecnológica.

8. McAdam, R., and T. McConvery (2004), Barriers to Innovation within Small Firms in a Peripheral Location, *Inter-national Journal of Entrepreneurial Behaviour and Research*, 10(3), 206– 221.

9 Spencer, J. (2001), How relevant is University-Based Scientific Research to Private High-Technology Firms? A United States-Japan Comparison. *Academy of Management Journal,* 44 (2), 432-440.

10 Dibrell, C., Davis, P. and Craig, J. (2008), Fuelling Innovation through Information Technology in SMEs. *Journal of Small Business Management,* 46(2), 203-218.

11 Brynjolfsson, E., McAfee, A., Sorell, M. and Zhu, F. (2006), Scale without Mass: Business Process Replication and Industry Dynamics. *Harvard Business School*, Working Paper, No. 07-016, 1-46.

12 European Commission (2008), *An Economic Assessment of ICT Adoption and its Impact on Innovation and Performance,* Enterprise & Industry Directorate General, Impact Study No. 10, Germany: DIW Berlin.

13 European Commission (2009), *ICT and e-Business Impact in the Glass, Ceramics & Cement Industry*. Impact study No. 02/2009. A Sectoral e-Business Watch study by empirica GmbH. Principal author: Hannes Selhofer. Bonn/Brussels.

14 Lin, R. J., Chen, R. H. and Chiu, K. K S. (2010), Customer relationship management and innovation capability: an empirical study. *Industrial Management & Data Systems,* 110(1), 111-133.

15 Vaona, A. & Pianta, M. (2008), Firm Size & Innovation in European Manufacturing. *Small Business Economics,* 30: 283-299.

16 Qian, G., and L. Li (2003). Profitability of Small- and Medium-Sized Enter-prises in High-Tech Industries: The Case of the Biotechnology Industry, *Strategic Management Journal,* 24(9), 881–887.

17 Verhees, F. J. H. M., and M. T. G. Meulenberg (2004). Market Orientation, Innovativeness, Product Innovation, and Performance in Small Firms, *Journal of Small Business Management,* 42(2), 134–154.

18 Analoui, F. and Karami, A. (2003) *Strategic Management in Small and Medium Enterprises,* USA: Thomson.

19 Meyer, D. and Heppard, K. (2000) *Entrepreneurship as Strategy: Competing on the Entrepreneurial Edge*, London: Sage Publications.

20 European Commission, Observatory of European SMEs, (2003a) 'Internationalization of SMEs'. *Report submitted to the Enterprise Directorate- General of the European Commission by KPMG Special Services and EIM Business & Policy Research in the Netherlands in co-operation with: European Network for SME Research (ENSR), and Intomart, Luxembourg: Enterprise Publications,* No. 4, pp. 5-58.

21 César Camisón-Zornoza, Rafael Lapiedra-Alcamí, Mercedes Segarra-Ciprés and Montserrat Boronat-Navarro (2004) A Meta-analysis of Innovation and Organizational Size. *Organization Studies,* 25(3):331–361

22 Sullivan, Paulina, and Jikyeong Kang 1999 'Quick response adoption in the apparel manufacturing industry: Competitive advantage of innovation'. *Journal of Small Business Management,* 37: 1–13

23 Damanpour, F. (1992). Organizational Size and Innovation. *Organization Studies* 13: 375–402.

24 Wade, J. (1996). A communication-level analysis of sources and rates of technological variation in the microprocessors market. *Academy of Management Journal*, 39: 1218–1244.

25 Aiken, Michael, Samuel B. Bacharach, and J. Lawrence French (1980) 'Organizational structure, work process, and proposal making in administrative bureaucracies'. *Academy of Management Journal* 23: 631–652.

25 Camisón, César (2001). La investigación sobre la PYME y su competitividad: Balance del estado de la cuestión desde las perspectivas narrativa y meta-analítica. *Papeles de Economía Española* 89–90: 43–87.

26 Hwang, G. (2004), Diffusion of information and communication technologies and changes in skills", available at: www.emcc.eurofound.eu.int/content/source/uk02010s.html?p1=sector&p2= Information_Technology.

27 Acemoglu, D., and Pishke, J. (1999), Beyond Becker: Training in Imperfect Labor Markets. *Economic Journal,* 109, 112–143.

28 Brynjolfsson, E. and Hitt, L.M. (2000), Beyond Computation: Information Technology, Organizational Transformation and Business Performance. *Journal of Economic Perspectives,* 14(4), 23-48.

29 Aral, S., and Weill, P. (2007), IT Assets, Organizational Capabilities, and Firm Performance: How Resource Allocations and Organizational Differences Explain Performance Variation. *Organization Science,* 18(5), 763–780.

30 Oh, W., and Pinsonneault, A. (2007), On the Assessment of the Strategic Value of Information Technologies: Conceptual and Analytical Approaches. *MIS Quarterly,* 31(2), 239–265.

31 King, S.F., and Burgess, T.F., (2006), Beyond Critical Success Factors: A Dynamic Model Of Enterprise System Innovation, *International Journal of Information Management,* Vol. 26 No. 1, pp. 59-69.

32 Frishammar, J., and S. A. Hörte (2005). Managing External Information in Manufacturing Firms: The Impact on Innovation Performance, *Journal of Product Innovation Management*, 22, 251–266.

33 Ramani, G., & Kumar, V. (2008). Interaction Orientation and Firm Performance. *Journal of Marketing,* 72 (1), 27-45.

34 Sahay, B.S. and Ranjan, J. (2008), Real time business intelligence in supply chain analytics. *Information Management & Computer Security*, 16(1), 28-48.

35 European Commission, (2004) *Innovation Management and Knowledge-Driven Economy*, Enterprise & Industry Directorate General Universidad Politécnica de Madrid (leading partner), Brussels-Luxembourg.

36 Wrigley, N (1985), *Categorical Data Analysis for Geographers and Environmental Scientists,* Longman, Harlow.

37 Norusis, M. (2008), *SPSS Statistics 17.0 Advanced Statistical Procedures Companion,* Prentice Hall, USA.

38 Field, A. (2009), *Discovering Statistics Using SPSS,* 3rd Edn., Sage Puplications, London.

39 Cooper, M., Upton, N. and Seaman, S. (2005), Customer Relationship Management: A Comparative Analysis of Family and Nonfamily Business Practices. *Journal of Small Business Management,* 43(3), 242-256.

40 Papastathopoulos, Ɨ. & Beneki, Ch. (2011) Predicting Innovation Activity in European Manufacturing Firms: A Multi-Country Empirical Study. *International Journal of Management and Marketing Research,* Vol. 4, No. 2, pp. 49-66.

WHAT ARE THE DETERMINANTS LEADING TO INNOVATION IN MANUFACTURING FIRMS

Gündüz Ulusoy[1], Kemal Kılıç[1], Gürhan Günday[1], Lütfihak Alpkan[2]

[1]Faculty of Engineering and Natural Sciences, Sabancı University, Istanbul, Turkey, gunduz@sabanciuniv.edu; kkilic@sabanciuniv.edu; ggunday@sabanciuniv.edu.

[2]Department of Management, Gebze Institute of Technology, Kocaeli, Turkey, alpkan@gyte.edu.tr.

In this paper, a comprehensive model of innovation determinants is analyzed based on empirical data gathered from 184 manufacturing firms located in the Northern Marmara region in Turkey. As opposed to the studies that establish the relationship with a limited set of antecedents and innovativeness, this study allows us to investigate how significant is an antecedent compared to others. Such knowledge is invaluable for the decision makers in order to manage their innovation strategies and provides a guideline for effective allocation of their limited resources to be more innovative. The analysis reveals that among all possible determinants considered, intellectual capital has the highest impact on innovativeness followed by organization culture. Path analyses for both of these major innovation determinants are investigated in detail. Some managerial implications are suggested.

Keywords
Empirical research; Innovation; Innovation determinants; Innovativeness model; Manufacturing industry.

1. Introduction

Effective management of innovative organizational climate and capabilities have been generally accepted to help firms achieve higher customer value leading to sustainable competitive advantage in the innovation management literature. Thereby, a long list of organizational drivers of innovativeness, e.g., organization culture, intellectual capital, firm strategies, etc., came out. However, the findings are not always in parallel with each other and sometimes a driver found to be effective in one study proved to be ineffective in another. Moreover, almost all of the empirical studies concentrated on only some specific parts or aspects of this list without controlling the other drivers.

In this study, instead of trying to add some new drivers conceptually and test their effects empirically, most of the already confirmed drivers are tried to be adopted and their individual effects together -not separately is being tested. This approach leads to the measurement and comparison of the individual effect sizes of different antecedents of innovativeness simultaneously. This model will be used to select the most important factors that create an innovative environment in manufacturing firms and thus suggest policies to improve innovativeness at the firm level to the senior managers.

In section two the relevant literature and the comprehensive model will be presented. Section three will cover details about the data and the measurement of variables. The multivariate data analysis employed in this study will be explained in section four. After the discussion of

the results of the path analyses leading to path models for intellectual capital and organization culture in section five, the paper will be concluded with further comments on managerial implications in section six.

2. Innovation and innovation determinants

Innovations can be considered as the successful development and application of new knowledge, with the purpose of launching newness into the economic area and transforming knowledge into profit. In this research, the OECD Oslo Manual [1], which is the primary international basis of guidelines for defining and assessing innovation activities as well as for compilation and use of related data, has been taken as the fundamental reference source to describe, identify and classify innovations at firm level. In the Oslo Manual, four different innovation types are introduced, namely, product, process, marketing and organizational innovations.

The results reported by Günday et al. [2] reveal that innovative companies perform better and are usually more competitive than their rivals. Some companies turn out to be more successful than the others in being innovative due to various internal and external factors they possess. These factors that affect the innovativeness (i.e., the innovative capabilities of the companies) are referred to as the innovation determinants.

2.1 Innovation determinants

Innovation determinants at firm level have been frequently discussed in the innovation management literature. The innovation determinants can be classified in two subgroups: in-firm (indigenous) parameters and out-firm (exogenous) parameters. The indigenous parameters include general firm characteristics (such as firm's age, size, ownership status etc.), intellectual capital (human capital, social capital, organizational capital), firm structure (formalization, centralization, communication), firm culture (firm decision making process and openness of in-firm communication channels, delegation of works, managerial support, reward system, etc.) and firm strategies (such as collaborations, knowledge management, investments strategies and cost strategies, pressure of competition elements, etc.). On the other hand, exogenous parameters are industrial conditions and relations (such as business sector and market structure, public regulations and incentives, external financial funds acquisition, and out-firm barriers to innovation).

Due to space limitations, the reader is referred to Ulusoy et al. [3] for a detailed discussion of these factors and their relevance to innovativeness.

2.2 Drivers of innovativeness model

Based on the literature that is reviewed in the previous section, one can conclude that the innovativeness in a firm is indeed a joint outcome of factors such as firm characteristics, firm structure, intellectual capital, firm strategies and external conditions. These innovation determinants with all their sub-elements are presented in a model designated as the drivers of innovativeness model (Figure 1).

In order to validate the drivers of innovativeness model, a questionnaire consisting of 311 individual questions was developed to be filled in by the upper managers of manufacturing companies. We will next discuss the data collection process and the methodology in more detail.

3. Data collection

After the questionnaire was developed, the initial survey draft was discussed with various firms' executives and it was pre-tested through 10 pilot interviews to ensure that the wording, format and sequencing of questions are appropriate. Data was collected over a 7-month period using a self-administered questionnaire distributed to firms' upper level managers operating in manufacturing sectors in the Northern Marmara region in Turkey.

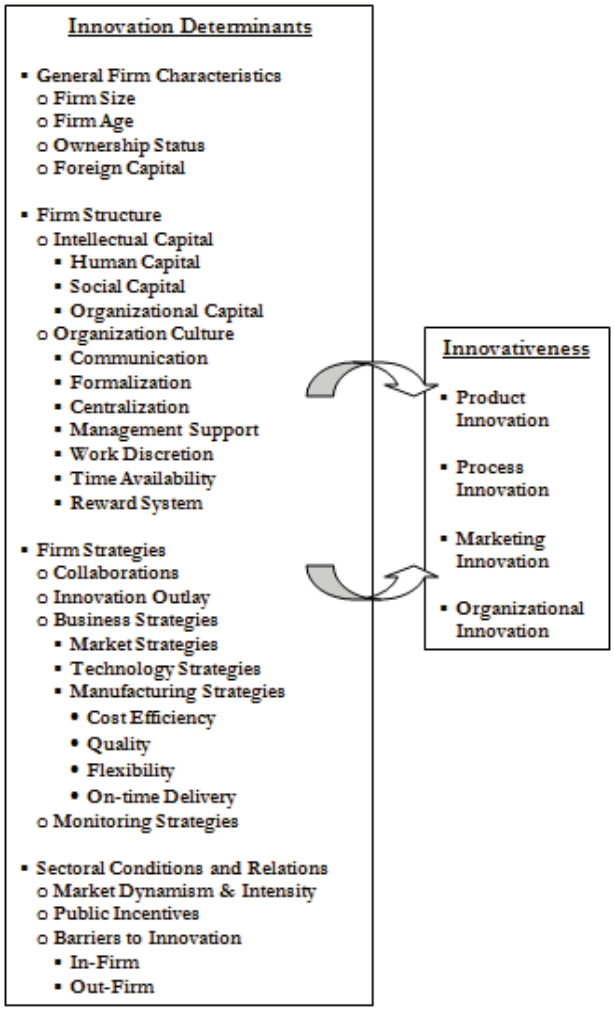


Figure 1 Drivers of innovativeness model.

In order to validate the drivers of innovativeness model, a questionnaire consisting of 311 individual questions was developed to be filled in by the upper managers of manufacturing companies. We will next discuss the data collection process and the methodology in more detail.

3.1 Data collection

After the questionnaire is developed, the initial survey draft was discussed with various firms' executives and it was pre-tested through 10 pilot interviews to ensure that the wording, format and sequencing of questions are appropriate. Data was collected over a 7-month

period using a self-administered questionnaire distributed to firms' upper level managers operating in manufacturing sectors in the Northern Marmara region in Turkey.

A sample of 1,674 manufacturing firms was obtained by selecting randomly from the database of the Union of Chambers and Commodity Exchange (TOBB) and Istanbul, Kocaeli, Tekirdag, Cerkezkoy, and Sakarya Industry Chambers and member lists of various Industry Parks in Northern Marmara region within Turkey. When randomly drawing these firms from the larger sample, care was exercised to secure representative geographic and sector distributions of these firms within the larger sample. Data was collected over a 7 months period in six different manufacturing sectors (namely textile (20%), chemical (18%), metal products (19%), machinery (15%), domestic appliances (8%) and automotive industries (20%)), where the percentages reported correspond to the percentage of the firms surveyed in each sector within the total sample. For each sector, number of firms in the sample turned out to be representative, since no significant difference ($p \leq 0.05$) has been detected between the population and sample percentages. Afterwards, the questionnaire was applied through a hybrid system of mail surveys and face-to-face interviews. Out of the sample of 1672 firms, 184 complete responses were obtained resulting in 11% return rate. The percentage of missing data across all data was calculated to be negligible. Occasional missing data were randomly distributed (MAR) on items.

The data was later controlled with t-test procedure for non-respondent bias (randomness of the data) and no significant difference ($p \leq 0.05$) was found between the interview and mailing data sets' responses both in terms of the questionnaire items and constructs, i.e. innovation and firm performance variables as well as in terms of control variables. In the analyses, variables such as firm size, firm age, ownership status and foreign investments in the company were examined as control variables, since these organizational variables may have possible effects both on innovative capabilities and firm performance. Moreover, the issue of Common Method Variance (CMV) was also attended based on the Harman's single-factor test and it is shown that one cannot conclude the existence of CMV as a result.

Figure 2 depicts a profile of the resulting sample, illustrating its diversity in terms of annual sales volume, firm size (in terms of number of employees) and firm age. Firm size was determined by the number of full-time employees (up to 50: small; between 50 and 250: medium; 250 and above: large) and firm age is determined by the year production started (before 1975: old; between 1975 and 1992: moderate; 1992 and later: young). Annual sales volume was divided into 5 categories: less than 1M Euro; between 1M Euro and 5M Euro; between 5M Euro and 20M Euro; between 20M Euro and 50M Euro; and 50M Euro or more.

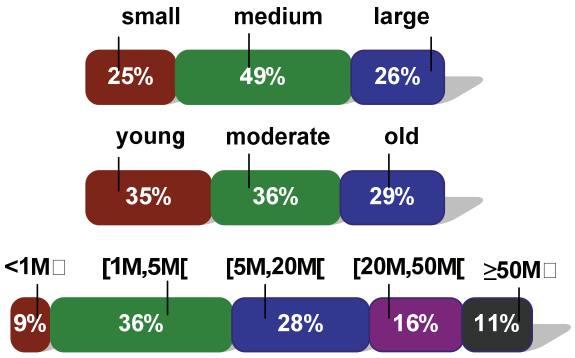


Figure 2 Sample profile.

After the data collection stage, multivariate statistical analyses via SPSS v17 and AMOS v16 software package were conducted in order to validate the research framework.

3.2 Measurement of variables

The questionnaire form is prepared by considering recent questionnaire forms utilized in similar studies and commonly accepted measures met in the current literature. Specifically, the questions about manufacturing strategies (operations priorities), organization culture, innovation barriers, intellectual capital, business strategies are enquired using a 5-point Likert scale and inquiring how important each item is for the firm with the scale ranging from 1=extremely unimportant to 5=extremely important. Such subjective measures possibly bring in manager bias, but are widespread practice in empirical researches [4].

The scales of the four different manufacturing strategies' measures are adapted from existing operations management (OM) literature with six, six, seven, and six criteria, respectively. The base of items asked regarding these priorities are adapted mainly from Boyer and Lewis [5], Alpkan et al. [6], Noble [7], Ward et al. [8], Vickery et al. [9] and Kathuria [10]. For business strategy items, we also benefited from Olson et al. [11].

The scales of the three intellectual capital measures are constructed by inspiring from Subramaniam and Youndt [12] with five, five, and four criteria, respectively for the human capital, social capital and organizational capital. Similarly organizational culture measures are adapted from several criteria in OM literature based previous studies of Walker et al. [13], Jaworski and Kohli [14] and Menon et al. [15].

The questions about innovative capabilities are enquired employing a 5-point Likert scale. The respondents are asked to indicate “to what extent are the related applications/practices implemented in your organization in the last three years” ranging from 1=‘not implemented’, 2=‘imitation from national markets’, 3=‘imitation from international markets, 4=‘current products/processes are improved’, 5=‘original products/processes are implemented’. The base of items regarding these capabilities is adapted mainly from Oslo Manual [1]. Each innovation construct is measured by its original measurement items, which are developed accordingly. Note that the innovation measures used in this research are partially new for the literature and required to be validated during the analysis.

4. Multivariate data analysis

In order to extract the underlying relationships between the innovation determinants and the innovativeness, multivariate data analysis was conducted. First, a principal component analysis (PCA) with varimax rotation is conducted using SPPS in order to identify the underlying innovation determinants and dimensions of innovations, which was followed by a second order PCA in order to reduce the obtained items to usable size and to achieve a more manageable set for subsequent structural equations modelling analysis (SEM) analysis. Five innovation determinants constructs were obtained; namely, organization culture, barriers to innovation, firm manufacturing strategy, intellectual capital and collaboration. Details of this stage are reported in Günday et al. [16]. This stage is concluded by exploring internal consistency and reliability (content validity) among the items of each construct via Cronbach α and unidimensionality tests.

For example, we hypothesized that Intellectual Capital and Organization Culture are subparts of another construct which was referred to as the Firm Structure. However, the factor analysis results implicated that, the items that compose these constructs can’t be grouped under a single construct and should be treated as two different constructs. Similarly, the formalization item was hypothesized to be part of the organization culture. However, the factor analysis placed formalization under the intellectual capital construct and hence, it was eliminated in the SEM analysis. Furthermore, some of the constructs such as the market dynamism and intensity, public incentives, and monitoring strategies were excluded from the SEM analysis since they were deteriorating the underlying factor structure.

The second stage involved the relationships between the factors explored through the correlation and regression analyses and SEM. SEM procedure obtains weights, loadings and path estimates while performing an iterative scheme of multiple regressions until they converge to a solution.

Since some of the innovation determinants such as the general firm characteristics (i.e., size, age, ownership status and foreign capital) and innovation outlay are in a different scale (the answer to these determinants have either nominal values or logical values such as yes or no). Same thing is true for the marketing and technology strategies. Therefore, it was preferred not to include them to the SEM analysis. The firm characteristics were treated as control variables and more appropriate statistical analysis (correlation analysis, t-tests, ANOVA, etc.) were conducted in order to assess their effect to the innovativeness at the firm level.

A single-step SEM analysis with the simultaneous estimation of both measurement and structural models was conducted by AMOS v16. The measurement model of SEM is based on the comparison of the variance-covariance matrix obtained from the sample to the one obtained from the model [17]. The entire model is supported with the goodness-of-fit indices. (Further details can be reached in Ulusoy et al. [3]). Each relation in the model is statistically significant ($p<0.05$). As a result, the proposed paths of relations matching innovation determinants to innovativeness are analyzed and validated regarding their significant path (regression) estimates. According to the path estimates obtained by the SEM analysis, intellectual capital is observed to be the strongest driver of innovative capabilities. It is followed by organization culture, collaborations, barriers to innovation, and firm manufacturing strategies. The barriers to innovation construct is found to be significantly and negatively correlated to innovativeness.

In the following section, we will report the results of the path analyses leading to path models for intellectual capital and organization culture -the two most effective drivers of innovative capabilities. A detailed account of business strategies, which is comprised of firm manufacturing strategy, technology development and market focus, can be found in Ulusoy et al. [18].

The path analysis models in the following section have a common endogenous variable (dependent variable): the innovativeness. The models are formed employing AMOS v4.0 and analyzed according to SEM method. In the figures displaying these path models, the estimates on the arrows are regression weights and the estimates on the box corners are the squared multiple correlations.

5. Results

5.1 Intellectual capital

As a result of explanatory factor analysis, intellectual capital is represented by four factors; namely, human capital, social capital, and organizational capital. The findings of the correlation analysis extract significant one-to-one positive relationship of the aggregated factors. All intellectual capital factors correlate significantly to innovativeness scale with $p<.01$ (Table 1). Organizational capital has the higher correlation coefficient ($r=0.518$) and human capital the lower correlation coefficient ($r=0.271$). Very high correlation of organizational capital stresses the major importance of this factor for firms in order to be more innovative. Hence, correlation analysis demonstrates the positive relationship between innovativeness and intellectual capital. However, this analysis cannot say much about the direction (cause) of the relationship. For that purpose, the multiple linear regression (MLR) analysis can provide more insight.

The regression model of the effects of intellectual capital on innovativeness is statistically significant ($p<0.01$) and according to this model, the independent variables express 28.0% ($R^2=0.280$) of innovativeness. Note that high R^2 of the model and high regression coefficient of organizational capital ($\beta=0.495$) indicate that intellectual capital and especially organizational capital have supreme importance for innovative capability. However, when the factors are included jointly in the MLR, only organizational capital ($\beta=0.495$; $p<0.01$) and human capital ($\beta=0.144$; $p<0.1$) result in significant positive effects. On the other hand, when entered separately, all intellectual capital factors were significantly and positively correlated to innovativeness. So, despite the fact that the model is significant, MLR analysis reveals only some intellectual capital factors have statistically significant effects on innovativeness. This finding implies that there are mediating effects between intellectual capital variables.

Table 1 Correlation analysis of intellectual capital.

	Mean	Std Dev	1	2	3	4
1. Innovativeness	2.81	0.84	1	0.295**	0.271**	0.518**
2. Human capital	3.62	0.65		1	0.582**	0.389**
3. Social capital	3.65	0.59			1	0.498**
4. Organizational capital	3.41	0.88				1

(**) $p<0.01$

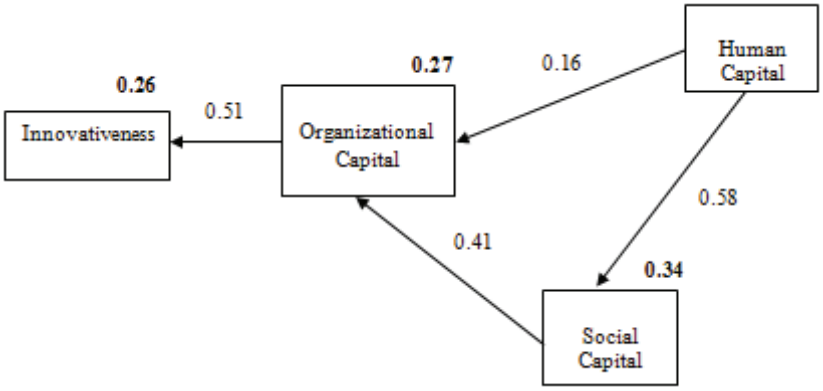


Figure 3 Path analysis model for intellectual capital.

Post hoc analysis suggests that organizational capital mediates the other intellectual capital factors' effects on innovativeness. The resulting path analysis model with its significantly consistent findings is displayed in Figure 3. 26% of the innovativeness can be explained by that model.

Human capital deals with the intelligence, talent, creativity, specialization and productivity of the human resources available. It indeed constitutes the basis of intellectual capital of an organization. Participation of human resources in communication and knowledge sharing; problem detection, formulation and solution; collaboration along these lines among themselves and with customers and suppliers; and acting as part of a learning organization are all encompassed by social capital. Accumulation of experience and knowledge and their reflection to conventions, methods, and processes, and their documentation are the components of organizational capital. As it is revealed in Figure 3 and the definition of the factors given above, it follows that human capital constitutes the basis of both social and organizational capital. Furthermore, social capital influences organizational capital. Innovativeness is directly affected by organizational capital.

5.2 Organization culture

As a result of explanatory factor analysis, organization culture is found to consist of seven factors, namely, communication, formalization, centralization, management support, time availability, work discretion, reward system. The findings of the correlation analysis extract significant one-to-one positive relationship of the aggregated factors (Table 2). All organization culture factors correlate significantly to innovativeness scale with $p<0.01$ except formalization and centralization whose correlations are at $\alpha=95\%$ level. Management support has higher correlation coefficient ($r=0.382$), and formalization has lower correlation coefficient ($r=0.155$) with innovativeness. High correlation of management support to innovativeness stresses the major importance of managerial encouragement to idea generation and support to new projects, in order to be more innovative. Note that centralization is negatively correlated to innovativeness as well as all the other factors. In summary, correlation analysis brings up the positive relationship between innovativeness and organization culture.

Table 2 Correlation analysis of organization culture.

	Mean	Std Dev	1	2	3	4	5	6	7	8
1. Innovativeness	2.81	0.84	1	.350**	.155*	-.192*	.382**	.226**	.219**	.340**
2. Communication	3.95	0.63		1	.293**	-.434**	.572**	.402**	.225***	.524**
3. Formalization	3.39	0.70			1	-.081	.321**	.029	.265**	.218**
4. Centralization	2.79	0.82				1	-.450**	-.332**	-.144	-.357**
5.Management support	3.53	0.68					1	.476**	.386**	.673**
6. Work discretion	3.23	0.75						1	.381**	.419**
7.Time availability	3.21	0.94							1	.405**
8. Reward system	3.68	0.93								1

(**) p<0.01; (*) p,0.05

For investigating the effects of organization culture on innovativeness, a regression model is obtained by applying MRL. The resulting regression model is statistically significant ($p<0.01$) and according to this model, the independent variables express 18.3% ($R^2=0.183$) of innovativeness. However, when organization culture factors are included jointly in the MLR, only communication ($\beta=0.181$; $p=0.058$) and management support ($\beta=0.195$; $p=0.082$) have significant positive effects on innovativeness. But when included individually, all organization culture factors are significantly and positively correlated to innovativeness. Therefore, despite the fact that the model is significant, there is mediating effect between organization culture factors.

Post hoc analysis suggests that communication, reward system and management support mediate other organization culture factors' effects on innovativeness. The results expose the positive relationship between organization culture and innovativeness. The resulting path analysis model is presented in Figure 4.

Formalization is at the root of the path analysis model. Formalization implies a well defined and documented and properly functioning organization designed as a hierarchy of authority. Formalization supports organizational capital. It should be noted that it has no overlap with centralization. As mentioned above, management support appears as the most influential factor on innovativeness. Considering that innovation implies change we can claim that innovation management is change management. Like any change management, such as total quality management, innovation management needs top management support to

overcome the hurdles met on the way to success. Communication and reward system are the other two factors besides management support affecting innovativeness directly. Communication construct includes components like the openness of channels between various levels of the organization; open channels among employees on the same organization level as well as with suppliers and customers, well informed employees on strategies, plans, and changes concerning the firm; existence of mechanisms for acquiring ideas and feedback from the employees in the decision making process. Open communication appears to be an effective tool for the creation of an environment conducive for innovativeness. A merit based transparent reward system functioning according to openly declared rules, which are approved by well informed employees, also serves this purpose. The employees need to know that their efforts and contributions towards being innovative and thus increasing the innovativeness of the firm will be recognized and rewarded.

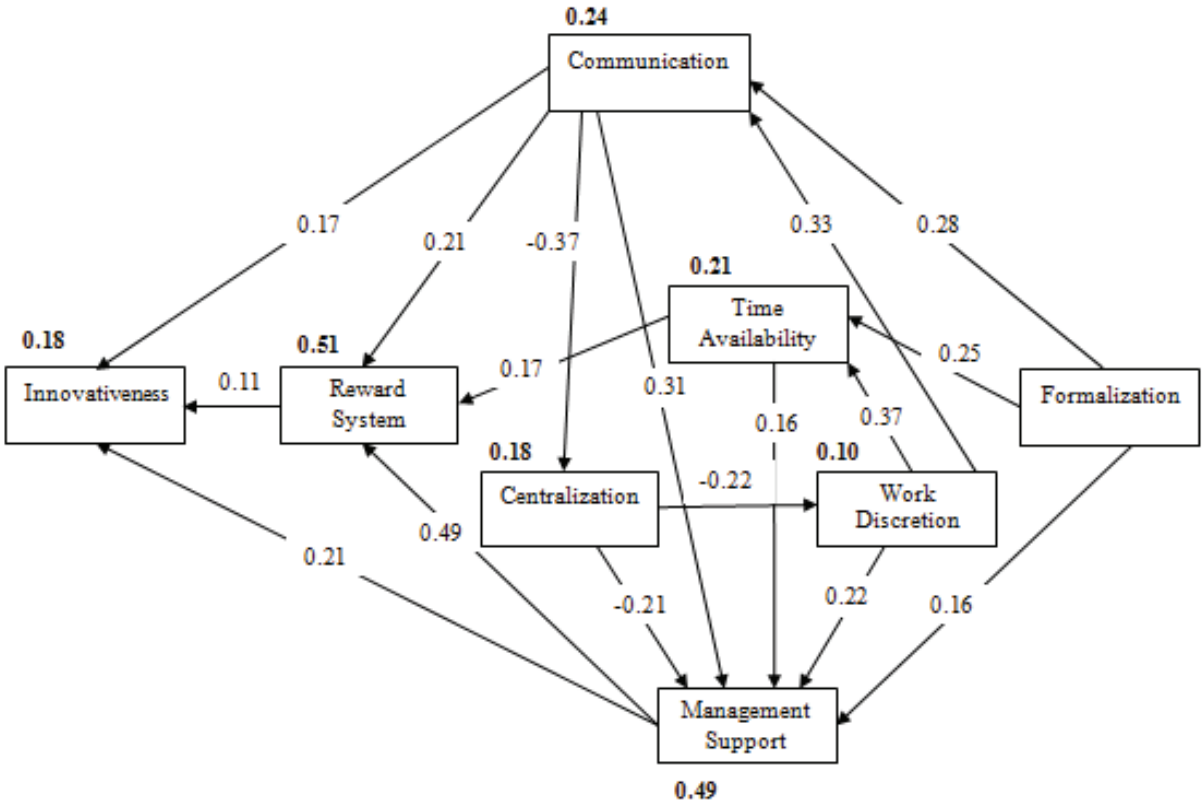


Figure 4 Path analysis model for organization culture.

As mentioned above centralization is negatively correlated to innovativeness as well as all the other factors. Path analysis model in Figure 4 also shows that the more centralized an organization is, the less opportunity the employees have for exercising initiative and hence, blocking the way to new approaches and innovation. It has a similar effect through decreased top management support for new ideas, projects and risk taking behaviour of the employees. Communication appears to act as an antidote to centralization.

6. Further comments

Two of the more important constructs, the intellectual capital and organization culture have been analyzed above in detail. Different policies can be derived from these analyses. For example, human resource possessed by a manufacturing firm is found to be the most effective innovation determinant on innovativeness. One of the policies in line with this would be the need for emphasis on human resources. The recruitment process should be taken very seriously for attracting young innovative talent. The working environment should be conducive for innovation and growth. This is not only a must for recruitment purposes but also for the keeping the talent within the firm.

Rather than trying to enumerate such policies as a list we have decided to conclude with remarks concerning the need for an innovation strategy acting as a framework for all such individual policies. Innovativeness in a firm should not be expected to occur by chance through some random events but should be cultivated through an innovation strategy with a 3-5 years rolling time horizon consisting of several time phased and possibly interacting projects. These projects should be planned, staffed, directed, and controlled with allocated budgets and sponsored by top management. Like any other management endeavour innovation strategy together with its project portfolio should be assessed through well defined and transparent performance criteria – input and output innovation metrics [19].

References

1 OECD, 'Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data, OECD Publications, Paris, 2005.
2 Günday, G., Ulusoy, G., Kılıç, K. and Alpkan, L. Effects of innovation types on firm performance. International Journal of Production Economics 2011; 133: 662–676
3 Ulusoy, G., Kılıç, K., Günday, G., Alpkan, L. Innovation determinants in manufacturing firms. Working Paper, Sabancı University, Istanbul, 2010.
4 Khazanchi, S., Lewis M.W. and Boyer K.K. Innovation-supportive culture: The impact of organizational values on process innovation. Journal of Operations Management 2007; 25: 871–884.
5 Boyer, K.K. and Lewis, M.W. Competitive priorities: investigating the need for trade-offs in operations strategy. Production and Operations Management 2002;11: 9–20.
6 Alpkan, L., Ceylan, A. and Aytekin, M. Performance impacts of operations strategies: a study on Turkish manufacturing firms. International Journal of Agile Manufacturing 2003; 6: 57-65.
7 Noble, M.A. Manufacturing competitive priorities and productivity: an empirical study. International Journal of Operations & Production Management 1997; 17: 85-99.
8 Ward, P.T., McCrery, J.K., Ritzman, L.P. and Sharma, D. Competitive priorities in operations management. Decision Sciences 1998; 29: 1035-1046.
9 Vickery, S.K., Droge, C. and Markland, R.E. Production competence and business strategy: do they affect business performance? Decision Science 1993; 24: 435-455.
10 Kathuria, R. Competitive priorities and managerial performance: a taxonomy of small manufacturers. Journal of Operations Management 2000; 18: 627-641.
11 Olson, E.M., Slater, S.F. and Hult, G.T.M. The performance implications of fit among business strategy, marketing organization structure, and strategic behaviour. Journal of Marketing 2005; 69: 3, 49-65.
12 Subramaniam, M. and Youndt, M.A. The influence of intellectual capital on the types of innovative capabilities. Academy of Management Journal 2005; 48: 450-463.
13 Walker, O.C., Jr. and Robert W.R. Marketing's role in the implementation of business strategies: a critical review and conceptual framework. Journal of Marketing 1987; 51: 3, 15–33.
14 Jaworski, B.J. and Kohli A.K. Market orientation: antecedents and consequences. Journal of Marketing 1993; 57: 3, 53-70.
15 Menon, A., Bharadwaj, S., Adidam, P. and Edison S. Antecedents and consequences of marketing strategy making. Journal of Marketing 1999; 63: 2, 18–40.

16 Gunday, G., Ulusoy, G., Kilic, K. and Alpkan, L. Determining the factor structure of an integrated innovation model. Working Paper, Sabancı University, Istanbul, 2009.
17 Bollen, K.A. (1989) Structural Equations with Latent Variables, John Wiley & Sons, New York, NY., 1989.
18 Ulusoy, G., Günday, G., Kılıç K., Alpkan, L. Business strategy and innovativeness: results from an empirical study. In: Emmanouilidis, C., Taisch, M., and Kiritsis, D. (Editors), Competitive Manufacturing for Innovative Products and Services: Proceedings of the APMS 2012 Conference, Advances in Production Management Systems, IFIP AICT, Series ISSN: 1868-4238, Springer Verlag, Berlin, (to appear in 2013).
19 McKinsey Global Survey Results: Assessing innovation metrics, McKinsey Quarterly October 2008; 1-11.

PROJECT DURATION ESTIMATIONS USING GREY ANALYSIS MODELS

Maria Mikela Chatzimichailidou[1], Stefanos Katsavounis[2], Dusko Lukac[3]

[1]Democritus University of Thrace, Polytechnic School, Department of Civil Engineering, 12 Vas. Sofias Str, Xanthi, Greece, mikechat@civil.duth.gr

[2]Democritus University of Thrace, Polytechnic School, Department of Production and Management Engineering, 12 Vas. Sofias Str, Xanthi, Greece, skatsav@pme.duth.gr

[3]Rheinische Fachhochschule Köln gGmbH, University of Applied Sciences, Vogelsanger Strasse 295, 50825 Köln, Germany, lukac@rfh-koeln.de

The safe estimation of duration, throughout the planning of Project Management schedules, is a key objective for project managers. However, linear approaches fail to include and sufficiently serve the dynamic nature of many characteristics of an activity. The present research emphasizes in designing and implementing a methodology that approximates the duration of the activities during the phase of planning and scheduling, utilizing Grey Analysis mathematical modeling and comparing it to commonly used linear methodologies. Grey Analysis, consisting of many prediction mathematical models, seems to gain ground on its obsolete ones and it gradually becomes a well-adapted and up-to-date technique for numerous scientific sectors. In this paper we examine the contribution of the most used GM(1,1) model, to predict future states, respectively task durations, in construction projects. Based on time observations of critical instances we develop a conceptual method for making duration estimations and communicating deviations from the original schedule in a way that approximations will fit reality better. The whole procedure contributes to the decrease of the uncertainty concerning project completion time and it can also reduce, up to a scale, project manager's inaccurate estimations. The survey concludes with a rudimentary but enlightening example that validates its effective use.

Keywords
Grey Analysis, Project Management, Risk Management, Technical Constructions

1. Introduction

It is apparent that Project Management is a crucial field of interest and research, for which Project Managers (PM) create and monitor project schedules. Probabilistic approaches were primarily used to bridge the gap between conflicting issues, such as cost, time and uncertainty, whilst the newly introduced Systems Thinking suggests a more holistic view, under which the analyst should take many phenomena of project's internal and external environment into account.

Apart from some conventional methods, which are commonly used in Project Management, there is also a new group of mathematical models called "Grey Systems Analysis". Grey systems and fuzzy logic models are preceded by the same principle and they investigate situations with no crisp values but fuzzy ones. Grey Analysis is still in an infantile state, it is

very popular in environmental matters though [1,2], once they do show great endogenous complexity.

Grey models is a practical tool in case of having sequences of data, something very common in activity durations. Complied with this rule and by utilizing previous given data, the present work focuses on the applicability of grey models to project's duration. The paper's utmost aim is to add value to Project Management, so that this sector could be stimulated and meet new and accumulating demands. For one thing and before elaborating on it, Grey Analysis should be put into borders first, so as to grasp its meaning and utility.

Probability and statistics, fuzzy mathematics and grey systems theory are the three mostly seen research methods employed for the investigation of uncertain systems. Probability and statistics study the phenomena of stochastic uncertainty with the emphasis placed on revealing the historical statistical laws. They investigate the chance for each possible outcome of the stochastic uncertain phenomenon to occur. Their starting point is the availability of large samples that are required to satisfy a certain typical form of distribution. PERT, the core and the most traditionally used statistical tool in Project Management, is a method to analyze the involved tasks in completing a given project, especially the time needed to complete each task, and to identify the minimum time needed to complete the total project. Because of its historical significance and attention it is going to be further explained in Section 2.

The focus of grey systems theory is on the uncertainty problems of small samples and poor information that are difficult for probability and fuzzy mathematics to handle. Fuzzy mathematics, grey systems theory and rough set theory are currently the most actively studied systems theories of uncertainty. Their more distinct differences are presented in Table 1 [3].

Table 1 Comparison between the three methods of uncertainty

Object	Grey systems	Prob. statistics	Fuzzy math
Research object	Poor information	Stochastic	Cognitive uncertainty
Basic sets	Grey hazy sets	Cantor sets	Fuzzy sets
Methods	Information coverage	Mapping	Mapping
Procedures	Sequence operator	Frequency distribution	Cut set
Data requirement	Any distribution	Typical distribution	Known membership
Emphasis	Intension	Intension	Extension
Objective	Laws of reality	Historical laws	Cognitive expression
Characteristics	Small sample	Large sample	Experience

The research of uncertain (fuzzy, grey, rough) systems can be categorized into the following three aspects [3]:

- The mathematical foundation of the uncertain systems theories.
- The modelling of uncertain systems and computational schemes, including various uncertain systems modelling, modelling combined with other relevant methods and related computational methods.
- The wide-range applications of uncertain systems theories in natural and social sciences.

From the ISI and EI Compendex [3] data bases it is found that the number of research papers having the keywords “fuzzy set,” “grey system,” and “rough set” increases rapidly.

2. PERT/CPM Method

One of the most challenging jobs that any manager can take on is the management of a large-scale project that requires coordinating numerous activities throughout the organization. In planning their coordination, in developing a realistic schedule and then in monitoring the project progress, many sets of details must be considered.

PERT (Program Evaluation and Review Technique) method belonging to the known group of mathematical modelling techniques is the most popular probabilistic method and it is ordinarily used in combination with CPM (Critical Path Method). This explains the fact that this method is mostly known as PERT/CPM. These techniques make heavy use of AON and AOA networks, to help plan and display the coordination of all the activities. AON approaches use widely available software packages to deal with all the data needed to develop schedule information and then to monitor the progress of the project.

The last forty years, PERT is an intrinsic part of Project Management and puts the foundation stone for project scheduling. Activity duration estimation is the most important aspect of the method. Although resource availability greatly affect the duration of activities, a basic precondition is resource abundance and it is usually taken for granted in advance, in case of non-deterministic project planning at least. This distinction is made because stochastic resource planning requires sophisticated tools such as the RCMPSP techniques [4].

PERT analysis calculates the expected critical path based on the hypothesis that expected duration of each activity is an independent random variable following a Beta probability distribution. Sampling from Beta distribution requires four parameters to be defined: minimum and maximum values (scale) and two important shape parameters, estimating the mean, the variance and the mode (the most likely) values according to the following formulas [5]:

$$\text{mean: } \mu = p + (o-p) * \left(\frac{\alpha}{\alpha+\beta}\right), \text{ variance: } \sigma^2 = \left(\frac{\alpha}{\alpha+\beta}\right)\left(\frac{\beta}{\alpha+\beta}\right)\left(\frac{(o-p)^2}{\alpha+\beta+1}\right)$$

$$\text{mode: } m = p + (o-p)\frac{\alpha-1}{\alpha+\beta-2},$$

where o, p are the optimistic (maximum) and pessimistic (minimum) values and α, β are the shape parameters.

PERT distribution uses three-point estimation for the expected time T_E of each activity. For each activity duration best-case estimation, the most likely estimate and worst-case estimate, corresponding to o, m, p, are used to calculate mean and variance [5] values:

$$\mu = T_E = \frac{(p+4m+o)}{6} \text{ and } \sigma^2 = \left(\frac{(o-p)^2}{36}\right)$$

The multiplier 4 scales the height of the distribution. In project analysis, mode (m) variable is given as the most likely estimation and the suitable choice of the two shape parameters gives for every activity a specific shape to the Beta distribution. Yet the typical PERT approach does not consider these mathematically expressed parameters, leading thus to simplifications that affect significantly the whole case.

In real world situations, regardless the nature of activities and the different weights they might all have, we assume the same shape parameters for all project activities. Due to the nature of each activity or for economic and technical reasons, weather conditions etc. we have to manipulate different sets of shape parameters. In such cases, the curve skews to the right or left of the corresponding Beta distribution, especially during the execution of the project, so we have to deal with these significant asymmetries. Moreover is highly uncertain

to keep the initially planned schedule, because there is usually vast uncertainty concerning each task's duration, accounting for the fact that things don't always proceed as normal [8].

It is evident that PERT's drawbacks are probability approximations, overlapping prevention and lack of critical resources. To our view, one of its biggest disadvantages is the fact that it is a precondition for all tasks to be invariably described by using the same shape and scale parameters. All the tasks, not only the critical ones, may be systematically and more carefully reconsidered, either on planning or execution phase. It is apparent that PERT is insufficient in case of dynamic scheduling and projects with randomly distributed duration data.

There is a need for a new perspective on the estimation of activities durations, based on real data. This data has to be taken into account not only during the planning phase of a project, by gathering information on similar situations in the past, but also in the execution phase. This can be achieved by utilizing any real and available data of the current project. To this extent Grey Analysis is examined aiming to introduce a different point of view.

3. Grey Analysis

Many social, economic, agricultural, industrial, ecological, biological, etc., systems are named by considering the features of classes of the research objects, while grey systems are labeled using the color of the systems of concern. In the theory of control, people often make use of colors to describe the degree of clearness of the available information. Objects with unknown internal information are black boxes, where "black" indicates unknown information, hence "white" the completely known information, and "grey" the partially known and partially unknown information.

The research objects of grey systems theory consist of uncertain systems that are known only partially with small samples and poor information. Theory focuses on the generation and excavation of the partially known information, to materialize the accurate description and understanding of material world. Incomplete system information may arise either from the behaviour of the system or by its structure, boundary and elements. Incompleteness in information is the fundamental meaning of being "grey".

It is apparent that such a general framework includes many interrelated fields. Grey Analysis main contents are [3]: grey algebraic system, grey sequences, grey cluster evaluation and analysis, moreover any prediction model is based on GM(1,1), decision-making models are represented by multi-attribute intelligent grey target decision models. The system of grey combined models is innovatively developed for producing new and practically useful results and the optimization model, consists mainly of grey programming, grey input-output analysis, grey game theory and grey control.

Undoubtedly, there is a vast amount of publications concerning the coupling of Grey Systems Analysis and Project Management, which will definitely aid researchers to comprehend this theoretical aspects via many practical examples and specific case studies [6-9].

3.1 GM(1,1) model

GM(1,1) model is the most well-known grey forecasting model, exceedingly applicable in the field of industry, agriculture, society and economy [10,11] and it is indispensable among a row of other models such as GM(n,m), Verhulst Model, Grey Econometric Model, Grey Markov, Grey Neural Network Model [3].

The contribution of this model is the fact that there is no need of moderating the known data, but using them as raw information. It is also an estimation and prediction model too. It is suitable in case of low amount of data, where decision makers should be objective and

efficient. It also belongs to the broader family of GM(n,m) models, where "n" indicates the degree derivative and "m" is about the number of values consisting the input of the model. Hence, GM(1,1) is the grey model of first order and of one variable.

In order to smooth the randomness, the primitive data obtained from the system to form the GM(1,1) is subjected to an operator, named accumulating generation operator. The differential equation of the GM(1,1) model is solved to obtain the *k*-step ahead predicted value of the system. Finally, using the predicted value, the inverse accumulating generation operator is applied to find the predicted values of original data [12]. In this section, seven descriptive steps fully delineate the mathematical procedure.

In such wise we came up with the following steps in order to describe GM(1,1) analytically:

-Step 1-

We define $X^{(0)} = \left\{x^{(0)}(1), x^{(0)}(2),..., x^{(0)}(n)\right\}$, as the sequence of raw data, consisting of suitable time points, depending on the nature of the case.

-Step 2-

We calculate $X^{(1)} = \left\{x^{(1)}(1), x^{(1)}(2),..., x^{(1)}(n)\right\}$, the new accumulating generation operator, where $x^{(1)} = \sum_{i=1}^{k} x^{(0)}(i), k = 1,2,...,n$.

-Step 3-

We calculate $Z^{(1)} = \left\{z^{(1)}(1), z^{(1)}(2),..., x^{(1)}(n)\right\}$,

where $z^{(1)} = \frac{1}{2}\left(x^{(1)}(k) + x^{(1)}(k+1)\right), k = 2,3,...,n$, is a new sequence of data created by the adjacent neighbour means [12].

-Step 4-

Knowing that $\begin{bmatrix} a \\ b \end{bmatrix} = (B^T B)^{-1} B^T Y$, where $B = f\left(-Z^{(1)}\right)$ and $Y = f\left(X^{(0)}\right)$ are the matrices which correspondingly include $Z^{(1)}$ and $X^{(0)}$ input data, we compute the *whitenization* [3] equation (image or least square estimation equation):

$$\left(\frac{dx^{(1)}}{dt}\right) + ax^{(1)} = b \quad (1)$$

-Step 5-

We calculate:

the time response function:

$$\hat{x}^{(1)}(k) = \left(x^{(0)}(1) - \frac{b}{a}\right)e^{-a(k-1)} + \frac{b}{a} \quad (2)$$

and the inverse accumulating generation operator: $\hat{x}^{(0)}(k) = \hat{x}^{(1)}(k) - \hat{x}^{(1)}(k-1)$ (3)

which is used to calculate the GM(1,1) estimation of known values and can also predict the unknown ones.

-Step 6-

We calculate the relative percentage error:

$$\varepsilon = \left|1 - \frac{Uapprox}{U}\right| \times 100\% = \left|1 - \frac{\hat{x}^{(0)}(k)}{x^{(0)}(k)}\right| \times 100\%, \quad (4)$$

where $Uapprox$ is the estimated value and U is the input value

This error represents the difference between the values adopted, i.e. $x^{(0)}(k)$, and those calculated by the GM(1,1) model, i.e., $\hat{x}^{(0)}(k)$.

4. The Project

Egnatia Odos, part of the Trans-European Road Network and one of the 14 priority projects of the EU, is a modern 680km highway, stretching from one side of Greece to the other. Being one of the few Greek highways to be designed and built to full up-to-date national and modern international specifications has been described as Europe's most difficult and modern motorway. The case study used in this paper is related to the construction of complex viaduct, part of the significant structural content of a 37km section, crossing a mountainous area with complex geology and severe environmental constraints.

The overall time is mainly determined from the construction equipment (machinery, cranes, and formworks) which is available on the construction site and obviously not all activities start simultaneously. The construction's actual duration was 145.2 weeks, having a planned duration of 129 weeks. Further technical details and elaborate description of the bridge can be found in [13].

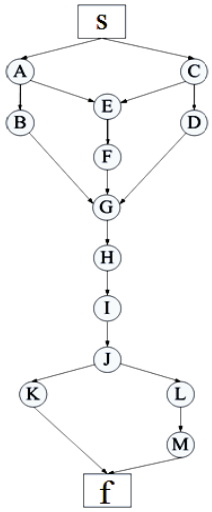
There are several factors affected the schedule performance. Some of them were unforeseen events others required re-work of several activities. However most or all of them are common in the construction projects. Variations in the initially assumed geotechnical conditions, under-skilled personnel in demanding activities, late supply and management of equipment, bad concreting and a fire incident are the main aspects influenced the schedule performance. The big question posed here, is whether grey models are sensitive enough to grasp such task behaviors concerning their completion time in either planning or execution mode.

4.1 Numerical Example

For better understanding we chose to simplify the main body of the construction and to schedule only the first level work packages of the WBS. It is apparent that, though, that grey models can also be applied to the lower levels of the WBS. Project Management process is divided into two phases, so as to apply estimation and prediction models by using both previous experience (planning-scheduling phase) and given data from the executed project (execution phase).

Table 2 displays durations and thirteen simply enumerated tasks, since bridges consist of specialized tasks, which are generally difficult to understand. We came up with the critical tasks, whilst the durations included in the table are those determined, during the phase of scheduling, by the Project Management team (project managers), according to their experience in bridge constructions.

Table 2 Basic information about the bridge with scheduling durations



Task No.	Task	Duration	Critical
1	A	28d	◄
2	B	14d	
3	C	28d	◄
4	D	14d	
5	E	15d	◄
6	F	16d	◄
7	G	16d	◄
8	H	8d	◄
9	I	7d	◄
10	J	3d	◄
11	K	8d	◄
12	L	3d	
13	M	3d	

According to planning calculations the project is going to last 101 days (*Baseline 1*) due to critical path total duration. Based on planning-scheduling data, we are going to apply GM(1,1) for the scheduling phase first and the execution phase on the following.

1. Scheduling Phase

We should first clarify that we use PM's estimation to shape GM(1,1) input data (sequence of data) and then compare PM's to GM(1,1) estimation. Under this notion we come up with the following.

Let A be the task to be examined:

-Project *manager's estimation: 28d*

-The points (time-points) where *milestones* should take place because of *critical sub-tasks:* (2,4,1,5,2,2,3,2,3,4) – *Step 1*. The sum is 28d and we use that sequence of data as an input to GM(1,1).

-GM(1,1) estimation: 27.99d (27d and 99/100*24h=27d and 23h) after utilizing (1), (2) and (3) equations – *Steps 2 through 5*.

Under the same notion we conclude to a summary Table 3 after GM (1,1) estimations.

Table 3 The PM's and GM(1,1) estimations in the phase of *scheduling*

Estimations	A	B	C	D	E	F	G	H	I	J	K	L	M
PM	28	14	28	14	15	16	16	8	7	3	8	3	3
GM(1,1)	27.99	13.97	28	14.03	15	15.97	16	7.68	6.99	3	6.99	3	3
%|error|	0.036	0.214	0	0.214	0	0.188	0	4	0.143	0	12.625	0	0
GM(1,1) (time scale)	27.23	13.23	≈28	14.01	≈15	15.23	≈16	7.16	6.23	3	6.23	3	3

So, the model estimates that the project will be completed a day earlier (100d & 15h) than the initial project managers' estimation (101d). The amount of 101 days belongs to *Baseline 1 and* 100d & 15h to *Baseline 2*.

2. Execution Phase

To the phase of execution we have some real data, as they are measured by the staff who monitors the tasks and subtasks. By using this given data, we shape the input data of the GM(1,1) prediction model and we then calculate the new estimated duration of the unfinished task. This input data of the GM(1,1) prediction model is a sequence, which belongs to the already executed project or part of the project, namely the already given data. Each sequence has a one-to-one relation with the project tasks and each point of this row of data represents the amount of days needed to partially execute the task being considered at that time. The days corresponding to the points of one sequence, are those observed during milestone controls. Along these lines, the number of the tasks concurs with the number of sequences. The number of time-points, consisting a sequence of data, depends on if the task is about to last long or not and it can be subjectively determined.

At this stage *Baseline 2* is taken for granted and the project managers have to chose some milestones, where they are going to update the project schedule. These milestones are usually imposed by S-curves, to the degree that each project shows change in its behavior near 30%, 50% and 70% of its total duration [14].

The first check takes place at 35% (36d of the project gone by), because we needed to let the project run and relatively proceeded, in order to have enough data for the forecasting process. Tasks A and C are already executed, whilst B, D and E are still under construction. Keeping in mind that we have some data concerning these unfinished tasks, we are going to use GM(1,1) prediction model, to approximate the new execution durations of B, D and E. So, we have (2,5,4,-,-) sequence of data for task B, which means that eleven days of work gone by and the use of "-" symbol conveys that two milestones remain to be checked and forecasted by GM(1,1). Concerning B, D and E tasks, we finally conclude to the following:

Task B	GM(1,1) - scheduling & estimation	13.97	
	GM(1,1) - execution & prediction	16.70	*DELAY*

Similarly, the known data for D is: (3,2,5,-,-) and for E (2,4,3,-,-)

Task D	GM(1,1) - scheduling & estimation	14.03	
	GM(1,1) - execution & prediction	12.04	*FORWARD*
Task E	GM(1,1) - scheduling & estimation	15	
	GM(1,1) - execution & prediction	12.89	*FORWARD*

The last step is to calculate the new total project duration, after the delay of B and the unexpected progress of D and E. However, after the rescheduling we do not have any change because B is not a critical task, so the project is going to be executed in 100 days.

We do the same procedure for the 50% of the project duration (54d of the project gone by), where F is unfinished and then for the 70% (68d of the project gone by). At this last check, H is unfinished, and there are no sufficient data to calculate its duration via GM(1,1), explaining the question mark in Table 4. A task with a very short duration, e.g., 3d, is not appropriate to be divided into time-points (milestones) and accurately predict any duration.

Table 4 The PM's and GM(1,1) estimations in the phase of *scheduling* and *execution* by focusing on tasks

Tasks	A	B	C	D	E	F	G	H	I	J	K	L	M
Estimations - scheduling													
PM	28	14	28	14	15	16	16	8	7	3	8	3	3
GM(1,1) (/100)	27.99	13.97	28	14.03	15	15.97	16	7.68	6.99	3	6.99	3	3

Prediction - GM(1,1) - execution													
1st check	Ex.	17.70	Ex.	12.04	12.89	-	-	-	-	-	-	-	-
2nd check	Ex.	Ex.	Ex.	Ex.	Ex.	18.81	-	-	-	-	-	-	-
3rd check	Ex.	Ex.	Ex.	Ex.	Ex.	Ex.	Ex.	?	-	-	-	-	-

We summarize the durations of each task and we use "Ex." to represent the executed tasks at every check point, while "-" represents the tasks that have not started yet.

Table 5 The different durations in *scheduling* and *execution* phases

Scheduling - planning	Who?	Total project duration	Critical path changes
	PM	101d	A,C,E,F,G,H,I,J,K
	GM(1,1)	100d & 15h (/100.63)	E,F,G,H,I,J,K
Executing	milestones		
1st check - 36d	Check 1	100d & 15h	F,G,H,I,J,K
2nd check - 50d	Check 2	102d & 10h	F,G,H,I,J,K
3rd check - 68d	Check 3	104d & 16h (/104.67)	H,I,J,K

Table 5 refers to the project as a whole and takes into account all these changes that took place in the previous Table 4.

Because there is high possibility for the critical activities to change, when durations change, they have to be reconsidered. A typical case in complex projects, is the existence of multiple critical paths. Is must be feasible for multiple critical paths to be detected and examined, even though known software packages present only one of them each time. The problems is detected in algorithmic criteria choice, thus a suitable algorithmic process could be used to create all the possible critical paths, assisting PMs to find the most appropriate schedule solution.

5. Conclusions

Large-scale complex projects have mainly fluent duration, due to the great amount of involved uncertainty. As far as actual future work is concerned, the divergence between planning and actual duration increases. So it is highly unrealistic for each activity duration to adapt and only be expressed by the well-known PERT technique, a simplified variation of Beta distribution. Additionally, projects should be effectively managed with the appropriate tools. Although it is promising to simulate projects by changing Beta distribution shape parameters and follow actual activities' durations, the practical use of such methods is limited, mainly due to the lack of enough data to fit.

The fact that grey models take as an input data of unknown distributions, make them at least worth of interest, since it is the unique tool in such cases. GM(1,1) base model, used in the aforementioned case, is a very promising methodology to aid PM estimations, regarding task durations in planning and scheduling phases and limiting their subjectivity at the same time. The methodology can be easily implemented with low complexity, to contribute to further examine and contrast GM(1,1) with a stochastic approach and construct a more solid model for project scheduling. The results of such grey approaches could also include grey econometrics to assist the economical point of view.

The future work could also design an elaborate information system, so as to organize and add registrations concerning gained experience from past projects that may belong to the

same type of technical projects. This information system could also include all the available grey models and other traditional ones for comparative actions.

References

1 Zhu C, Hao Z. The Grey Differential Model of River Water Pollution and its Application. IEEE International Symposium on Knowledge Acquisition and Modelling Workshop. Wuhan, China 2008.
2 Wang Z, Du X. Numerical Simulation and Grey Correlation Analysis of Factors Affecting the Diffusion of Automotive Emission NOX. International Conference of Logistics Engineering and Management. Chengdu, China 2010.
3 Liu S F, Lin Y. Grey Systems Theory and Applications. Springer Verlag. Berlin, Germany 2010.
4 Chatzimichailidou M, Katsavounis S, Chatzopoulos C, Lukac D. Mass Customization as a Project Portfolio for Project – oriented Organizations. ACTA Technica Corviniensis-Bulletin of Engineering http://acta.fih.upt.ro/ACTA-2013-2.html 2013 April.
5 Davis R. Teaching Project Simulation in Excel Using PERT-Beta Distributions. INFORMS Transactions on Education 2008; 8: 139-148.
6 Jie Z, Yuan L, Jian-feng Y. An Evaluation Method for Coordinate Level of Concurrent Project Schedules Based on Grey Correlation Analysis. IEEE International Conference on Intelligent Computing and Intelligent Systems (ICIS). Xiamen, China 2010.
7 Fang J, Yuan D. The Risk Evaluation of the Construction Project Design Based on the Gray Relational Grade. International Conference on Management and Service Science. Wuhan, China 2010.
8 Zavadskas E K, Turskis Z, Tamosaitiene J. Risk Assessment of Construction Projects. Journal of Civil Engineering and Management 2010: 16; 33-46.
9 Wanbin Y, Zhiming Q. Investigation of Grey System Theory in Engineering Project Risk Management. International Conference on Intelligent Computation Technology and Automation. Hunan, China 2009.
10 Deng J L. Grey Prediction and Decision. Huazhong University of Science and Technology Press. Wuhang, China 2002.
11 Liu S F, Dang Y G, Fang Z G. Grey System Theory and its Application. Beijing Science Press. China 2004.
12 .Kayacan E, Ulutas B, Kaynak O. Grey Theory-based Models in Time Series Prediction. Expert Systems with Applications 2009; 37: 1784-1789.
13 Tzaveas T, Katsavounis S. Evaluation and Validation of Construction Projects Using EVA and ES Methodologies. International Journal of Construction Project Management. https://www.novapublishers.com/catalog/product_info.php?products_id=21367 2011 January.
14 Cioffi, D.F., A tool for Managing Projects: An Analytic Parameterization of the S-curve. International journal of project management 2005; 23: 215-222.

PATH DEPENDENCE, SUBSIDIARITY AND IMPACT IN THE EU REGIONAL POLICY: THE CASE OF GREECE

Sophia Athanassopoulou[1], Yiannis Bassiakos[2], Panos Tsaltakis[3], Eleni Tsipouri[4]

[1]*University of Athens, Centre of Financial Studies* sophiaja@gmail.com

[2]*University of Athens, Department of Economic Sciences, ybassiak@econ.uoa.gr*

[3]*Managing Authority of OP Competitiveness and Entrepreneurship, ptsaltakis@mou.gr*

[4]*University of Athens, Department of Economic Sciences, ltsipouri@gmail.com*

The purpose of the paper is to investigate the impact of the European Union (EU) Structural Funds on the economic performance of supported companies and hence the development of Greece. The main assumption is that path dependence in both policy and company performance is too strong and cannot be eliminated by external funding support. The dataset includes companies that received support from the Community Support Framework III (2000-2006) and the National Strategic Reference Framework (2007-2012). A total of 94,719 companies were examined and the dataset was merged with financial information on 41,353 privately held companies. In order to assess the impact of the support mechanisms on the financial data of the companies, a series of "derivative" variables were compiled, in order to capture potential effects occurring over time and in comparison to a control group. The analysis was designed to ascertain the differences in profit, sales and debt between supported and not supported companies. Evidence suggests that support improves sales but not profitability trends. Companies that received support in both periods demonstrated the best performance with inverse results compared to expectations in early debt and late profit trends.

Keywords
Crowding out, path dependence, structural funds, support.

1. Introduction

The aim of this paper is to investigate the impact of the European Union (EU) Structural Funds on the development of Greece. The EU is managing the largest transnational transfer of funds between sovereign countries aiming at increasing the competitiveness of the less favoured regions and thus distributing the benefits of the integration more evenly. After the unambiguous manifestation that regions/countries cannot rely on automatic convergence, economic policy in the (then) European Economic Community shifted from simple economic integration into integration cum fund transfers for economic and social cohesion. In four successive multi-annual plans of transfer of resources (from 1990-2012), two major trends are observed:

- Funds increased significantly over time;

- Policy focused increasingly from support of physical infrastructure into support of endogenous development variables (entrepreneurship and innovation).

The governance of the system has also shifted into different models over time: while always keeping the partnership relationship, responsibility and accountability have taken different forms over time. A crucial moment was the adoption of the subsidiarity principle, indicating that decisions on development policy and implementation need to be taken at the lowest possible level[1].

The main argument of the paper is that, despite availability of development funding, path dependency prevented Greek policy from being really effective and make a difference. At the same time, the subsidiarity principle prevented radical changes although it was clear that real convergence was not achieved. Hence, the impact of regional policy was lower than expected.

Greece has a peculiar development history. It has grown in episodes (Thomadakis 1997) rather than in a more stable exponential pattern. During the growth periods it has outperformed its peers, but has been underperforming and falling behind until the next growth episode. The same pattern was repeated twice in the 19th and 20th century providing evidence of path dependence(1). Development economists and economic historians explain it by the inability of the productive system to transform into an economically sustainable organism, able to adapt to new challenges and restructure in response to internal and global challenges (Vaitsos-Giannitsis 1994, Hatziiosif 1986). Sociologists and political scientists can go deeper into this analysis and explain the recurring regression through a vicious circle of lack of trust between the state and its citizens, an unstable environment that discourages long-term investments ending up in short termism and political clientelism.

The 21st century has not been an exception. Greek growth rates have been well above the EU average until 2008, but plummeted after that. The present distress of the country is not an echo or an overreaction to the financial crisis; it is a pattern that has been repeatedly observed in Greece in the past and unless structural reforms take place and there is a fundamental behavioural change, there will be no transformation of the Greek economy and the country will at best avoid an economic catastrophe, but be faced with serious problems again in the next world recession.

The successive Greek governments focused on financial absorption in an effort not to lose the EU funds. Speed without institutional reforms has led to a kind of liquidity trap, which has deteriorated over the years and culminated into simple absorption and survival criteria during the recent crisis. Path dependence did not link funding with long-term development goals. The purpose of this research is to turn into micro-level research that may be able to explain differentiated performance, investigating the impact of different types of instruments (individual measures like EU research grants, national research grants, national investment grants etc.) and different company characteristics (persistent innovators, companies benefiting from cumulative support measures, companies by size) to see to what extent they respond better in terms of profitability, sales growth and (to the extent possible) employment.

[1] This implies that the funding organisation (EU) has degrees of freedom since regional and national authorities are in a better position to know their needs.

2. Empirical Analysis

2.1 Literature Review

Greek convergence has been at best controversial until the recent crisis followed by a clear divergence after 2009. Research has as yet focused on overall convergence trends.

The effect of subsidies in regional growth has been investigated by a large number of studies again with mixed evidence: Current literature focuses mostly on R&D input additionality, dealing principally with the effect of R&D subsidies on private R&D investments (crowding out effect). Busom (2000) applied an econometric selection model on a cross sectional sample of 147 Spanish manufacturing firms and concluded that public funding induced more effort for the majority of firms in the sample. Crowding out effects though, could not be ruled out for about 30% of the participants[2]. Wallsten (2000) proved that public R&D funding deterred subsidized companies from engaging in private R&D investment, by sampling 479 companies that received subsidies from the US Small Business Innovation Research (SBIR) program[3]. Czarnitzki (2001)[4], Czarnitzki and Fier (2002)[5], and Fier (2002)[6] investigated the impact of public subsidies in Germany in companies both from the manufacturing and the service sector and rejected full crowding out effects. Aerts, K. and D. Czarnitzki (2006) also ruled out crowding out effect in a sample of companies in Flemish manufacturing sector. They proved that R&D subsidies also induce innovation)[7].

Literature on R&D output additionality, hence the affect of R&D subsidies on subsidized companies growth, patents, and profitability is examined less often. Baghana (2010) researched 3,821 Canadian manufacturing companies in the period 1997-2004 and found that R&D subsidies increase productivity but at a lower level compared to the effect of R&D financed by own funds or R&D tax credits. Productivity was approximated by a function of the labor productivity growth rate, the capital-labor growth rate, the R&D intensity induced by private R&D and tax credits, and the R&D intensity induced by public grants. It was assumed that R&D grants today need at least one year, before they can materialise into changes in productivity, hence one year time lag was considered in the analysis. Analysis evidenced that for each additional dollar of public R&D grant, output increases by 0.134 dollars., while output increases by 0.322 dollars if R&D if financed by own funds. The analysis also showed that public R&D grants account for 42% of the productivity induced by both private funds and R&D tax credits[8].

Beason and Weinstein (1996) investigated the use of capital subsidies in Japan and found no effect on productivity enhancement[9]. The same result was supported by the research of Lee (1996) in Korean manufacturing sector; although tax incentives did have an impact on the allocation of resources, they did not increase overall productivity[10] .Van Tongeren (1998) provided evidence that investment subsidies used in the Netherlands during the 1980s did not manage to change investment decisions, but improved the solvency ratio of benefited firms[11].

Bergstorm (2000) found strong positive correlation between subsidies and performance one year after the subsidy was received in a sample of Swedish companies in the period 1987-1993. He argued that factors such as the influence of third parties may come into play when deciding on subsidies and this could lead to the subsidization of less productive companies, hence a distortion of the overall estimates of effects from subsidization[12].

Piekkola (2007) provided evidence that subsidies induce productivity growth in small and medium sized firms. Productivity was derived as a function of employment. Firms used subsidies to raise R&D employment, but at a decreasing rate. Public subsidies overall failed to augment growth in large firms, but probably this could partly be attributed to time lags occurring from the receipt of R&D funds to the expectance of results. His dataset included corporate data from the manufacturing sector in Finland in the period 1996-2002 and

information on public subsidies from the Finnish Funding Agency for Technology and Innovation (TEKES) in the period that the subsidy was granted not paid[13].

Molto et al. (2011) studied the effect of R&D subsidies on public and private firms and proved that they induced R&D investment and increased the overall production output. R&D subsidies on private firms lead also to higher profits[14].

In Greece, Tzelepis and Skuras (2004) studied the effect of ERDF funding on the financial performance of Greek companies. Financial performance data were extracted from a sample of 1,456 Greek companies from the food and beverage manufacturing sector in the period 1982-1996. From this sample, were subtracted companies that had ceased their operations by 1996, leading to a total sample of 1,005 companies. Data on subsidization were provided by the Ministry of Economy database; 355 companies were identified to have received capital grants. Company performance, was assessed through efficiency (Return on Assets), profitability (Net Profit Margin), leverage (Total Liabilities over Total Assets) and growth ratios (Annual Growth rate of Average Total Assets). Independent variables were R&D subsidies, firm size (total personnel), capital accumulation and market share. Subsidization was demonstrated to have a negative and insignificant effect on efficiency (ROA) and profitability (Net Profit Margin), but improved solvency and enhanced corporate growth of subsidized firms[15].

2.2 Methodology

The present study used a dataset formed by merging data from two different sources:

- The dataset provided by the Greek Ministry of Development, contained companies (total count 94,719) which were supported in the context of the institutional initiatives undertaken by the Ministry. This dataset contained information on the type of funding scheme and data on the size of support broken down into public support and self-financing. After extensive "cleaning" and matching with the ICAP database (to obtain financial information) 11,640 entries remained in the dataset. The support type was separated into two main sources:
    - The Community Support Framework III (CSF3), which covered the years 2000-2006.
    - The National Strategic Reference Framework (NSRF), which covered the years 2007-2013.
- The ICAP database, containing financial information on privately held companies by NACE (rev.2) codes. This set contained a total of 41,353 companies.

In order to assess the impact of the support mechanisms (i.e. Ministry of Development support) on the financial data of the companies, a series of "derivative" variables were computed. This was necessary, since the financial data covered a period of six years (2006-2011) in order to capture any possible effects occurring enough time after the support was given. These variables were:

- Total profit: the cumulative profit over the six year period.
- Total sales: the cumulative sales over the six year period.
- Four trend variables (for profit, sales, short term debt and long term debt): these were calculated via linear regressions of the four impact variables (profit, sales, short term debt and long term debt) on the year and the year by economic climate index (eci) interaction (product). These regressions were carried out separately for each company. The slope of time (year) estimated the trend, while the slope of year-by-eci interaction was used as an independent variable to adjust the time impact by the influence of the economic climate index. The index could not be used alone, since it was a unique

sequence of values (same for all companies), and its relation to time was not statistically significant.

These six variables were re-calculated (in an analogous fashion) for the two support periods (2006-2009 and 2008-2011). As a result, eighteen variables are to be analyzed capturing the economic performance of the companies for the six year period and the two four-year sub-periods. This separation was necessary, since the impact of CSF3 would be more pronounced in the period 2006-2009, while NSRF would have no impact during that same period. On the other hand, the impact of NSRF would be more pronounced during 2008-2011, while the impact of CSF3 would be somewhat "watered down" during that same period.

The analysis was designed to ascertain the differences in profit, sales and debt between supported and not supported companies. Not supported companies were randomly chosen (using stratified random sampling) from the ICAP database, matched to the supported sub-sets on company size (measured by total sales) and sector. Thus every comparison used a tailor-made control sub-set. All comparisons were carried out using Wilcoxon's rank sum test, since the distributions of the variables were far from Normal in all cases. Statistical significance was set at 0.05. The comparisons were carried out in total and in a variety of sub-sets, which were defined according to the source of support each company received. This resulted in five sets of analyses:

i. One involved an overall comparison of supported versus not supported companies irrespective of the type of support. The comparison was carried out for all three time spans (i.e. 2006-2011, 2006-2009, 2008-2011).
ii. The second involved a detailed separation of support sources, namely:
    ii.1. CERDF only
    ii.2. CESF only
    ii.3. CERDF and CESF only
    ii.4. NERDF only
    ii.5. CERDF and NERDF only
    ii.6. CESF and NERDF only
    ii.7. CERDF, CESF and NERDF
    ii.8. NESF only
    ii.9. CERDF and NESF only
    ii.10. NESF and CESF only
    ii.11. CERDF, CESF and NESF
    ii.12. NESF and NERDF only
    ii.13. CERDF, NERDF and NESF
    ii.14. CESF, NERDF and NESF
    ii.15. ALL SOURCES
iii. The third had a less detailed separation, namely:
    iii.1. Companies which received some type of CSF3 support (without excluding companies which received NSRF support, if any)
    iii.2. Companies which received no CSF3 support of any type.
iv. The fourth had a similar separation, namely:
    iv.1. Companies which received some type of NSRF support (without excluding companies which received CSF3 support, if any)
    iv.2. Companies which received no NSRF support of any type.
v. The fifth had a more distinct separation, namely:
    v.1. Companies which received only CSF3 support (no other type of support).

v.2. Companies which received only NSRF support (no other type of support).
v.3. Companies which received both types of support.

2.3 Characteristics of Enterprise Support

Enterprise support in Greece between 2000-2011 was composed of EU funds matched with national funds[2]. A total of 94,719 different companies have been supported with 7,447,703,331 Euros (total public support to companies in the form of State Aid) for a total of 119,055 individual state aid projects, i.e. average of 1.26 projects per company and mean public support per company 78,629 Euros, while per project this corresponds to 62,557 Euros. The corresponding median support is 24,000 □ per company and 22,935 □ per project. The number of companies supported represent close to 10% of all Greek companies. If we break them down into limited liability companies (a proxy for larger and more organized companies) and companies with legal status, then the share of companies supported increases significantly for the former (Table 1).

Table 1 Share of type of companies supported in the total population

Reference Period	Limited liability (with legal status SA,LTD,OE,EE)	Individual liability (personal companies)	Total By Period
2000-2006 Number Share	17,973	19,645	37,618
2007-2011 Number Share	18,705	46,432	65,137
Grand Total 2000-2011	31,477	63,242	94,719

In order to allow for analyses, the periods and type of intervention are distinguished, the former refer to the programming periods, characterized by different guidelines and regimes, namely 2000-2006 and 2007-2011; the latter to the criteria of intervention namely support through the European Regional Development Fund (ERDF) aiming at diminishing regional disparities and the European Social Fund (ESF) supporting social cohesion. Conclusions from table 2 below include the total number of companies supported in the second period.

[2] In the data analysis that follows no national funding included (i.e. non-eligible grants with EU criteria), which represents approximately 5% of total.

Table 2[3] Breakdown of Projects and Public Support By Fund and By Period

Period		ERDF	ESF	Total by Period
CSF3 2000-2006	Companies	33,241	5,169	37,618
	State Aid Projects	41,866	5,292	47,158
	Total Public Support	3,321,359,867	74,213,853	3,395,573,720
	Mean PS/Company	*99,918*	*14,357*	*90,265*
	Mean PS/Project	*79,333*	*14,024*	*72,004*
NSRF 2007-2011	Companies	35,962	30,829	65,137
	State Aid Projects	39,755	32,142	71,897
	Total Public Support	3,399,756,075	652,373,537	4,052,129,611
	Mean PS/Company	*94,537*	*21,161*	*62,209*
	Mean PS/Project	*85,518*	*20,297*	*56,360*
Grand Total	Companies	62,487	35,877	94,719
	State Aid Projects	81,621	37,434	119,055
	Total Public Support	6,721,115,942	726,587,389	7,447,703,331
	Mean PS/Company	*107,560*	*20,252*	*78,629*
	Mean PS/Project	*82,345*	*19,410*	*62,557*

In order to proceed with the impact analysis we constructed three distinct variables, in addition to size and legal status:

I. *The old guard*: Companies supported in 2000-2006 only. If our hypothesis is that the entrepreneurial support gives an impetus allowing these companies to cross a growth threshold and become sustainable, then their sales and profitability during the whole period studied, or at least the second part, should exceed their peer group.

II. *New entrants to support*: Companies that have been supported in the 2007-2011 period can hardly be expected to show any significant difference in growth and profitability attributed to the support, since the implementation of intervention did not take place until the end of the period. Conversely, if these companies show a differentiated pattern it suggests a different pattern of selection of companied rather than the impact of grants.

III. *Persistent support seekers:* These are companies that have received grants in both periods. As grants are not a target per se, the justification for persistent seekers can only be found in the existence of an above average (above a control group of peers) performance.

[3] The partial numbers do not add up to a total of 94,719 companies, since there are overlaps and one company may receive grants from both Funds and in both periods. Conversely the sum of projects and funds adds up to the Grand Total.

2.4 Assessing Enterprise Support

The following conclusions can be drawn from the statistical comparisons performed (Table 3), keeping in mind the reservations mentioned in the methodology regarding the bias of the sample:

I. *Sales: Companies supported through the Structural Funds in both programming periods have outperformed their control group in terms of sales*, both total sales and growth trend. This is an important indication that interventions have met their target, in particular because trends are growing. This may, however, be interpreted in different ways, as our data does not allow for causality comparisons: The optimistic explanation is that support helps companies increase their sales. This interpretation is contradicted by the fact that even companies that were not funded in the 2000-2006 period demonstrate increased sales. Hence, a less encouraging, possibly more plausible interpretation in this case is that that there is a reverse causality and that it is the dynamic companies that seek support and exploit it adequately. In this case crowding out cannot be excluded.

II. *Profitability:* Results on profitability are less clear-cut compared to sales. *Companies supported are very often outperforming their peers in terms of total profits*. This is again a positive sign if grants increase profitability (hence GDP and taxes). However, *support does not imply increasing profitability trends:* While again, as with sales, almost all supported companies have a significantly higher total profitability in the period studied, the trend is not rising compared to peers. In this case the interpretation is more problematic: higher profits are not occurring after the intervention. This again may be interpreted as the more profitable companies applying for grants rather than grants increasing profitability, another potential indication of crowding out.

III. *Combination of sales and profitability:* It is rather problematic to see a growth in the trend of sales not being accompanied by rising profitability. This may be interpreted as sales growing at the cost of marginal profits, or of misreporting profits. In either case this incompatibility needs further investigation.

IV. *Debt:* The most problematic outcome of the statistical analysis is that of debt. *Short term debt is inversely related to receiving grants*. While one would expect increasing sales and profits to be used to reduce debt, companies receiving grants increase their debts significantly more rapidly than companies that do not. The best interpretation for this is that because grants are paid with significant delays companies borrow in order to finance the transactions to be implemented and then get refunded. This interpretation is corroborated by the fact that the inverse relationship occurs mainly during the time companies are receiving the grants. The outcome is more problematic for the interpretation of the long term debt, which is clearly inversely correlated for all supported companies in the first period studied. Again, this could be interpreted by dynamic companies borrowing more easily at a time of excess liquidity, while reducing their debts during the crisis.

At the same time a comparison between programming periods gives also some indicative results:

I. Companies supported by the CSF only in the 2000-2006 period, did not demonstrate any above average performance compared to their peers, with the exception of total

sales in the years immediately after they received the grants. On the contrary, outcomes were inverse to expectations in debts and profit trends. Relations improved or were inconclusive when assessing them for a longer period of time.

II. The same applies for companies supported by the NRSF only: their comparative performance is better in the whole period studied than in the years when they received grants. This is a very curious outcome, suggesting practically that these companies performed better before receiving support.

III. The combination of the two conclusions above again suggest that dynamic companies receive more support as the expected relationships appear usually before or after the years they receive grants. After the years they receive the grants, relationships may be associated with longer-term effects (and better response to the crisis for that matter) or even better through behavioural changes, while before the years they receive grants, relationships suggest again a potential of crowding out.

IV. Companies that received support both from the CSF and NRSF demonstrate the best performance with inverse results compared to expectations in early debt and late profit trends.

Table 3 Trends comparing the different periods and funds of support and their impact on debt, sales and profits

	CSF only		***NRSF only***		***CSF and NRSF (both)***			***All supported***		
	2006-09 (N=4937)	***2006-11 (N=4949)***	***2008-11 (N=3636)***	***2006-11 (N=3697)***	***2006-09 N=2977***	***2008-11 N=2968***	***2006-11 N=2993***	***2006-09 N=11504***	***2008-11 N=11387***	***2006-11 N=11639***
LT debt trend	*0.0079*	**--**	***0.0003***	**--**	*<0.0001*	***<0.0001***	**--**	*<0.0001*	***<0.0001***	**--**
ST debt trend	*0.0416*	**--**	*0.0036*	*0.0200*	*0.0040*	*--*	*--*	*0.0002*	**--**	**--**
Profit trend	*0.0009*	**--**	*0.0104*	*--*	*--*	*0.0138*	*--*	*--*	**--**	**--**
Sales trend	**--**	***<0.0001***	***0.0001***	***<0.0001***	***<0.0001***	***0.0005***	***<0.0001***	***<0.0001***	***0.0062***	***<0.0001***
Total profit	**--**	***0.0001***	***0.0004***	***<0.0001***	***<0.0001***	***0.0158***	***0.0001***	***<0.0001***	**--**	***0.0001***
Total sales	***0.0053***	***<0.0001***	***<0.0001***	***<0.0001***	***0.0032***	***<0.0001***	***<0.0001***	***0.0003***	***<0.0001***	***<0.0001***

Italics: significant trends in the opposite direction than expected
Bold: significant trends as expected
--: statistical tests not significant

3. Conclusions and Further Research

The investigation undertaken in this paper has produced indicative results for the impact of grants for state aid's projects under sectoral operational programmes and regional operational programmes in Greece in two consecutive programming periods. It is initially suggested that, because of path dependence, policy delivery could not change and grants remained small and fragmented. In addition grants could not yet (or were not adequately designed to) change the behaviour of Greek companies.

Significant lack of data availability has led us to work with a small sample (just over 10% of all companies supported), which is biased towards larger companies. Thus the results should be interpreted as formulating certain hypotheses for further research rather than giving robust responses to questions on the short and long term impact of the interventions. In that sense indications suggest that:

- Support improves sales but not profitability trends
- It is the more dynamic companies that are supported and support does not make companies more dynamic; it is necessary to further investigate for potential crowding out.

We see the merit of this exercise more as a challenge to Greek authorities to increase their efforts to investigate the efficiency and effectiveness of their intervention. This can be done by using the Technical Assistance of Structural Funds for evaluations and impact assessments, a policy that has been significantly neglected until now. At the same time, it is imperative to facilitate academic research by making data available to interested researchers, self-evidently keeping confidentiality and anonymity clauses. This again is a path dependency that needs to be changed.

If this is the case the analysis can be enriched in different directions:

1. Expand the sample and get data for the total population of 94,719 companies directly from the financial authorities.
2. Use different classifications, such as a difference in the performance of companies supported by the European Social Fund (alone), compared to those support by the European Regional Development Fund (alone) and finally those support from both. Correlations.
3. Investigate the impact of different types of interventions (e.g. RTDI, energy, simple investment support, training support).
4. Use new methodologies beyond rank comparisons and investigate correlations and causalities.
5. Expand outcomes to employment and exports rather than being limited to sales, profitability and debt.
6. Control for size of company and total amount of grants.
7. Extend the analysis to indicate trends at regional level.

References

1 David (2007) defines path dependence as “the relationship between the system’s process dynamics and the limiting con□guration(s) that it ultimately takes on” or alternatively as “the nature of the limiting probability distribution that eventually will govern the movements of the system under examination”
David, P. Path dependence: a foundational concept for historical social science; 2007; Cliometrica (2007) 1:91–114.

2 Busom. I. An empirical evaluation of the effects of R&D subsidies Economic Innovation and New Technology, 2000, Vol 9, 111-148.

3 Wallsten, S.J. The Effects of Government-Industry R&D Programs on Private R&D: The Case of the Small Business Innovation Research Program. Rand Journal of Economics, 200, 31(1), 82–100.

4 Czarnitzki, D. and A. Fier Do R&D Subsidies Matter? – Evidence from the German Service Sector,ZEW Discussion Paper No. 01-19, 2001.

5 Czarnitzki, D. and A. Fier Publicly Funded R&D Collaborations and Patent Outcome in Germany, 2003, ZEW Discussion Paper 03-24, Mannheim.

6 Fier, A. Staatliche Förderung industrieller Forschung in Deutschland, ZEW Wirtschaftsanalysen, Bd. 62, Baden-Baden, 2002.

7 Aerts, K. and D. Czarnitzki The impact of public R&D funding in Flanders, IWT M&A Study 54, Brussels, 2006.

8 Baghana R. Public R&D subsidies and productivity: Evidence from firm□level data in Quebec, Working paper series, ISSN 1871-9872, 2010.

9 Beason, R. and Weinstein, D.E. (Growth, economies of scale, and targeting in Japan □1955-1990, The Review of Economics and Statistics, 1996, Vol. 78, pp. 286-95.

10 Lee, J.W. Government interventions and productivity growth", Journal of Economic Growth, 1996, Vol. 1, pp. 391-414.

11 Van Tongeren, F.W. Microsimulation of corporate response to investment subsidies', 1998, Journal of Policy, Modeling, Vol. 20, pp. 55-75.

12 Bergstrom, F. Capital subsidies and the performance of firms, 2000, Small Business Economics, Vol. 14, pp. 183-93.

13 Piekkola H. Public Funding of R&D and Growth: Firm-Level Evidence from Finland, Economics of Innovation and New Technology, 2007, 16:3, 195-210.

14 Molto M., Poyago-Theotoky J., Zikos V., R & D Subsidies, Spillovers, and Privatization in Mixed Markets, 2011, Southern Economic Journal 78(1)

15 Tzelepis D., Skuras D., The effects of regional capital subsidies on firm performance: an empirical study, Journal of Small Business and Enterprise Development, 2004, Vol. 11 (1) pp. 121 – 129.

EFFICIENCY OF THE R&D SECTOR IN THE EU-27 AT THE REGIONAL LEVEL: AN APPLICATION OF DEA

Aleksander Aristovnik[1]

[1]*Faculty of Administration, University of Ljubljana, Slovenia; aleksander.aristovnik@fu.uni-lj.si*

The main aim of the paper is to measure the relative efficiency of the R&D sector in the EU-27 at the regional level. For this purpose, the paper applies a non-parametric approach, i.e. data envelopment analysis (DEA), to assess the relative technical efficiency of R&D activities across selected EU (NUTS-2) regions. The empirical analysis integrates available inputs (R&D expenditures, researchers and employment in high-tech sectors) and outputs (patent and high-tech patent applications) over the 2005–2010 period. The empirical results show that among regions with a high intensity of R&D activities the most efficient performers are Noord-Brabant (Netherlands), Stuttgart (Germany) and Tirol (Austria). In contrast, a wide range of NUTS-2 regions from the Baltics, Eastern and Southern Europe is characterized by an extremely low rate of knowledge production and its efficiency, particularly in Poland (Mazowieckie), Lithuania (Lietuva), Latvia (Latvija), Romania (Bucuresti-Ilfov), Bulgaria (Yugozapaden), Slovakia (Západné Slovensko), Greece (Attiki), Spain (Canarias) and Italy (Sardegna).

Keywords:
Data Envelopment Analysis (DEA), Efficiency, EU, NUTS-2 regions, R&D

1. Introduction

In today's knowledge-based economy, technological progress plays an increasingly important role in sustaining and improving the economic welfare and growth of the national economy. It is an important input for economic growth and a central factor in determining the competitiveness of firms in the marketplace regionally, nationally and internationally. R&D activities are widely recognized as one of the main impetuses of technological progress, and levels and rates of growth of R&D expenditures are viewed as reliable indicators of innovative capacity. Therefore, EU member states spend significant amounts on R&D activities. Indeed, one of the EU's key objectives in the last decade has been to encourage higher levels of investment in order to provide a stimulus to the EU's competitiveness. The Lisbon Strategy set the EU the objective of devoting 3% of its GDP to R&D activities by 2010. However, annual public and private R&D investments within the EU have, on average, accounted for between 1.8% and 2.0% of GDP during the last decade [1]. As the set target was not reached, the 3% target was maintained and forms one of five key targets within the Europe 2020 strategy adopted in 2010.

R&D activities are funded and performed by many organizations, including firms, universities, and government laboratories within the EU. Although the roles of the various institutions involved in the national R&D enterprise vary from country to country, the main funder and performer of R&D in EU economies is generally the private sector. Accordingly, more than one-half of all EU R&D expenditure is financed by companies, and they perform two-thirds of

all R&D activities. An analysis of R&D expenditure by source of funds shows that more than half of the total expenditure in the last decade within the EU-27 was funded by business enterprises, while just over one-third was funded by government and less than one-tenth from abroad [1]. The relatively important role played by the business sector as a source of R&D funding is particularly highlighted in some of the most developed EU countries such as Luxembourg, Finland and Germany where business-funded R&D has accounted for about two-thirds of total expenditures. In contrast, a majority of the expenditure on R&D made in the new member states (Cyprus, Bulgaria, Poland, Romania, Slovakia and Lithuania) has been funded by the government sector [1].

This paper joins the efforts of other scholars in investigating R&D efficiency at the regional level by applying a non-parametric methodology. The importance of examining R&D efficiency is particularly pronounced for the EU regions where R&D activities as well as innovation lie at the heart of many regional policies, including the aforementioned Europe 2020 strategy for smart growth. Therefore, the aim of the paper is to review some previous research studies on measuring the efficiency of the R&D sector and to apply the Data Envelopment Analysis (DEA) technique to a wide range of EU (NUTS-2) regions to evaluate their relative efficiency within the sector. Consequently, the paper provides some new evidence on regional R&D efficiency in terms of various inputs and outputs. This regional-level study may hold implications for R&D management as well as innovation policy at the regional level. More specifically, the paper also provides a more complete picture of regional R&D performances by measuring R&D efficiency with available inputs and outputs.

Very few recent studies have examined the efficiency of countries or regions in utilizing R&D expenditures or other resources. For instance, Lee and Park [2] and Wang and Huang [3] both evaluated R&D efficiency across nations by considering three outputs (patents, technology balance of receipts, and journal articles) and two outputs (patents and SCI and EI articles), respectively. Lee et al. [4] used the Data Envelopment Analysis (DEA) approach to measure and compare the performance of national R&D programmes in South Korea. Sharma & Thomas [5] took account of the time lags in the R&D process and investigated the R&D efficiency of developing countries relative to developed countries. Some other studies that focus on subject areas, institutions, firms, policy programmes or regions are Chen et al. [6], Guan & Chen [7], Guan & Ma [8], Guan & Wang [9], Guan & He [10], Huang et al. [11], Karkazis & Thanassoulis [12], Liu & Lu [13], Meng et al. [14], Moed [15], Sueyoshi & Goto [16] and Zhong et al. [17]. Most of these studies assess a particular nation and very few studies attempt cross-country or cross-regional comparisons of R&D efficiency (also see Aristovnik [18]). However, very insightful, cross-regional analyses for the R&D sector are rarely used for policy analysis. This gap in the literature is addressed in the following sections of this paper where the DEA approach is applied to EU (NUTS-2) regions.

The paper is organized as follows. In the next section we present the theoretical background to non-parametric methodologies with a special focus on Data Envelopment Analysis (DEA), the specifications of the model and information about the applied data. Section 3 outlines the results of the non-parametric efficiency analysis. The final section provides concluding remarks and some policy implications.

2. Methodology and Data

We adopted the mathematical development of DEA by Charnes et al. [19] who built on the work of Farrell [20] and others. DEA is a linear programming-based methodology that has

proven to be a successful tool for measuring efficiency. It computes the comparative ratio of outputs to inputs for each unit, with the score expressed as 0–100%. A DMU with a score of less than 100% is inefficient compared to other units. It is used to identify best practices and is increasingly becoming a popular and practical management tool. DEA was initially used to investigate the relative efficiency of non-profit organizations but now its use has spread to hospitals, schools, banks and network industries, among others (Avkiran [21]). DEA empirically identifies the best producers by forming the efficient frontier based on observed indicators from all producers. We refer to the producers as decision-making units (DMUs). Consequently, DEA bases the resulting efficiency scores and potential efficiency improvements entirely on the actual performance of other DMUs, free of any questionable assumptions regarding the mathematical form of the underlying production function. We use the DEA methodology to evaluate the relative efficiency of each region as it converts, for instance, R&D expenditures into patent applications. We identify the regions (NUTS-2) as the DMUs. Let n (=271) be the number of (EU NUTS-2) regions in the data set. Let X_{ij} be the amount of input i consumed by Region j, for i = 1 and j = 1, 2, …, 271. Let Y_j be the number of patent applications by Region j, for j = 1, 2, …, 271. We are now ready to present the output-oriented DEA model for Region k, k = 1, 2, …, 271. We must solve one such linear programming model for each region. Mathematically, the technical efficiency of each DMU is computed as:

$$Max \quad \phi_k \tag{1}$$

subject to

$$\sum_{j=1}^{271} \lambda_j X_{ij} \le X_{ik} \quad for \quad i = 1,2,3 \tag{2}$$

$$\sum_{j=1}^{271} \lambda_j Y_j \ge \phi_k Y_k \tag{3}$$

$$\sum_{j=1}^{271} \lambda_j = 1 \tag{4}$$

$$\lambda_j \ge 0 \quad for \quad j = 1,2,...,271 \tag{5}$$

$$\phi_k \ge 0 \tag{6}$$

We observe that setting λ_k=1, λ_j=0 for $j \neq k$ and $\emptyset_k$=1 is a feasible but not necessarily optimal solution to the linear program for Region k. This implies that $\emptyset_k^*$, the optimal value of $\emptyset_k$, must be greater than or equal to 1. The optimal value, $\emptyset_k^*$, is the *overall inverse efficiency* of DMU k, which represents one plus the proportion by which Region k can increase its patent applications. For instance, if $\emptyset_k^*$=1.10, then Region k can increase its output by 10% without increasing any of its inputs. We refer to $E_k^*=1/\emptyset_k^*$ as the *overall efficiency* of region k. Thus, if $\emptyset_k^*$=1.10 then E_k^*=0.91 and we can say that Region k is 91% efficient overall. The left-hand side of Equations (2) and (3) are weighted averages because of Equations (4) and (5), of the inputs and output, respectively, of the 271 regions. At optimality, that is with the λ_j replaced by λ_j^*, we call the left-hand side of Equations (2) and (3) the *target inputs* and *target output*, respectively, for Region k.

Equation (2) suggests that each target input will be less than or equal to the actual level of that input in Region *k*. Similarly, Equation (3) shows that the target output will be greater than or equal to the actual output level in Region *k*. Equation (4) ensures that the weights add up to one and allows us to interpret the target inputs and target output as weighted averages of the corresponding quantities in Region *k'*s reference regions, that is, those states for which $\lambda_j>0$. Accordingly, this constraint indicates that the production process is a variable return to scale (VRS), meaning that the productivity effect of an additional unit of an input may differ with the size of the region. Thus, the optimal solution to the linear program for Region *k* identifies a hypothetical target state *k** that, relative to Region *k:* (a) consumes the same or less of every input; and (b) produces the same or more of the output. Moreover, the objective function expressed in Equation (1) ensures that the target Region *k** produces outputs that are increased as much as possible.

In the majority of studies using DEA the data are analysed cross-sectionally, with each decision-making unit (DMU) – in our case a region – being observed only once. Nevertheless, data on DMUs are often available over multiple time periods. In such cases, it is possible to perform DEA over time where each DMU in each time period is treated as if it were a distinct DMU. However, in our case the data set for all the tests in the study includes average (available) data for the 2005–2010 period in order to evaluate long-term efficiency measures as the effects of R&D are characterized by time lags in selected EU (NUTS-2) regions. The inputs utilized are researchers (as % of total employment), total research expenditure (in % of GDP) and employment in high-tech sectors (high-tech manufacturing and high-tech knowledge-intensive services) (as % of total employment) in each selected region. The output can be in the form of publications or patents (see Sharma and Thomas, 2008) and therefore the raw data for output employed in this study comprise patent applications to the EPO by priority year (number of applications per million inhabitants) and high-tech patent applications to the EPO by priority year (number of applications per million inhabitants). The data come from the Eurostat database (for Summary statistics, see Table 1). The program used for calculating the relative efficiency scores is the Frontier Analyst 4.0 software.

Table 1 Summary Statistics

	Average	St. Dev.	Min.	Max.
Inputs				
Total research expenditure (in % of GDP)	1.46	1.25	0.10 (Severen tsentralen– BG)	7.23 (Prov. Brabant Wallon – BE)
Researchers (as % of total employment)	0.60	0.47	0.07 (Sud-Est– RO)	2.81 (NE Scotland – UK)
Employment in high-tech sectors (as % of total employment)	4.11	1.72	0.99 (Thessalia – GR)	10.99 (Berkshire, Buckinghamshire and Oxfordshire – UK)
Human resources in science and technology (% of economically active population)	35.83	8.34	14.63 (Região Autónoma dos Açores – PT)	61.10 (Inner London – UK)
Outputs				
Patent applications to the EPO by priority year (number of applications per million inhabitants)	84.70	102.79	0.26 (Sud – Muntenia – RO)	550.19 (Stuttgart - GER)
High-tech patent applications to the EPO by priority year (number of applications per million inhabitants)	14.46	22.14	0.15 Sud – Muntenia – RO)	163.03 (Noord-Brabant – NL)

Sources: Eurostat, 2013; own calculations

The degree of correlation between inputs and outputs is an important issue that has a great impact on the robustness of the DEA model. Thus, a correlation analysis is crucial to establish appropriate inputs and outputs. On one hand, if very high correlations (higher than 0.95) are found between an input variable and any other input variable (or between an output variable and any of the other output variables), this input or output variable may be thought of as a proxy of the other variables. On the other hand, if an input variable has a very low correlation with all the output variables (or an output variable has a very low correlation with all the input variables) this may indicate that this variable does not fit the model. In our correlation analysis we could not find any evidence of a very high (or low) correlation between the input variables (nor between the output variables) (see Table 2). Accordingly, this is a reasonable validation of the presented DEA model.

Table 2 Correlations among the inputs and outputs

	Total research expenditure (in % of GDP)	Researchers (as % of total employment)	Employment in high-tech sectors (as % of total employment)	Human resources in science and technology (% of economically active population)	Patent applications to the EPO by priority year (number of applications per million inhabitants)	High-tech patent applications to the EPO by priority year (number of applications per million inhabitants)
Inputs						
Total research expenditure (in % of GDP)	1.00					
Researchers (as % of total employment)	0.79	1.00				
Employment in high-tech sectors (as % of total employment)	0.62	0.65	1.00			
Human resources in science and technology (% of economically active population)	0.60	0.67	0.70	1.00		
Outputs						
Patent applications to the EPO by priority year (number of applications per million inhabitants)	0.66	0.44	0.53	0.52	1.00	
High-tech patent applications to the EPO by priority year (number of applications per million inhabitants)	0.67	0.56	0.59	0.53	0.78	1.00

Note: All correlations are significant at the 0.01 level (2-tailed)
Sources: Eurostat, 2013; calculations by the author

3. Empirical Results

In order to ensure relative homogeneity of the sample, the first part of the empirical research divides EU regions into two main groups, the “Top Half” and the “Bottom Half”. The “Top Half” group comprises NUTS-2 regions with R&D expenditures (in % of GDP) higher than the calculated median of 265 regions (i.e. 1.12%). On the other side, the “Bottom Half” includes regions with lower R&D expenditures. The results for the “Top Half” group based on an output-oriented VRS formulation of the DEA analysis suggest that the most efficient regions are in Austria (Tirol), Germany (Stuttgart) and the Netherlands (Noord-Brabant) (see Table 3). These regions, in particular Stuttgart, could serve as a good benchmark for the other regions as they featured among the highest in R&D expenditure. Some other regions also seem to be efficient (for instance, Salzburg, Niederösterreich, Lorraine and Campania), yet they show relatively low R&D intensity compared to the “Top Half” regions. Ultimately, almost 11% of the observed regions are efficient and could be a good example to less efficient regions. The least efficient regions in this group are from Poland, Czech Republic, the UK, Romania, France, Italy and Slovenia. These regions should significantly increase the number of their patent applications and high-tech applications to the EPO.

Table 3 Relative Efficiency of the Selected "Top Half" NUTS-2 Regions

Top Half – 131 regions			
The most efficient regions		The most inefficient regions	
Niederösterreich (AT)	100.0	Mazowieckie (PL)	3.5
Salzburg (AT)	100.0	Střední Cechy (CZ)	4.4
Tirol (AT)	**100.0**	NE Scotland (UK)	5.1
Vorarlberg (AT)	100.0	Praha (CZ)	5.3
Prov. Hainaut (BE)	100.0	Jihovýchod (CZ)	5.7
Oberfranken (DE)	100.0	SW Scotland (UK)	6.9
Sachsen-Anhalt (DE)	100.0	Bucuresti – Ilfov (RO)	7.4
Stuttgart (DE)	**100.0**	Lancashire (UK)	8.8
Com. Foral de Navarra (ES)	100.0	Languedoc-Roussillon (FR)	9.4
Basse-Normandie (FR)	100.0	Lisboa (PT)	11.0
Lorraine (FR)	100.0	Merseyside (UK)	11.1
Campania (IT)	100.0	Kent (UK)	11.1
Noord-Brabant (NL)	**100.0**	Lazio (IT)	11.3
South Yorkshire (UK)	100.0	Zahodna Slovenija (SI)	11.5
Average Efficiency Score	44.5		
Standard Deviation	29.4		
No. (%) of Efficient Regions	14 (10.7%)		

Note: The regions in bold employ above-average R&D inputs
Sources: Eurostat, 2013; calculations by the author

In the group of the "Bottom Half" regions, there are 15 efficient regions (or 13.4% of all observed regions) from both old and new EU member states. However, regions from the new EU member states are predominantly efficient due to the relatively low level of their R&D inputs. But the relevant benchmark regions, i.e. those with above-average inputs in the "Bottom Half" group, are from old members, i.e. Germany (Brandenburg-Nordost, Lüneburg and Schwaben), the Netherlands (Drenthe), Portugal (Centro) and the UK (Eastern Scotland and Highlands and Islands) (see Table 4). Some regions from Bulgaria, Poland, Romania and Greece seem to be efficient particularly due to their extremely low R&D inputs and it would therefore be crucial for them to increase their R&D resources and employ them in an efficient manner. On the other hand, the least efficient regions mainly come from the new EU member states (particularly from the Visegard and Baltic countries). In order to become an efficient region, these regional units should significantly increase their R&D outputs and should follow their peers in the old EU member states.

In the second part of the empirical research, the top 5% of regions with the highest output (patent applications to the EPO) and bottom 5% with the lowest input (R&D expenditures and researchers) were excluded in order to eliminate the outliers. The empirical results suggest that 30 regions or almost 15% of all regions (a total of 207) included in the analysis have been efficient. Similarly to the first part of the analysis, there are developed efficient regions in old member states such as Austria, Belgium, France, Germany and Spain (see Table 5). Some poor regions in Romania and Bulgaria are also efficient due to their extremely low R&D intensity. By contrast, the most inefficient regions are predominantly from a great majority of the new EU member states, particularly Poland, Bulgaria, Romania, Czech Republic, Slovakia and the Baltic states. In all of these regions, the key task should be to significantly increase R&D outputs via additional investment in the R&D sector (higher R&D expenditures). Hence, improving the R&D sector's efficiency, which could significantly contribute to the development and growth of the region, should therefore be a top priority for practically all of these regions in the near future.

Table 4 Relative Efficiency of Selected "Bottom Half" NUTS-2 Regions

Bottom Half – 112 regions			
The most efficient regions		The most inefficient regions	
Prov. Luxembourg (BE)	100.0	Malopolskie (PL)	3.7
Severen tsentralen (BG)	100.0	Lubelskie (PL)	4.9
Severozapaden (BG)	100.0	Moravskoslezsko (CZ)	5.0
Brandenburg – Nordost (DE)	**100.0**	Slaskie (PL)	5.1
Lüneburg (DE)	**100.0**	Západné Slovensko (SK)	5.4
Schwaben (DE)	**100.0**	Lietuva (LT)	5.5
Thessalia (GR)	100.0	Warminsko-Mazurskie (PL)	5.5
Drenthe (NL)	**100.0**	Jihozápad (CZ)	5.8
Lubuskie(PL)	100.0	Yugozapaden (BG)	6.2
Centro (PT)	**100.0**	Severovýchod (CZ)	6.7
Nord-Est (RO)	100.0	Kujawsko-Pomorskie (PL)	7.3
Sud-Est (RO)	100.0	Latvija (LV)	7.6
Sud-Vest Oltenia (RO)	100.0	Sardegna (IT)	8.4
Eastern Scotland (UK)	**100.0**	Észak-Alföld (HU)	8.8
Highlands and Islands (UK)	**100.0**	Nyugat-Dunántúl (HU)	8.9
Average Efficiency Score	36.8		
Standard Deviation	31.9		
No. (%) of Efficient Regions	15 (13.4%)		

Note: The regions in bold employ above-average R&D inputs
Sources: Eurostat, 2013; calculations by the author

Contrary to all expectations, some of the least efficient regions are also from highly developed member states, such as the UK. For instance, North East Scotland which spends an average of 3.2% of its GDP on R&D shows a dismal performance on the technical efficiency front as revealed by its efficiency score of 10.6 that emerges as one of the lowest among the regions in the old EU member states. A more detailed analysis shows that Prov. Brabant Wallon, which is one of the peers of NE Scotland, has 1.8 researchers per hundred employees and is able to file 262.9 patent applications to the EPO per million inhabitants as compared to 24.3 patent applications for NE Scotland (with more than 2.8 researchers per hundred employees). This example highlights the importance of the efficient use of relatively high R&D expenditure (or any other R&D inputs) in many regions. Indeed, we should be aware of the fact that R&D efficiency can significantly contribute to the development and growth of those regions that lag behind by tapping into their underlying potential.

Table 5 Relative Efficiency of Selected NUTS-2 Regions (without outliers)

Without outliers – 207 regions			
The most efficient regions		The most inefficient regions	
Burgenland (AT)	100.0	Mazowieckie (PL)	2.8
Oberösterreich (AT)	**100.0**	Lietuva (LT)	3.9
Salzburg (AT)	100.0	Moravskoslezsko (CZ)	4.5
Tirol (AT)	**100.0**	Malopolskie (PL)	4.9
Prov. Antwerpen (BE)	**100.0**	Yugozapaden (BG)	5.5
Prov. Brabant Wallon (BE)	**100.0**	Észak-Alföld (HU)	5.6
Prov. Vlaams-Brabant (BE)	**100.0**	Lubelskie (PL)	5.9
Yuzhen tsentralen (BG)	100.0	Bucuresti – Ilfov (RO)	5.9
Severoiztochen (BG)	100.0	Jihozápad (CZ)	6.2
Brandenburg – Nordost (DE)	100.0	Slaskie (PL)	6.3
Detmold (DE)	**100.0**	Canarias (ES)	7.1
Düsseldorf (DE)	**100.0**	Západné Slovensko (SK)	7.2
Koblenz (DE)	100.0	Jihovýchod (CZ)	7.5
Lüneburg (DE)	100.0	Strední Cechy (CZ)	7.6
Oberfranken (DE)	100.0	Latvija (LV)	7.6
Weser-Ems (DE)	100.0	Andalucía (ES)	7.9
Com. Foral de Navarra (ES)	**100.0**	Strední Morava (CZ)	8.0
Prov.-Alpes-Côte d'Azur (FR)	100.0	Severovýchod (CZ)	8.7
Rhône-Alpes (FR)	**100.0**	Nyugat-Dunántúl (HU)	9.0
Île de France (FR)	**100.0**	Attiki (GR)	9.7
Peloponnisos (GR)	100.0	Dolnoslaskie (PL)	10.3
Thessalia (GR)	100.0	NE Scotland (UK)	10.6
Prov. Autonoma Bolzano (IT)	100.0	Praha (CZ)	10.8
Zachodniopomorskie (PL)	100.0	Wielkopolskie (PL)	11.1
Centro (PT)	100.0	Lódzkie (PL)	11.3
Sud – Muntenia (RO)	100.0	Sardegna (IT)	11.8
Vest (RO)	100.0	Kujawsko-Pomorskie (PL)	11.9
Eastern Scotland (UK)	100.0	Basilicata (IT)	12.1
Hamp. and Isle of Wight (UK)	100.0	Észak-Magyarország (HU)	12.3
Surrey, E&W Sussex (UK)	100.0	Castilla y León (ES)	12.3
Average Efficiency Score	47.2		
Standard Deviation	32.5		
No. (%) of Efficient Regions	30 (14.5%)		

Note: The regions in bold employ above-average R&D inputs
Sources: Eurostat, 2013; calculations by the author

4. Conclusions

The paper joins the efforts of other scholars in investigating R&D efficiency by applying a non-parametric methodology at the regional level. In this respect, the Data Envelopment Analysis (DEA) technique was presented and then applied to a wide range of EU-27 (NUTS-2) regions to evaluate technical efficiency within the selected sector. The research findings suggest that Drenthe, Noord-Brabant (Netherlands), Prov. Antwerpen, Prov. Brabant Wallon, Prov. Vlaams-Brabant (Belgium), Tirol, Oberösterreich (Austria), Stuttgart, Detmold, Dusseldorf and Luneburg (Germany), Com. Foral de Navarra (Spain), Rhône-Alpes and Île de France (France) belong to the best-performing NUTS-2 regions located on the regional technology frontier. These EU regions could also serve as peers to improve the efficiency of the less efficient ones. The innovative capacity of advanced regions is their most important source of prosperity and growth. These results confirm the idea that regions with a mature

economic system enjoy higher R&D efficiency compared to regions still developing their technology pattern. On the other hand, a wide range of NUTS-2 regions from the Baltics, Eastern and Southern Europe is characterized by an extremely low rate of knowledge production and its efficiency, particularly in Poland (e.g. Mazowieckie, Malopolskie, Lubelskie, Slaskie), Lithuania (Lietuva), Latvia (Latvija), Romania (Bucuresti-Ilfov), Bulgaria (Yugozapaden), Slovakia (e.g. Západné Slovensko), Greece (e.g. Attiki), Spain (e.g. Canarias, Andalucia), and Italy (e.g. Sardegna), suggesting that they are still in the phase of imitating and replicating existing technologies, while only little effort is made to innovate at the EU regions' technology frontier. Consequently, regional and other horizontal (R&D) policies (together with EU regional policy) should be especially aimed at ensuring a sufficient level of R&D spending in the abovementioned countries.

References

1 Eurostat. Science, technology and innovation in Europe. 2012; Brussels: European Commission.
2 Lee, H. Y. and Park, Y. T. An international comparison of R&D efficiency: DEA approach, *Asian Journal of Technology Innovation* 2005; 13(2): 207–222.
3 Wang, E. C. and Huang, W. C. Relative efficiency of R & D activities: A cross-country study accounting for environmental factors in the DEA approach. *Research Policy* 2007 36(2): 260-273.
4 Lee, H. Y., Park, Y. T. and Choi, H. Comparative evaluation of performance of national R&D programs with heterogeneous objectives: A DEA approach. *European Journal of Operational Research* 2009; 196(3): 847–855.
5 Sharma, S., and Thomas, V. J. Inter-country R&D efficiency analysis: an application of data envelopment analysis. *Scientometrics 2008;* 76(3): 483–501.
6 Chen, C. P., Hu, J.L. and Yang, C. H. R&D efficiency of multiple innovative outputs: The role of the national innovation system. *Innovation: Management, policy & practice* 2011; 13: 341–360.
7 Guan, J. and Chen, K. Modeling macro- R&D production frontier performance: an application to Chinese province-level R&D. *Scientometrics* 2010; 82(1):165-173.
8 Guan, J., Ma, N. A comparative study of research performance in computer science. *Scientometrics* 2004; 61(3): 339–359.
9 Guan, J., Wang, J. Evaluation and interpretation of knowledge production efficiency, *Scientometrics* 2004; 59(1): 131–155.
10 Guan, J., He, Y. Comparison and evaluation of domestic and international outputs in information science and technology research of China, *Scientometrics* 2005; 65(2): 215–244.
11 Huang, C., Varum, C. A., Gouveia, J. B. Scientific productivity paradox: The case of China's S&T system, *Scientometrics* 2006; 69(2): 449–473.
12 Karkazis, J., Thanassoulis, E. Assessing the effectiveness of regional development policies in Northern Greece using data envelopment analysis. *Socio-Economic Planning Sciences* 1998; 32(2): 123–137.
13 Liu, J. S. and Lu, W. M. DEA and ranking with the network-based approach: a case of R&D performance. *Omega-International Journal of Management Science* 2010; 38(6): 453-464.
14 Meng, W., Hu, Z., Liu, W. Efficiency evaluation of basic research in China, *Scientometrics* 2006; 69 (1): 85–101.
15 Moed, H. F. Measuring China's research performance using the Science Citation Index, *Scientometrics* 2002; 53(3): 281–296.
16 Sueyoshi, T. and Goto, M. A use of DEA–DA to measure importance of R&D expenditure in Japanese information technology industry. *Decision Support Systems* 2013 54: 941–952
17 Zhong W, Yuan W, Li SX et al. The performance evaluation of regional R&D investments in China: An application of DEA based on the first official China economic census data. *Omega-International Journal of Management Science* 2011; 39(4): 447-455.
18 Aristovnik A. The relative efficiency of education and R&D expenditures in the new EU member states. *Journal of Business Economics and Management* 2012; 13(5): 832-848.
19 Charnes, A., Cooper, W. W., Rhodes, E. Measuring the efficiency of decision making units. *European Journal of Operational Research* 1978; 2(6): 429–444.

20 Farrell, M. The Measurement of Productive Efficiency. *Journal of the Royal Statistical Society Series A (General)* 1957; 120(3): 253-281.
21 Avkiran, N. K. Investigating technical and scale efficiencies of Australian Universities through data envelopment analysis. *Socio-Economic Planning Sciences* 2001; 35(1): 57-80.

PROTOTYPE OF THE REGIONAL DEVELOPMENT: KAZAN*

Sabri Er[1], Bünyamin Zile[2], Ahmet Özçelik[3]

[1]*Ankara Development Agency, Ankara/Turkey, sabrier@ankaraka.org.tr*

[2]*Kazan Municipality, Kazan-Ankara/Turkey, bunyaminzile@gmail.com*

[3]*Ankara University, Ankara/Turkey, aozcelik@agri.ankara.edu.tr*

ABSTRACT

Kazan has been striking example for regional development basically in two dimensions by accommodating economically industry and agriculture and socially modern city life and tradition. Being close to capital, suitable transport facilities and geographical location have led Kazan to be the most progressing industrial zone of Ankara whilst being historically one of the best agricultural production basins with fertile land and irrigation in the province. Similarly, significant social structural change has been experienced by getting dense immigration, urbanization, more years in education, modern city life mingled with local tradition. All these have brought about regional development elements such as competitiveness, economic growth, social development, and wealth to the district.

The purpose of this paper is to describe causes and effects of the regional development of Kazan showing elimination of disparities between developed central Ankara and developing rural part of the province. Kazan is a good local model of regional development, since minor changes at local level may trigger tremendous impacts on province even on country level. The outcomes of several common wisdom meetings with various sector representatives have been considered in addition to survey conducted for the Kazan city inventory. Also, several documents produced by government and private bodies have been taken into account. The study has been constrained by the lack of involvement of all sectors and sides residing in Kazan.

*Kazan is a district (or county) of Ankara province

Keywords: Kazan, prototype, regional development

1. Let Us Know Kazan

Kazan, district of Ankara and having 560 square km area, is located on the Akıncı Plain in northwest of capital Ankara. The district, just 47 km away from the capital city, is on Ankara Istanbul state road and it takes 20 minutes by car. Kazan, situated in upward of Sakarya part in Central Anatolia, is surrounded by Keçiören and Çubuk districts in its east, Ayaş district in its west, Sincan and Yenimahalle districts in the south, and Kızılcahaman district in its north, as displayed on the Ankara map, below.

Figure1. Map of Ankara

The district carries the traces of the various civilizations from the old settlement areas and tumulus to many historical artifacts belonging to Seljuk and Ottoman period. It also offers natural life appropriate to hiking and natural camping with its parks, and recreation areas. Kazan accommodates 33 neighborhoods with 15 villages. Total population of the district is 42.090 in 2011 including village population by 1.747.

Kazan has dual economic structure thereby incorporating industry and agriculture within the district. At the entrance of Kazan from Ankara, industrial zone accommodating many industrial establishments belonging to several different sectors appears. Fertile agricultural land on which several crops from grains to fruits and vegetables are grown is located on the plain. Livestock is also one of the major agricultural activities in Kazan.

Dual social structure is also observed in Kazan by having modern city life engaged with tradition through urbanization, education, immigration, and so on. Cheaper cost of living compared to capital city, more opportunities for the young and unemployed, being safe place to live, quality education and health services, and others have led heavy migration to Kazan within as well as outside of Ankara province. The population has gone up nearly 42% in last decade from 29.692 in 2000 to 42.090 in 2011.

Although Kazan is a new county of Ankara(officially designated), it has shown tremendous development in both economic and social dimensions. According to TurkStat, Kazan is the

fastest developing district in Ankara. The major reasons for this achievement are the following;

- Being close to capital city
- Developing industry sector and hence improving employment
- Convenient geographical location in term of transportation and logistic
- Implementing new urbanization concepts leading to better living conditions
- Fertile land with irrigation
- Having long-term historical&cultural background

2. Main Economic Activities

The industry is the main economic activity in Kazan particularly in last decade, though agriculture has been traditional economic activity in the region. TAI(Turkish Aerospace Industry), the biggest aircraft industry in the country, is located in Kazan. TAI is manufacturing/assembling F-16 war planes, helicopters, and others and thus several subsidiary companies producing equipment, spare parts, etc. have emerged in Kazan. The industrial zone just for defense industry will be established nearby TAI. Consequently, defense industry with huge value added is one of the triggering sectors in Kazan.

The Ankara logistic base, aimed in European standard, is the first international transportation base in Turkey has been set up in Kazan. The logistic base was established by over 45 international freight companies residing in Ankara by taking into account geographical location and trade links. The major reason to set up the logistic base in Ankara/Kazan is to gain competiveness advantage and create collaboration with other institutions and partners since Ankara is natural harbor for Eurasia. The base has been fulfilling the need of infrastructure for the sector, meeting circulation of goods, and mitigating environmental hazards caused by heavy trucks.

Food sector is another emerging industrial one that has promising future. Chocolate, cookies, and beer are the major food processing products in Kazan whilst other food products are in the line to be processed, packed and marketed at national and international merkets.

The wood processing industry is another important and progressing sector in Kazan. Industrial zone located east of Kazan has been designated for wood processing. Several companies have been busy to build trailer houses for which demand has sharply gone up.

Electrical and machinery equipment manufacturing, glass production, small scale iron/steel manufacturing, health equipment industry, and metal ware industry are other major industries residing in Kazan. There are hundreds small and medium size enterprises (SMEs) in these sectors operating in Kazan.

Since Kazan has been bestowed with fertile plain land sided by irrigation facilities, agriculture has been one of the key as well as traditional sectors in the district. By having nearly 27.000 hectare agricultural land, grains, vegetables, melon (brand for Kazan), sugar beet, and chick

pea are major herbal products being produced. Bovine and ovine breeding are also main activities in rural Kazan. Milk and meat are significant animal products produced in the district. Another important agricultural activity in Kazan is beekeeping and honey production.

2.1. Main Production Sectors (Clusters)

The industries mentioned above particularly defense industry, logistic base, wood processing industry, electrical and machinery equipment industry are main production sectors or clusters in Kazan. There are hundreds and hundreds SMEs in those sectors. There are more than 1.200 SMEs in electrical and machinery equipment industry operating in Kazan. Food processing industry and health equipment industry accomadating tens of firms are other candidate industries for main production sectors in near future in Kazan. Not only do many companies reside in clusters but several public and private banks, training centers, infrastructural facilities, and other activities essential to clusters are also established in Kazan. Consequently, the district of Kazan is like a business incubator center paving the way for clusters for different kinds of industries.

2.2. Innovation Activities in Kazan

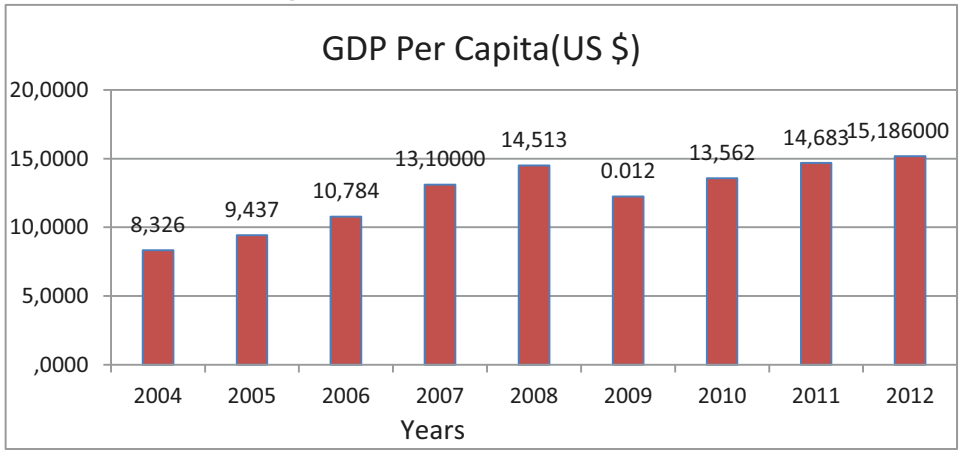
Main economic sectors stated above are keen to R&D and innovation in order to be competitive in the market. TAI has been more engaged in R&D particularly in electronics and nanotechnology while most SMEs have been involved in innovation. Since innovation simply refers to processing of ideas or invention into commercial value, SMSs are much more interested in producing innovative products so as to keep themselves dynamic and competitive in their operating market. Electrical/Electronic equipment, auto parts and other machinery equipment industries are some but active industries in Kazan pushing forward for innovation activities.

3. Main Economic Indicators in Kazan

3.1. GDP Per Capita in Kazan

GDP per capita in Kazan has fluctuated with parallel to that of Ankara and Turkey. GDP per capita in the district has been shown on Figure 2. GDP per capita of Ankara in general is 22% higher than the GDP per capita of Turkey. Similarly, GDP per capita of Kazan is generally 8% greater than that of Ankara for last 10 years. GDP per capita value has reached to 15.185 US$ in 2012, 45% higher than that of 2004. Apparently, economic development particularly in the last decade has brought about GDP growth in Kazan.

Figure 2. GDP per capita in Kazan



Source[1]: Kazan Municipality and Kazan Industry and Businessmen Association

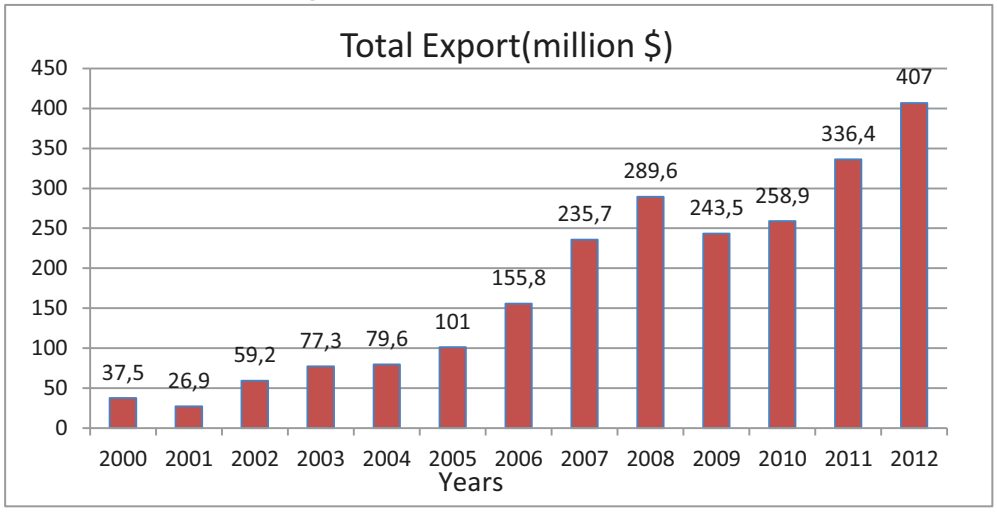
3.2. Total Export from Kazan

The total export value generated by Kazan has been displayed on Figure 3, below. As seen on the figure, there has been tremendous increase in the export value from 37,5 million US$ in 2000 to 407 million US$ in 2012, though there was temporary decline in 2008 and 2009 due to global economic slowdown. Major export products are electrical equipment, electronic parts mainly used in defense industry, spare parts of automobiles and aircraft, glass, products of metal industry, food products, health equipment, and others. Main export destinations are Germany, UK, France, Poland, Iran, Iraq, Saudi Arabia, and other countries such as US, Algeria, etc.

Industry is the main activity and major income source of Kazan whilst export of different products is the actual drive of the industry. Therefore, export ability and promotion are one of the key focus areas of the Kazan firms. The more export they perform, the more income they generate, the more investment they make, and so on. More export earning is anticipated as long as Kazan firms are able to invent new products through R&D and especially through innovation.

[1] GDP per capita numbers are tentative and not confirmed. But they are approximated.

Figure 3. Total Export from Kazan

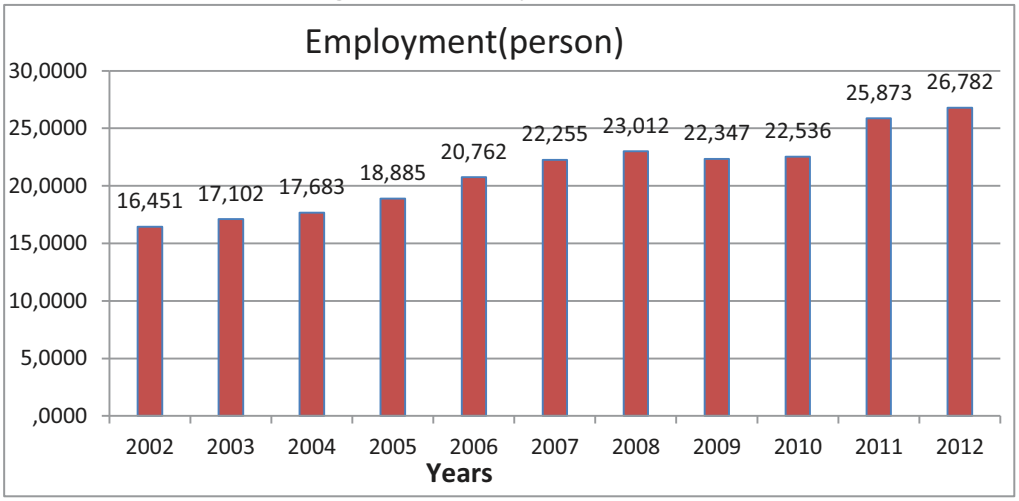


Source: Central Anatolian Exporters' Union

3.3. Employment in Kazan

There has been steady rise in employment over years except in 2008 and 2009 because of economic slowdown in those years, as shown on Figure 4. There has been more than 38% growth in employment between 2002 and 2012. Rise in employment is anticipated in Kazan unless there is an economic slowdown in the economy. Around 10% of this employment is made up of high wage paid engineers and managers as other middle and minimum wage paid group of workers. Since Kazan is located nearby capital city where best universities of the country are settled, companies have great advantage to employ qualified professions when they need. Besides that, companies are also able to hire any level worker due to closeness to big labor market.

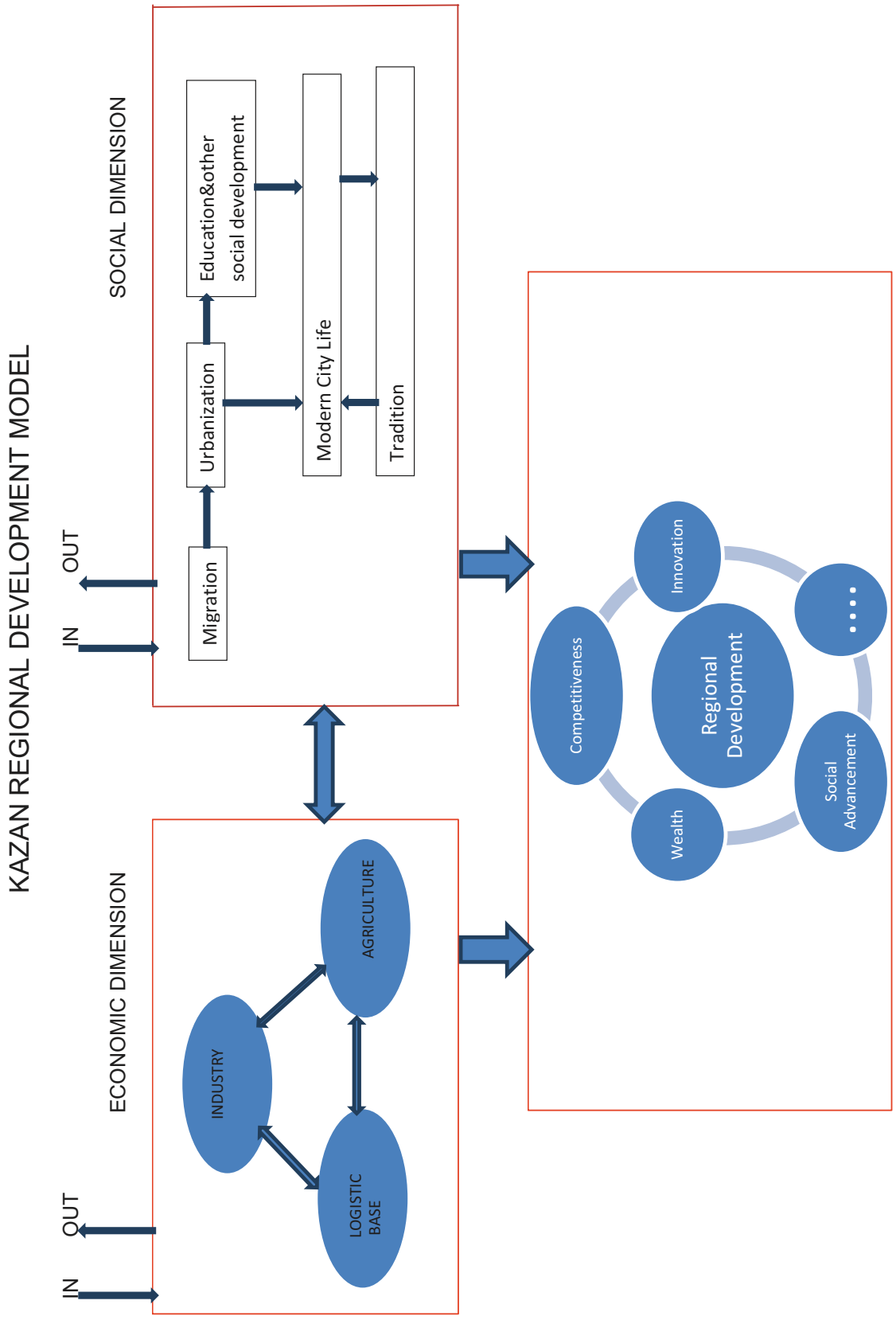
Figure 4. Employment in Kazan



Source: Kazan Industry and Businessmen Association

4. Development Model of Kazan

Kazan Regional Development Model has been depicted as shown below. There are two main structures in the model; economic and social dimensions. Economic dimension has been composed of three major sectors; industry, agriculture, and logistic base. There are apparently mutual relationships among those sectors. They are actually pushing and feeding each other. Social dimension, other major structure in the model, is made up of several subcomponents some of which are migration, urbanization, and so on. Those developments have brought about to emerge modern city life in the Anatolian district. This new culture has been mingled with traditional patterns. Apparently, these two major dimensions are not functioning in a closed environment. By rather, there is an intensively in and out flow in term of economic and social elements with province, country and even the world. Those two major structures (dimensions) with their sub-items have resulted in emerging the elements of regional development such as competitiveness, innovation, social advancement, and others. This model is a snap-shot of a current development picture of Kazan. It is not a static model rather it is quite dynamic one. New element(s) of economic and/or social dimensions can be most probably will be added in the future. Then, model will be modified with new elements.


KAZAN REGIONAL DEVELOPMENT MODEL
SOCIAL DIMENSION
Education&other social development
Urbanization
Modern City Life
Tradition
Migration
OUT
IN
ECONOMIC DIMENSION
AGRICULTURE
INDUSTRY
LOGISTIC BASE
OUT
IN
Innovation
Competitiveness
Regional Development
Social Advancement
Wealth
....

5. Major Policies and Strategic Programs Triggering Kazan Development

The major policies and strategic programs that have contributed to Kazan development are the following;

a. Transportation Policies: The district, just 47 km away from the capital city, is on Ankara Istanbul state road as well as D750 route that is an ex-Ankara Istanbul state road that have significantly contributed to the development of Kazan. Besides, railway line that will connect Kazan to main railway system of the country is now one of the top priorities of the local authority pushing forward.
b. Incentive Policies: These policies basically contain providing free land owned by the state to investors, offering cheap workshops built by municipality to manufacturers, constructing basic infrastructure essential to workshops and offices, cheap credit by banks, project base grant offers by state agencies, and others.
c. Zoning Policies: This is one of the key areas of the municipalities located to metropolis to handle carefully. This is essential for further development of the cities and protect environment. Kazan municipality has been working on this topic to reserve certain place(s) for industry and housing while protecting fertile agricultural land and water basins.
d. Clustering Support Policies: Defense industry and Logistic base clusters are one of the biggest ones in the country and hence particularly supported by local and federal governments. The Kazan municipality has been assigning free land(if possible) to companies who want to be part of cluster. Moreover, it supplies infrastructural facilities to those clusters. Several projects are on the table to make the logistic base the biggest one in Eurasia. Similarly, new big industrial zone just for defense industry is also on the way.

6. Is Kazan Model Transferable to Other Regions of the Country?

Kazan is obviously a model being examined and transferred to other regions of the country which have commonalities with Kazan. Emerging big cities such as Bursa, Konya, Kayseri and others are all trying to create industrial zones and suburbs outside of the city. So that development will not only appear in the city but in the entire province. In other words, they are trying to minimize disparities within the province as at least nearly occured in Kazan example. Transferring Kazan model to somewhere else apparently will not be one to one copy or replacement. Rather Kazan model will be modified according to needs and the requirements of the specific region.

7. Expectations and Drawbacks

The ex-Ankara-Istanbul state road on which Kazan is residing is now far away from meeting the needs of heavy transportation and urgently needs to be enlarged and modernized. Likewise, railway to Kazan is expected to be linked as quickly as possible. Several companies are popping up somewhere in Kazan and it requires new well-established industrial zone with modern infrastructure. This is an important issue that has to be tackled with. Companies will be able to find well-prepared working place while environment will be well-protected in the industrial zone. Most high wage group of people working in Kazan unfortunately do not live in Kazan and rather going and coming back to Ankara. Further social development elements need to be established such as colleges, cinemas, and others to keep these people in Kazan.

References

1. Ankara with Statistics. Ankara Development Agency. 2011.
2. Ankara Regional Plan 2011-2013. Ankara Development Agency. 2011.
3. Comparison of counties of Ankara. Working paper. Kazan Municipality. 2012
4. Kazan City Guide. Kazan Municipality Cultural Publications. 2012.
5. Kazan City Inventory(Social-Economic Situation of Kazan). Kazan Municipality. 2012.
6. Kazan Industry and Businessmen Association(SIAD). SIAD Presentation. 2011
7. Wp1/03 Search Working Paper. Regional Economic Development. January 2012
8. http://www.statsamerica.org/innovation/guide/practitioners_guide.pdf January 2013
9. http://www.businessdictionary.com/definition/innovation. February 2013
10. http://www.oaib.org.tr/en February 2013

A REGIONAL DEVELOPMENT INDEX PROPOSAL FOR A NUTS2 LEVEL REGION IN TURKEY

Emine Arslan Pauli[1], Yasin Dalgıç[2], Dr. Kadir Yasin Eryiğit[3]
Jülide Alan[4], Dr. Mehmet Sait Cülfik[5]

[1]Bursa Eskişehir Bilecik Development Agency, emine.arslan@bebka.org.tr

[2]Bursa Eskişehir Bilecik Development Agency, yasin.dalgic@bebka.org.tr

[3]Uludağ University, Faculty of Economics and Administrative Sciences, Department of Econometrics, kyeryigit@uludag.edu.tr

[4]Bursa Eskişehir Bilecik Development Agency, julide.alan@bebka.org.tr

[5]Bursa Eskişehir Bilecik Development Agency, mehmet@bebka.org.tr

How to measure regional development is one of the issues emerges when it is the matter of the evaluation of the policies applied in a region. One of the aspects of the question is how to reflect a region analytically if the region has divergent characteristics. This aspect of the question even becomes more important where the region has different administrative units which have resources to manage having distinct characteristics. The indicators are convenient to express various features of regional development; there is still a need of presenting these by one single figure. In this paper, to measure the discrepancies within the region, an index where the main purpose is to monitor the development of the provinces of Turkey, specifically three provinces Bursa, Eskisehir and Bilecik within TR41 region which is one of the 26 NUTS2 level regions, was developed. Beside countrywide indices available in Turkey, this study provides a tailor-made comparison for a region at the level of its provinces based on a broad set of regional indicators. It provides an approach how an index can be determined taking a region as a starting point and analyse the development where there is a limitation on the availability of regional indicators. In the stage of determining the regional indicators set to be used for the index, the method of principal component analysis (PCA) used. The methods used and the regional development level of provinces of TR41 Region were discussed with reference to the index developed.

Keyword
regional development index, TR41 Bursa Eskişehir Bilecik, principal component analysis

1. Introduction

The Development Agencies in Turkey, that were established with the purpose of accelerating regional development, ensuring sustainability and reducing inter-regional and intra-regional development disparities in accordance with the principles and policies set in the National Development Plan and Programmes, lead their work in accordance with this purpose. The first approach to reduce the inter-regional and intra-regional disparities is to determine these disparities. In this context, the first step to take has to be answering the question of how to measure the development and how to monitor it.

In Turkey, the development has been measured by Ministry of Development by an index called Socio-Economic Development Index (SEDI) of which recent announcement is SEDI 2011 in May 2012 after the ones announced in the years 1996 and 2003. Since this

countrywide index covering all the provinces of Turkey is announced in long intervals which is every ten years on average, there is a need for following up the development for intra-years.

This study presents an approach for a development index that can be used by regions to provide a regional look to the development issue providing a comparison for a region at the level of its provinces. With the broad set of regional indicators determined by taking TR41 region, that is one of the 26 NUTS2 level region of Turkey, as a reference and also covering all the provinces in Turkey,

The availability of 'Development Index' to measure and monitor the development in the region more closely and periodically by various dimensions will provide further details about the components of development. Also, it provides an opportunity for a development agency to follow up the state of the provinces within the region and those provinces within all the provinces in the country thematically. This opportunity enables the regional level analysis be detailed and especially up-to-date and shows the issues that requires further analysis.

In this paper, by covering total 81 provinces of Turkey and three consecutive years, an approach about how to determine an index to measure the development has been discussed. Also, how the provinces of TR41 region rank among 81 provinces of Turkey by this index and sub-indices of this index have been presented.

2. Methodology

The purpose of the study is to make a development index considering different dimensions of development by sub-indices to determine the state of provinces of TR41 Region within the region and among 81 provinces of Turkey. The spatial coverage of the study is 81 provinces of Turkey and time coverage is years 2008 to 2010.

In the beginning of the study, the indicators available to follow for 81 provinces in Turkey have been listed according to their availability on province level and their available periods. This inventory work has continued with the detailed research of data source, data reliability, and continuity of the data source. After the listing of the indicators available on province level, national and international literature about indices in the field of development was reviewed. Regarding the national and international work about indices about development, the indicators have been prioritised, selected and grouped into themes. The themes to which the indicators attained were determined after examination of the components of development concept used in literature. According to availability of the data by the date of the study and to apply the methodology for more than one year, the years 2008-2010 have been selected for the study.

The themes that constituted sub-indices are:

- Human Development,
- Socio-Cultural Development,
- Economic Development,
- Innovation,
- Quality of life and accessibility.

The general index for development is consisting of 68 indicators in total, of which 29 indicators are for human development sub-index, 5 indicators are for socio-cultural sub-index, 10 indicators are for economic development sub-index, 5 indicators are for innovation, 17 indicators are for quality of life and accessibility sub-index. These indicators are the indicators mainly calculated as a ratio of the quantity either to the population or to the area to allow comparison among provinces which have different features by population and area.

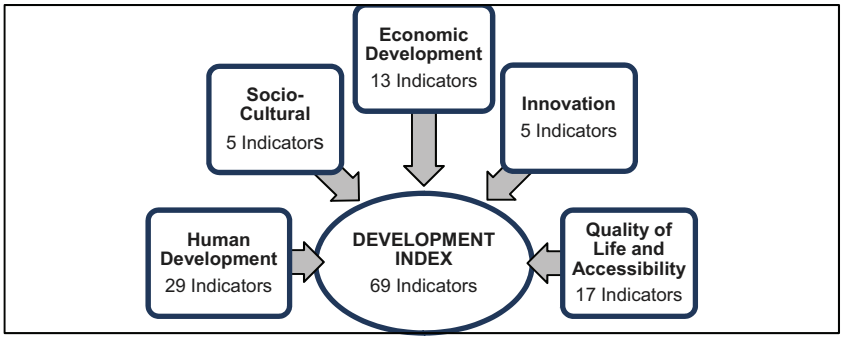


Figure 1 Development Index

Table 1 List of Indicators Used for Sub-Indices

HUMAN DEVELOPMENT	
Annual Population Growth Rate (%0)	Rate of Female Literacy (%) (age of 6 and over)
Province and District Centre Population Growth Rate (%0)	Literacy Rate of Province and District Centre (%) (age of 6 and over)
Sub-district and Village Population Growth Rate (%0)	Literacy Rate of Sub-district and Village Centre (%) (age of 6 and over)
Urbanisation Rate (%)	Number of University Graduates per 1000 Persons
Old Age Dependence Ratio (age of 65 and over)	Net Schooling Ratio for Secondary Education (%)
Young Age Dependence Ratio (age of 0-14)	Net Female Schooling Ratio for Secondary Education (%)
Net Migration Rate (%0)	Number of Students per Teacher (Primary Education)
Average Age At First Marriage- Bride	Number of Students per Teacher (Overall Secondary Education)
Average Age At First Marriage- Groom	Number of Students per Teacher (General Secondary Education)
Crude Divorce Rate (%0)	Number of Students per Teacher (Vocational and Technical Secondary Education)
Number of Hospital Bed Per 100 Thousand Persons	Number of Students per Classroom (General Secondary Education)
Number of Doctors Per 100 Thousand Persons	Number of Students per Classroom (Vocational and Technical Secondary Education)
Number of Specialised Doctors Per 100 Thousand Persons	Labour Force Participation Rate (%)
Number of Nurses Per 100 Thousand Persons	Unemployment Rate (%)
Rate of Literacy (%) (age of 6 and over)	
SOCIO-CULTURAL DEVELOPMENT	
Number of Benefiting in Public Library per 1000 Persons	Percentage of Associational Memberships in Population (%)
Number of Theatre Seats per 100 Thousand Persons	Percentage of the Number of Employees Under Service Contract in the Population with Age of 15 and Over (%)
Number of Cinema Seats per 100 Thousand Persons	
ECONOMIC DEVELOPMENT	
Number of Night Spent in Municipality Tourism Operation Licenced and Municipality Licenced Establishment (Citizen)	Export per Capita (000 USA dollars)
Number of Night Spent in Municipality Tourism Operation Licenced and Municipality Licenced Establishment (Foreign)	Import per Capita (000 USA dollars)
Value of Crop Production per Person (TL)	Deposit with Banks per Capita (TL)
Value of Livestock per Person (TL)	Specialised Loans per Capita (TL)
Value of Animal Products per Person (TL)	Non-Specialised Loans per Capita (TL)
Commercial Electricity Consumption per 1000 Persons (MWh)	Loan / Deposit (%)
Industrial Electricity Consumption per 1000 Persons (MWh)	
INNOVATION	
Applications for Patent per 100 Thousand Persons	Applications for Utility Model per 100 Thousand Persons
Applications for Trademark per 100 Thousand Persons	Rate of Companies Issued with an R&D Certificate in Total (%)
Applications for Industrial Design per 100 Thousand Persons	

QUALITY OF LIFE AND ACCESSIBILITY	
Rate of Population Served by Municipal Waste Services in Total Population (%)	Number of Motor Vehicles Per Thousand Persons
Rate of Municipal Population Served by Sewerage System in Total Municipality Population (%)	Rate of Traffic Accidents in Total (%)
Proportion of Municipal Population Served By Wastewater Treatment Plants in Total Municipality Population (%)	Length of Railway per Thousand km^2
Amount of Wastewater Discharged per Capita In Municipalities (Liters/Capita-Day)	Number of Mobile Phone Subscribers per Thousand Persons
Rate of Population Served By Drinking Water Treatment Plants In Total Municipal Population (%)	Number of Internet Subscribers per Thousand Persons
Water Abstraction per Capita in Municipalities (Liters/Capita-Day)	Rate of Waste Delivered to Controlled Landfill Site (%)
Percentage of Underground Water in Total Water Abstracted for Municipal Water Supply Network (%)	Average Sulphur Dioxide (SO2) in Air Quality Measurements in Centre of Provinces (µg/m3)
Residential Electricity Consumption per Thousand Persons (MWh)	Average Particulate Matter (PM10) in Air Quality Measurements in Centre of Provinces (µg/m3)
Length of Motorway per Thousand km^2	

3. Empirical Results

The analysis that is used for 'Development Index' is Principal Components Analysis. It is analysis that reveals the variations in the set of variables, namely the set of indicators covered by sub-indices in this context. The advantage of this analysis is that it can explain which variable is important for the index.

By PCA, reducing the dimensions for related variables, the variables have been reduced to a new variable. Owing to dimensionality reduction property of PCA, in the sub-indices the indicators related to each other could be covered. The calculated new variables from the indicators in the sub-indices are the linear combinations of the original variables weighted based on the weights that explain the variance. Here, variance explanation weights are calculated as eigenvalues. In the application of PCA by Minitab program, to standardise the indicators and weight them equally, correlation matrix was used for the set of indicators for sub-indices for each year in the period of 2008 to 2010. Using this correlation matrix, orthogonal eigenvalues were calculated. The matrix of principal components is a matrix consisting of independent variables; the first principal component corresponds to the highest percentage of the variance in the data. Similarly, the other components following the first principal component correspond to smaller variances respectively. Thus, by PCA, by less number of variables, the maximum variance possible has been explained.

In PCA, to make decision about how many variables need to retain by using the eigenvalues, Kaiser rule was used. According to this rule, the eigenvalues over 1 have been considered. By using these eigenvalues for every year, 'factor scores' have been calculated as linear combinations of eigenvalues. The calculated factor scores' are the standaridised variables with mean 0 and standard deviation 1. In this study, factor scores are taken as 'index values'.

The 'Development Index' has been calculated by equally weighted factor scores of five sub-indices since all sub-indices in the study has been taken as equally important.

$$\text{Development Index} = \frac{\text{HD} + \text{SCD} + \text{ED} + \text{I} + \text{QLA}}{5}$$

HD : Human Development Sub-Index Value
SCD : Socio-Cultural Sub-Index Value
ED : Economic Development Sub-Index Value
I : Innovation Sub-Index Value
QLA : Quality of Life and Accessibility Sub- Index Value

3.1 Evaluation of the sub-indices

In this section, the ranking of provinces according to calculated factor scores of each sub-index will be examined on the basis of sub-indices. By Principal Component Analysis (PCA), index values (factor scores) were calculated for the years 2008, 2009 ve 2010 for each sub-index separately. Due to the fact that the variance for each set of variables in PCA changes from one year to other, the index values couldnot be compared among three years covered in

the study. Nevertheless, the ranking of the provinces could be compared it is an indicator for the performance of the provinces among whole provinces for each year.

3.1.1 Analysis of Human Development Sub-Index for the Years 2008-2010

In human development sub-index, demographic indicators and indicators related to education, health and employment are covered.

The eigenvalues that are above 1 and considered for the calculation of the factor scores by Kaiser rule are presented in Table 2. According to PCA, for each year from 2008 to 2010, there are five factors of which eigenvalues are above 1, explains 80% of the variance. According to loading matrix, for the years 2008-2010 Young Age Dependence Ratio has the largest loading in negative magnitude. Young age dependence ratio is the percentage of the ratio of 0-14 years age group to 15-64 years age group that is working age group. This is an indicator about the demographic structure of the society that shows the potential of how the young population of age 0-14 is socially and/or economically depended on working age population. In EU 27 countries, this young dependency ratio is 23,8% by year 2010 where it is 38,1% for Turkey. The negative loading of the principal component of the indicator confirms that the age dependence ratio and development level are inversely correlated.

Table 2 Results of PCA for Human Development Sub-Index for the Years 2008-2010

Year		Eigenvalues	Variance	Cumulative Variance
2008	1	13.14	0.453	0.453
	2	5.388	0.186	0.639
	3	2.196	0.076	0.715
	4	1.866	0.064	0.779
	5	1.290	0.044	0.823
2009	1	13.024	0.449	0.449
	2	5.038	0.174	0.623
	3	2.639	0.091	0.714
	4	2.029	0.070	0.784
	5	1.310	0.045	0.829
2010	1	12.666	0.437	0.437
	2	5.259	0.181	0.618
	3	2.912	0.100	0.719
	4	1.913	0.066	0.784
	5	1.415	0.049	0.833

Table 3 Loading Matrix for Human Development Sub-Index for the Years 2008-2010

2008 Principal Components			2009 Principal Components			2010 Principal Components	
1	2		1	2		1	2
Youngdep	-0.263	0.026	Youngdep	-0.265	0.036	Youngdep	-0.268	0.044
Literpro	0.261	0.015	Literpro	0.26	0.004	Schoofem	0.263	0.043
Schoofem	0.257	0.054	Schoofem	0.257	0.066	Schoosec	0.26	0.029
Schoosec	0.254	0.037	Schoosec	0.254	0.056	Literpro	0.256	0.033
Literacy	0.249	0.089	Teachsec	-0.246	0.138	Teachsec	-0.249	0.153

Note: The loadings of first two principal components and first five variables presented in the table.

For three years, after the young age dependency ratio that has the highest loading, the variables which have the highest loadings are basically the indicators related to education, namely ‘literacy rate of province and district centres’, ‘net schooling ratio of women’, ‘net schooling ratio for secondary education’, ‘number of students per teacher in overall secondary education’ etc. This explains that the indicators related to education have a great impact on human development of a society.

Table 4 Top 10 Provinces in Human Development Sub-Index for the Years 2008-2010

Ranking in Human Development Sub-Index	2008	2009	2010
1	Ankara	Ankara	Ankara
2	İzmir	Isparta	Eskişehir
3	Eskişehir	Eskişehir	Antalya
4	İstanbul	İzmir	Bilecik
5	Kocaeli	Edirne	İzmir
6	Isparta	Bolu	Isparta
7	Yalova	Trabzon	Çanakkale
8	Antalya	Antalya	Muğla
9	Edirne	Bilecik	Edirne
10	Denizli	Çankırı	İstanbul

3.1.2 Analysis of Socio-Cultural Development Sub-Index for the Years 2008-2010

In socio-cultural sub-index, the indicators related to theater/cinema, associations and employees under contract are covered. According to PCA, for the years 2008 to 2010, there exists one factor of which eigenvalue is above 1 and it explains around half of the of the total variance. But, for the year 2010 there are two eigenvalues that explain the 70% of the variance. For three years, the ranking of the variables according to their loadings are exactly the same. The indicator which has the highest loading in the sub-index is 'the proportion of the number of employees under service contract in the population with age of 15 and over'. This indicator shows social and cultural character of the provinces could be characterised by how intensively the residents are involved in working life. This provides evidence about how higher the registered employees are the more developed the province is.

Table 5 Results of PCA for Socio-Cultural Development Sub-Index for the Years 2008-2010

Year		Eigenvalues	Variance	Cumulative Variance
2008	1	2.6506	0.53	0.53
2009	1	2.6041	0.521	0.521
2010	1	2.4633	0.493	0.493
	2	1.1256	0.225	0.718

Table 6 Loading Matrix for Socio-Cultural Development Sub-Index for the Years 2008-2010

	2008 Principal Components			2009 Principal Components			2010 Principal Components	
	1	2		1	2		1	2
Employed	0.553	-0.186	Employed	0.562	0.069	Employed	0.560	0.096
Cineseat	0.547	-0.093	Cineseat	0.549	-0.012	Cineseat	0.562	-0.093
Assocmem	0.491	-0.302	Assocmem	0.51	-0.055	Assocmem	0.514	-0.027
Library	-0.295	-0.237	Library	-0.262	-0.652	Library	-0.240	-0.698
Theaseat	0.258	0.900	Theaseat	0.232	-0.753	Theaseat	0.221	-0.703

Note: The loadings of first two principal components ranked according to the first principal component loadings presented in the table.

Second higher loading belongs to the indicator of 'proportion of number of associational memberships in population'. The number of memberships of the association or voluntary organisations is taken to measure the social capital in literature. Also, the developed countries where social capital is high, the number of memberships in associations is high.

Table 7 Top 10 Provinces in Socio-Cultural Development Sub-Index for the Years 2008-2010

Ranking in Socio-Cultural Development Sub-Index	2008	2009	2010
1	Ankara	İstanbul	Ankara
2	İstanbul	Ankara	İstanbul
3	Eskişehir	Eskişehir	Kocaeli
4	İzmir	Kocaeli	Eskişehir
5	Kocaeli	İzmir	Yalova
6	Yalova	Bursa	Bursa
7	Bursa	Yalova	İzmir
8	Tekirdağ	Karabük	Tekirdağ
9	Karabük	Sakarya	Zonguldak
10	Antalya	Zonguldak	Antalya

3.1.3 Analysis of Economic Development Sub-Index for the Years 2008-2010

In this sub-index, the indicators related to foreign trade, energy consumption, agriculture and banking are covered. According to PCA, for the years 2008 to 2010, there exists five factors of which eigenvalues are above 1 and they explain around 85% of the of the total variance.

Table 8 Results of PCA for Economic Development Sub-Index for the Years 2008-2010

Year		Eigenvalues	Variance	Cumulative Variance
2008	1	4.8157	0.37	0.37
	2	2.4072	0.185	0.556
	3	1.6081	0.124	0.679
	4	1.1923	0.092	0.771
	5	1.0774	0.083	0.854
2009	1	4.6499	0.358	0.358
	2	2.4565	0.189	0.547
	3	1.6015	0.123	0.67
	4	1.2688	0.098	0.767
	5	1.0649	0.082	0.849
2010	1	4.5842	0.353	0.353
	2	2.5788	0.198	0.551
	3	1.6883	0.13	0.681
	4	1.3614	0.105	0.786
	5	1.0311	0.079	0.865

The ranking of the variables according to their loadings are same for three years. The indicator which has the highest loading in the sub-index is 'non-specialised loans per person'. Non-specialised loans refer to loans used by individuals which mean that the individuals are actively in economic life to invest via banks. Second higher loading belongs to the indicator of 'commercial electricity usage' which shows that commerce life in that province has intensity.

Table 9 Loading Matrix for Economic Development Sub-Index for the Years 2008-2010

2008 Principal Components			2009 Principal Components			2010 Principal Components	
1	2		1	2		1	2
Nspeloan	0.422	0.04	Nspeloan	0.425	0.085	Nspeloan	0.429	0.052
Electcom	0.414	-0.151	Electcom	0.415	-0.178	Electcom	0.415	-0.197
Deposit	0.397	-0.079	Deposit	0.402	-0.04	Deposit	0.393	-0.098
Hotelcitiz	0.345	-0.217	Export	0.332	0.366	Hotelcitiz	0.34	-0.275
Export	0.329	0.331	Hotelcitiz	0.33	-0.289	Export	0.331	0.338

Note: The loadings of first two principal components and five variables with the highest first principal component loadings presented in the table.

Table 10 Top 10 Provinces in Economic Development Sub-Index for the Years 2008-2010

Ranking in Economic Development Sub-Index	2008	2009	2010
1	İstanbul	İstanbul	İstanbul
2	Kocaeli	Ankara	Kocaeli
3	Ankara	Kocaeli	Bursa
4	İzmir	Bursa	Ankara
5	Bursa	İzmir	İzmir
6	Zonguldak	Zonguldak	Zonguldak
7	Antalya	Muğla	Denizli
8	Denizli	Antalya	Tekirdağ
9	Muğla	Denizli	Muğla
10	Tekirdağ	Eskişehir	Hatay

3.1.4 Analysis of Innovation Sub-Index for the Years 2008-2010

In this sub-index, the indicators related to industrial property and R&D centres are covered. For each year, regarding the eigenvalues, one factor for each year explains around 70% of the total variance. For each year from 2008-2010, the factors which have the highest loadings are 'applications for trademark per 100 thousand persons', 'applications for utility model per 100 thousand persons' and 'applications for industrial design per 100 thousand persons' respectively. Although, the factors vary from year to year, the loadings converge to each other, in other words, the factors related to industrial property have similar importance comparatively.

Table 11 Results of PCA for Innovation Sub-Index for the Years 2008-2010

Year		Eigenvalues	Variance	Cumulative Variance
2008	1	3.6905	0.738	0.738
2009	1	3.7871	0.757	0.757
2010	1	3.6592	0.732	0.732

Table 12 Loading Matrix for Innovation Sub-Index for the Years 2008-2010

2008 Principal Components			2009 Principal Components			2010 Principal Components		
	1	2		1	2		1	2
Trademar	0.470	0.002	Utimodel	0.47	-0.256	Indusdes	0.464	0.278
Utimodel	0.458	-0.442	Trademar	0.452	-0.200	Trademar	0.456	0.356
Indusdes	0.449	-0.503	Indusdes	0.444	-0.57	Utimodel	0.45	0.413
Patent	0.445	0.363	Patent	0.435	0.540	RDcentre	0.442	-0.472
RDcentre	0.410	0.649	RDcentre	0.434	0.527	Patent	0.423	-0.635

Note: The loadings of first two principal components and five variables with the highest first principal component loadings presented in the table.

Table 13 Top 10 Provinces in Innovation Sub-Index for the Years 2008-2010

Ranking in Innovation Sub-Index	2008	2009	2010
1	İstanbul	İstanbul	İstanbul
2	Ankara	Bursa	Bursa
3	Kayseri	Ankara	Kayseri
4	Bursa	Kayseri	Manisa
5	Konya	İzmir	İzmir
6	İzmir	Kocaeli	Ankara
7	Kocaeli	Konya	Kocaeli
8	Sakarya	Manisa	Konya
9	Tekirdağ	Tekirdağ	Tekirdağ
10	Eskişehir	Sakarya	Gaziantep

3.1.5 Quality of Life and Accessibility Sub-Index for the Years 2008-2010

In this sub-index, the indicators related to environment, communication and transportation are covered. From year 2008-2010, regarding the eigenvalues, for each year five factors for each year explains around 70% of the total variance.

Table 14 Results of PCA for Quality of Life and Accessibility Sub-Index for the Years 2008-2010

Year		Eigenvalues	Variance	Cumulative Variance
2008	1	6.3556	0.374	0.374
	2	1.987	0.117	0.491
	3	1.6418	0.097	0.587
	4	1.3113	0.077	0.664
	5	1.1625	0.068	0.733
2009	1	5.5841	0.328	0.328
	2	2.0523	0.121	0.449
	3	1.6348	0.096	0.545
	4	1.2865	0.076	0.621
	5	1.1815	0.069	0.691
	6	1.0937	0.064	0.755
2010	1	6.4421	0.379	0.379
	2	1.9682	0.116	0.495
	3	1.5129	0.089	0.584
	4	1.4711	0.087	0.670
	5	1.1252	0.066	0.736

Table 15 Loading Matrix for Quality of Life and Accessibility Sub-Index for the Years 2008-2010

	2008 Principal Components			2009 Principal Components			2010 Principal Components	
	1	2		1	2		1	2
Mobile	0.35	0.115	Internet	0.341	0.17	Mobile	0.346	0.17
Electres	0.335	0.243	Electres	0.338	0.277	Electres	0.328	0.306
Internet	0.323	0.205	Trafacci	0.329	-0.108	Internet	0.328	0.247
Trafacci	0.306	-0.132	Wasteser	0.307	-0.197	Trafacci	0.293	-0.116
Wasteser	0.284	-0.208	Drinkwat	0.291	-0.052	Wasteser	0.288	-0.235

Note: The loadings of first two principal components and five variables with the highest first principal component loadings presented in the table.

In the sub-index of quality of life and accessibility, the factor which has the highest loadings for the years 2008 and 2010 is ‘number of mobile phone subscribers per thousand persons’, and for the year 2009 it is ‘number of internet subscribers per thousand persons’. Having ‘residential electricity consumption per thousand persons’ indicator with the second highest loading for all three years supports that beside communication accessibility of the residents in the provinces, their energy usage also shows the development level of the provinces.

Table 16 Top 10 Provinces in Quality of Life and Accessibility Sub-Index for the Years 2008-2010

Ranking in Quality of Life and Accessibility Sub-Index	2008	2009	2010
1	İstanbul	İstanbul	İstanbul
2	Ankara	Ankara	Ankara
3	Kocaeli	İzmir	İzmir
4	Yalova	Kocaeli	Antalya
5	İzmir	Yalova	Kocaeli
6	Sakarya	Eskişehir	Muğla
7	Adana	Antalya	Yalova
8	Antalya	Adana	Eskişehir
9	Eskişehir	Bursa	Bursa
10	Muğla	Muğla	Sakarya

3.2 TR41 Region Provinces in Sub-Indices

According to rankings of three provinces of TR41 Region, namely Bursa, Eskişehir and Bilecik, it can be concluded in which component of the development represented by the sub-indices, the province is stronger.

Regarding the years 2008 to 2010 generally, Bursa has high ranking for innovation and economic development. For the same years, Eskişehir has the higher ranking in human development and socio-cultural development. Similarly, human development and socio-cultural development themes are the strong points of Bilecik. Regarding in which fields of development the provinces are not strong, it is observed that the human development area is the weakest point of Bursa, where it is economic development for Eskişehir and quality of life and accessibility for Bilecik. If individually each year is examined by taking the average of the ranking of three TR41 provinces to conclude about the overall performance of the provinces altogether, we conclude that they performed best in socio-cultural development in 2008 and 2009. For 2010, the strongest development area is human development. When their worst performance is examined, these provinces performed worst in the field of quality of life and accessibility in 2008, in the field of economic development in 2009, which is the economic crisis year, and in the field of innovation in 2010.

Table 17 Ranking of TR41 Provinces in Sub-Indices of Development Index

	2008	2009	2010
Human Development Sub-Index			
Bursa	12	21	18
Eskişehir	3	3	2
Bilecik	19	9	4
Socio-Cultural Development Sub-Index			
Bursa	7	6	6
Eskişehir	3	3	4
Bilecik	15	16	24
Economic Development Sub-Index			
Bursa	5	4	3
Eskişehir	16	10	14
Bilecik	23	47	23
Innovation Sub-Index			
Bursa	4	2	2
Eskişehir	10	13	13
Bilecik	15	28	51
Quality of Life and Accessibility Sub-Index			
Bursa	11	9	9
Eskişehir	9	6	8
Bilecik	31	25	39

3.3 Development Index 2008-2010

In development index, that is calculated by consolidation of human development, socio-economic development, economic development, innovation, quality life and accessibility sub-indices by equal weights, 68 indicators have been covered in total.

Table 18 Top 10 Provinces in Development Index for the Years 2008-2010

Ranking in Development Index	2008	2009	2010
1	İstanbul	İstanbul	İstanbul
2	Ankara	Ankara	Ankara
3	Kocaeli	İzmir	Bursa
4	İzmir	Bursa	Kocaeli
5	Bursa	Kocaeli	İzmir
6	Eskişehir	Eskişehir	Antalya
7	Yalova	Kayseri	Eskişehir
8	Antalya	Yalova	Tekirdağ
9	Kayseri	Antalya	Kayseri
10	Sakarya	Sakarya	Yalova

As a result of the consolidation, the ranking of the provinces for top ten provinces is mainly consistent with the ranking of the provinces sub-indices. Also for 2010, in Figure 2, index values of 81 provinces mapped according to their standard deviation where dark coloured provinces show the provinces high in the ranking. Additionally, for comparison of top ten provinces in the year 2010, index values were plotted in Figure3.

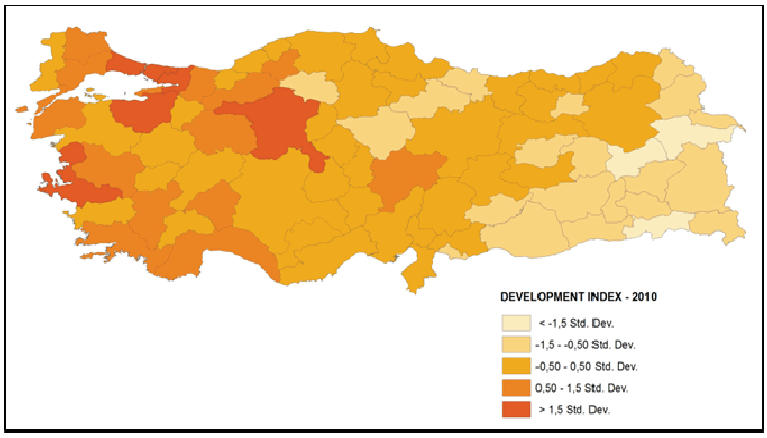


Figure 2 Development Index Values Grouped By Standard Deviation

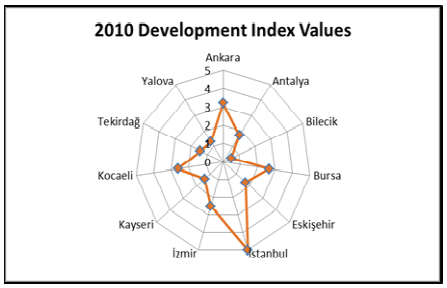


Figure 3
Index Values for Top 10 Provinces and TR41 Region Provinces in Development Index for the Year 2010

3.4 TR41 Region Provinces in Development Index

In the overall evaluation of the development index for TR41 region provinces, namely Bursa, Eskişehir and Bilecik, it is observed that two provinces of TR41 region is within top ten provinces for three years where Bilecik, that is the smallest province in terms of population and area aspects among TR41 provinces, performed less better compared to other two provinces. Regarding the trend in their ranking, Bursa followed a better trend among 81 provinces where Eskişehir had almost a stable trend and Bilecik followed a rather stagnant ranking.

Table 19 Ranking of TR41 Provinces in Development Index

	2008	2009	2010
Bursa	5	4	3
Eskişehir	6	6	7
Bilecik	16	24	26

4. Conclusion

This study provided an approach about how to make an index resulting from sub-indices calculated from thematically grouped indicators by Principal Component Analysis (PCA). Since the main goal of the study was measuring and monitoring of the development of the provinces of TR41 region in Turkey, it is a study which provides an approach having the region as a starting point for making a development index and focusing on the provinces of the region in comparison with the rest. In other words, from development aspect, this study reveals how the development can be monitored by an index which provides ranking that expresses how a province's performance is analysed in interaction with the others. Since, the index is calculated for three consecutive years separately, it provides a full picture of the provinces about their development in interaction with the rest of the country comparatively.

REFERENCE

1 Norris, Pippa, '*Making Democracies Work: Social Capital and Civic Engagement in 47 Societies'*, John F. Kennedy School of Government Harvard University Faculty Research Working Papers Series, October 2001.
2 Turkish Statistical Office
3 SAZAK, Şaduman, '*Türkiye'de Bölgelere Göre Nüfusun Yaş Gruplarına Dağılımı'*, Trakya Üniversitesi Fen Bilimleri Dergisi, 5(2): 187-198, 2004.
4 *'İllerarası Rekebetçilik Endeksi 2009 -2010' Uluslararası Rekabet* Araştırmaları Kurumu (*URAK*),2011.
5 Salzman, J., '*Methodological Choices Encountered in the Construction of Composite Indices of Economic and Social Well-Being*', 2003.
6 Kaiser, H.F., *'The application of electronic computers to factor analysis.'* Educational and Psychological Measurement 20, 141-151, 1960.
7 *Youth in Europe A Statistical Portrait,* EUROSTAT, Luxembourg, 2009.
8 İllerin ve Bölgelerin Sosyo-Ekonomik Gelişmişlik Sıralaması Araştırması (2003), DPT Yayın No 2671, May 2003.

BRIDGING THE GAP BETWEEN BUSINESS SUPPORT PROVIDERS AND BUSINESS PRACTITIONERS, FROM THEORY TO PRACTICE.

Paraskevi Giourka[1], *Ioannis Bakouros*[2]

[1]*Department of Mechanical Engineering, University of West Macedonia, Bakola and Sialvera, Kozani, Greece, pgiourka@uowm.gr*

[2]*Department of Mechanical Engineering, University of West Macedonia, Bakola and Sialvera, Kozani, Greece, ylb@uowm.gr*

Policy makers and academics agree that entrepreneurship is one of the most important generating mechanisms of growth and development that support the worlds' economies. However, the linkages between universities and the real socioeconomic and entrepreneurial needs are yet to be established. Although a variety of measures are initiated at a regional or a national level, there is lack of coordination resulting in funding overlaps and decreased efficiency and effectiveness of each measure. Hence, it can be said that the measures taken for supporting entrepreneurship are rather sporadic. This paper offers a practical insight on the linkages that can be established between business support providers and business practitioners through examining a holistic model that has been developed and implemented in Frankfurt, Germany in order to provide support to 'wannabe' entrepreneurs. The holistic mechanism is developed using a socioeconomic approach and the relevant stakeholders' role to the mechanism is indispensable in completing a collective effort. The paper concludes with proposing how a regional mechanism for supporting entrepreneurship can be established highlighting the positive implications this might have in the management and coordination of entrepreneurship support.

Keywords
entrepreneurship, regional development, supporting institutions

1. Introduction

There is growing evidence that entrepreneurship is significantly associated with economic growth [1]. The Global Entrepreneurship Monitor report demonstrates the framework conditions that are necessary for understanding the 'rules of the game' and determine the productivity of entrepreneurial activity. Multiple factors and the condition of these factors are influencing entrepreneurial activity. This urges for action upon these factors in a holistic and systematised way in order to enhance the potential of entrepreneurial success. Efforts to support entrepreneurship have been promoted by governments in different forms and include policy-making, building institutions, capacity building and making investments, and human capital [1, 2].

This paper focuses on institutions that support entrepreneurship and proposes complementary activities for supporting the entrepreneurial process combining the main elements of common archetypes of incubation as described in Carayannis and von Zedtwitz [2] with networking activities of all the relevant stakeholders in an area or a region. It presents a practical model of incubation that is designed to support entrepreneurship at all

the stages of development facilitating entrepreneurial growth and success using a socioeconomic approach. Finally, the role of the universities in the entrepreneurship supporting mechanism is explored.

The paper begins with an overview of the role of entrepreneurship and the factors that have been studied by various researchers as influencing the entrepreneurial success. It presents the archetypes of incubation models and the main pillars of the incubation process. It then presents an extended model of incubation and shows how this model has been adapted to address company's requirements and needs, synthesising socioeconomic elements. Finally it presents empirical evidence of the performance of this model implemented in the city of Frankfurt in Germany and concludes with suggestions for further research.

2. Literature Review

Interest in entrepreneurship has grown rapidly during the last two decades and it is seen as the linchpin for stimulating economic growth and development [3-6]. However, entrepreneurship is an activity that is characterised by its multidimensionality and is impacted by various socioeconomic factors [1].

The debate on how to stimulate entrepreneurial activity is very rich. Research in the field has demonstrated that entrepreneurship is linked with teaching methods and tools that focus on action based activities and need to be performed within the context of tertiary, secondary and higher education is order to nurture entrepreneurial skills and increase the potential of employability of students [7-9]. Knowledge plays an important role in supporting entrepreneurial activity [10]. Other research in the field has also shown that entrepreneurship is highly affected by the condition of the environment in which enterprises are operating [11]. Practically this is translated to the enforcement of the laws and the regulations, the incentives provided by governments to support entrepreneurship and to attract foreign investments, and the stability of the taxation system that creates a safe environment for running a business [12]. Furthermore, the triple helix, the university – industry –government interrelationships are valued as important determinants of entrepreneurship and innovation [6]. It is also shown that supporting institutions such as incubators and research centres are viewed as tools for promoting the creation of new ventures [13]. Entrepreneurial performance is also seen to be influenced by social factors such as social networks and trust. Social networks are seen to increase 'access to information, power, knowledge, capital and other networks' [14-16].

This paper focuses on the supporting institutions and specifically incubators and the networking of all the relevant actors supporting entrepreneurship in order to build a holistic mechanism of entrepreneurship support. Incubators are facilitating the early stage start-ups providing a supportive environment by offering office space, financial and managerial support, professional advice and network access [2, 13]. In Carayiannis & von Zedtwitz the most common archetypes of incubation are presented and they are: the regional business incubators; the university incubators; the independent commercial incubators; the company-internal incubators; and the virtual incubators. Further discussion on the incubations archetypes can be found in von Zedtwitz [17]. According to Bergek and Norrman [13] the incubators' model is based on three main pillars: the selection of the incubates, the business support, and the mediation.

There are generally two approaches regarding the criteria of selecting the incubatee, the idea-based approach and the entrepreneur or the team-based approach. In the idea based approach the focus is given on the idea of the new venture itself and requires the manager who makes the selection, to have special technical knowledge in the field. Whereas in the entrepreneur/team based approach the focus is given primarily on the skills, experience and personality of the entrepreneurs [13].

Business support is a very important element in the incubation process and includes training, professional advice, and administrative services [13]. The quality, the intensity and the degree of assistance in administrative and operational requirements of the support is playing a key role in the success of the incubatees [18].

Mediation refers to the provision of linking the incubatees with the environment for the purpose of identifying resources, human capital, finance, information, knowledge and technology [13]. Practically mediation is the networking activity that links the incubatees with all the potential resources that can influence the success of the new venture. Networking also refers to the collective effort to support entrepreneurship by all relevant actors in an area or a region who hold special knowledge and expertise in supporting business ventures. The values of the networks are widely acknowledged in supporting entrepreneurial activities. The more developed a network is, the more beneficial it can be for existing or new entrepreneurs [15].

Most often business support service providers are offering their services according to a sector, size of business, or a specific target group and without necessary aligning their efforts and initiatives with other business service providers in the region. This approach of supporting entrepreneurship has been criticized as being fragmented and insufficient. In order to shift from such a fragmented entrepreneurship support system towards a holistic support mechanism that combines all efforts, new insight is needed. Actors that provide business support in a region need to be part of a well-developed network that involves government agencies, regional economic development providers, labour offices, chambers, universities, associations, media and banks [19]. These regional networks can provide support to potential and young entrepreneurs to overcome the initial hurdles of launching a new venture.

3. An empirical application

Entrepreneurship according to the Global Entrepreneurship Monitor report [1] start with the potential entrepreneurs who have spotted an opportunity and believe they are capable of creating a venture. The next phase includes the initiation of entrepreneurial activity where entrepreneurs are involved in nascent activities for the first three months and then become new entrepreneurs. Subsequent phases include the establishment of the new venture or its discontinuation.

Using the framework developed by Bergek and Norrman [13] which provides the three main pillars of the incubation process and based on the entrepreneurship phases and the importance of networking all business support service providers in an area or a region, a holistic mechanism for supporting entrepreneurship is proposed. This mechanism is named *'The 4+1 model for supporting entrepreneurship'* and includes support activities categorised in four main phases and an additional pre phase:

- approach and admission (pre phase);
- orientation and information;
- planning and qualification;
- start up and implementation; and
- success and growth.

The purpose of the 4+1 model is to represent a clear process that describes the stages involved in setting up and running a business. The elaboration of the 4+1 model includes the selection of the incubatees and the business support needed by a new venture according to the different stages of development. The activities undertaken during the implementation of the 4+1 model is supplemented by mediation that is networking activities facilitating the linkage between the entrepreneurs and the required resources. The 4+1 model and the networking activities as applied by Kompass are analysed below.

3.1 Approach and admission

This is a prephase to the whole process which focuses on communicating the opportunity to as many people of the target groups as possible and encouraging them to launch their own business.

3.2 Orientation and information

The 4+1 process essentially starts with an orientation and information phase. This phase provides the potential entrepreneurs with general information and awareness raising of the challenges that entrepreneurs may face as well as the risks and the benefits of being a business owner. Then a meeting is organized with a business advisor to discuss on the idea of the entrepreneur. The business advisor provides information on the sector of interest and analyses the potential of the idea with the entrepreneur. Then an assessment of the competences of the entrepreneur is conducted with the use of profiling tools. The aim of this activity is to establish that the entrepreneur has the competences and the characteristics that are essential for becoming a business owner. The selection criteria of the incubatees vary. The incubatees can be owners of mature business ideas with immediate opportunity to initiate business activity or immature business ideas that needs further elaboration but appear to have strong potential. In both cases a mapping activity is conducted to identify the forerunners that are leading the niche markets in the specific field and initiate collaboration with them. In cases where technological expertise is required cooperation is established with high rank regional universities.

3.3 Planning and qualification

The planning and qualification phase includes two interrelated stages that involve planning and getting the required qualifications. During the planning stage the target market is thoroughly explored and analysed to identify competitors and elaborate on the competitive advantage of the proposed idea. Then, the entrepreneur is required to write a complete business plan. The writing of the business plan is intentionally written by the entrepreneur with the support of the incubator's staff in order to acquire the full competences of designing and planning a business.

At the same time special training is provided to the entrepreneurs according to his/her specific requirements. The training covers different topics on: marketing, sales, e-commerce, organisational strategy and operations, human resources, finance, and innovation management, and on how to write a business plan.

3.4 Start up and implementation

The start up and implementation phase involves individual coaching and support for starting and running a business such as registration of the business, and VAT and revenue registrations. At the same time continuous coaching is provided to the entrepreneurs covering the everyday issues and problems encountered at a managerial and an operation level.

3.5 Success and growth

The last phase involves the continuation of coaching for five years after the formation of the venture and support for planning the future strategy of the venture. This is a very important phase as it leads to the establishment of the venture and providing the incubatees with the skills to plan ahead, to set targets, and to develop a strategy to obtain these targets.

3.6 The 4+1 model

The 4+1 model is schematically represented in Figure 1 below.

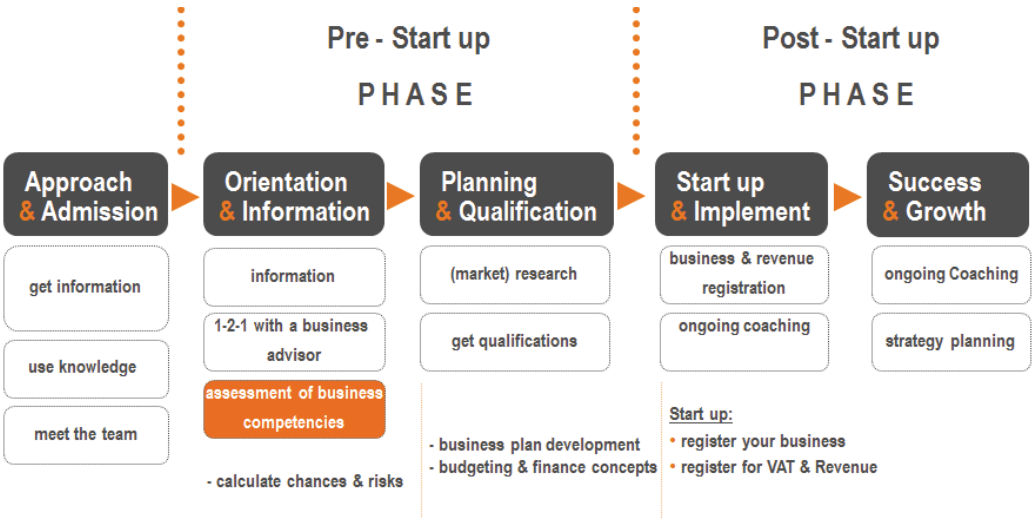


Figure 1 The 4+1 Model for supporting entrepreneurship

The 4+1 model has been designed and implemented by Kompass, an innovation and incubation center in Frankfurt am Main, in the state of Hesse, in western Germany. The city's economic development sectors are: the financial sector, the transport sector, the cultural and creative sector, the information and communication technologies sector, the biotechnology, and the medicines and optics sector. Kompass aims at providing business support and networking activities acting as a "compass" for new entrepreneurs and working in cooperation and on behalf of the city of Frankfurt, the Frankfurt Employment Agency and the

federal-municipal Jobcenter [20]. Kompass was established in 2000 and is at present a very important actor in the field of supporting entrepreneurship. Since 2000, about 17,000 potential entrepreneurs have contacted Kompass, and about 4,500 people have actually founded a business after attending the centre's services. About 80% of the businesses established with the help of Kompass and the elaboration of the 4+1 model are still operating after five years [20].

The success of the 4+1 model is also partly due to the collaboration network of actors from the Frankfurt, Main region together with authorities and further institutions of the German federal state of Hesse. The network, the Rhine Main Net includes the following actors:

- the Town of Frankfurt which provides political and financial support for the establishment of the Net;
- kompass which is an innovation and incubation centre providing business support;
- the Jobcenter which provides business support for unemployed people;
- the Frankfurt Economic Development GmbH which provides business support;
- chambers of crafts and commerce providing business support/certification and trade specific information;
- JUMP Ihr Sprungbrett in die Selbständigkeit, Frauenbetriebe e.V. providing business support;
- universities which provide access to new technologies, research and information - cooperation with Johan Wolfgang Goethe University Frankfurt am Main Germany;
- FIZ, Frankfurt Innovation Center for Biotechnoloy, which provides business support, innovation and incubation services;
- RKW Hessen - Rationalisierungs- und Innovationszentrum der Wirtschaft e.V. , which provides access to finance;
- ConCap Microfinance which provides Micro-Finance;
- banks of guarantees which provides loan guarantees;
- planning association Hessen which coordinates the interests of its 75 member communities for major issues, balancing these with regional planning concerns;
- department of Creative Economy which provides business Support for the creative sector;
- government ministry of Hessen which provides political and financial support;
- employers and trade association which provides business support;
- the Assembly of the European Regions which provides linkages with other European regions and disseminates the 4+1 Phase Model and the Profiling tool that is used for the selection process of the entrepreneurs;
- HAT e.v. which provides business support and is an innovation & incubation center.

The Rhine-Main Net is a well developed award winning network and is working much like a public transit system. The actors above provide different business support services and different competences that are complementary to the needs of the new entrepreneurs. Kompass is linking the new entrepreneurs with the actors of the network providing them immediate access to important resources directing them according to individual needs and requirements.

4. Conclusions

This paper presented an empirical application of a holistic mechanism for supporting entrepreneurship in the area of Frankfurt using the incubation framework that involves three basic pillars, namely the selection, the business support and the mediation elaborating on Bergek and Norrman's framework [13]. The application of the 4+1 model and the networking of all the relevant actors to support entrepreneurship is based on providing individual support caring for socio-economic factors. Along with financial and market economics, the individual approach considers not only personal aspects such as motivation, social background, specifics of the business sector and mentalities, but also expertise and entrepreneurial core skills. The 4+1 model also successfully applies gender aspects in a mainstream context, due to the fact that women and men have different requirements with respect to their professional lives, needs and situational perceptions.

The 4+1 model along with the networking of the relevant actors provides a holistic mechanism for supporting entrepreneurship. This mechanism also provides a framework that can be used to enable stakeholders that provide entrepreneurship support to redesign and improve their services in order to achieve effective and efficient collaboration within a specific area or a region. The role of the universities should further be explored in providing access to information and new technology that is well calibrated with business real needs.

The 4+1 model and the Rhine Main Net has been disseminated as a good practice to other European regions through the ENTREDI project, an INTERREG IVC project aiming at fostering entrepreneurial diversity. The 4+1 model along with the Rhine Main Net has been disseminated in order to inform policy makers in designing and implementing business support strategies. However, there is need to be tested for its applicability in other regions and the results need to be compared depending on the different context conditions. Furthermore the model needs to be compared with other models in terms of the short term outcomes and the long term impact it may have in achieving certain goals.

References

1. Bosma N, Wennekers S, Amorós JE. 2011 Extended Report: Entrepreneurs and Entrepreneurial Employees Across the Globe2012.
2. Carayannis EG, von Zedtwitz M. Architecting gloCal (global,Äìlocal), real-virtual incubator networks (G-RVINs) as catalysts and accelerators of entrepreneurship in transitioning and developing economies: lessons learned and best practices from current development and business incubation practices. Technovation. 2005;25(2):95-110.
3. Audretsch DB, Keilbach M. Resolving the knowledge paradox: Knowledge-spillover entrepreneurship and economic growth. Research Policy. 2008;37(10):1697-705.
4. Glaeser E, Kallal HD, Scheinkaman JA, Shleifer A. Growth in cities. Journal of Political Economy. 1992(100): pp. 1126–52.
5. Henderson V, Kuncoro A, Turner A. Industrial development in cities. Journal of Political Economy. 1995(103):pp. 1067–90.
6. Kim Y, Kim W, Yang T. The effect of the triple helix system and habitat on regional entrepreneurship: Empirical evidence from the U.S. Research Policy. 2012;41(1):154-66.
7. European Comission. Survey of Entrepreneurship Education in Higher Education in Europe: Niras Consultants, Fora, ECON Pöyry,2008.

8. Laukkanen M. Exploring alternative approaches in high-level entrepreneurship education: Creating micromechanisms for endogenous regional growth. Entrepreneurship and Regional Development. 2000;12(1):25-47.
9. Rasmussen EA, Sørheim R. Action-based entrepreneurship education. Technovation. 2006;26(2):185-94.
10. Todorovic ZW, McNaughton RB, Guild P. ENTRE-U: An entrepreneurial orientation scale for universities. Technovation. 2011;31:128-37.
11. Welter F, Smallbone D. Exploring the Role of Trust in Entrepreneurial Activity. Entrepreneurship: Theory & Practice. 2006;30(4):465-75.
12. Russell SS. Testing Baumol: Institutional quality and the productivity of entrepreneurship. Journal of Business Venturing. 2008;23(6):641-55.
13. Bergek A, Norrman C. Incubator best practice: A framework. Technovation. 2008;28(1,Äì2):20-8.
14. Elfring T, Hulsing W. Networks in entrepreneurship: The case of high-technology firms. Small Business Economics. 2003;21:409-22.
15. Gnyawali DR, Madhavan R. Cooperative networks and competitive dynamics: a structural embeddedness perspective. Academy of Management Review. 2001;26(3):431-45.
16. Ulhøi JP. The social dimensions of entrepreneurship. Technovation. 2005;25(8):939-46.
17. von Zedtwitz M. Classification and management of incubators. International Journal of Entrepreneurship and Innovation Management. 2002;2(5/6).
18. Hackett SM, Dilts DM. A real options-driven theory of business incubation. Journal of Technology Transfer. 2004;29(1):pp. 41–54.
19. Bakouros Y, Gkiourka P, Jaeger HC. Entrepreneurial Diversity Guidebook. The process of Good Practices transfer. Thessaloniki: ENTREDI; 2011.
20. European Foundation for the Improvement of Living and Working conditions. Ethnic Entrepreneurship. Case Study: Frankfurt am Main, Germany: Eurofound2011.

AGGLOMERATION ECONOMIES AND THE ROLE OF UNIVERSITIES IN THE DEVELOPMENT OF SOUTHEAST EUROPEAN COUNTRIES

Mirjana Stankovic[1], Bratislav Stankovic[2]

[1]Ministry of Education and Science, Sv. Kiril i Metodij 54, 1000 Skopje, Republic of Macedonia, mirjana.stankovic@fulbrightmail.org

[2]University for Information Science and Technology "St. Paul the Apostle", Partizanska bb, 6000 Ohrid, Republic of Macedonia, bratislav.stankovic@fulbrightmail.org

Most Southeast European countries experience constrains in relation to science, technology and innovation policies. The main obstacle to achieving sustainable innovation systems in these countries is the lack of sustainable and long lasting cooperation in the field of technology transfer between the private sector and the universities. This article gives a critical overview of the theories claiming that most of the innovative activities depend on the (non)existence of certain preconditions which lead to agglomeration economies and clustering of small firms around research universities in so-called technology districts, scientific parks and regional innovation systems. The article builds upon the scientific literature exploring the geographic aspects of knowledge externalities and the localized relationships between the main stakeholders of the triple helix innovation model in the Southeast European countries. It features the results of a survey conducted over 50 Macedonian high technology firms. We attempt to create a methodology for testing the effect of agglomeration on university technology transfer by relying on a triad of variables, i.e. university patent citations, number of graduates finding jobs in the area, and number of local faculty spin offs. This work gives a unique perspective to the analysis of agglomeration economies and their impact on the success rate of the university technology transfer by expanding the normative and socio-cultural model of Gilson [1]. The empirical data complement the theoretical observations of the authors of this article.

Keywords

Agglomeration economies, Innovation stickiness, Technology parks, Triple helix innovation

1. Introduction

The correlation among agglomeration, externalities, and regional growth is a question that requires extensive empirical and analytical investigation. This article hypothesizes that entities that cluster in geographic space take advantage of external economies and develop more rapidly than do isolated entities. In geography of innovation stickiness, knowledge spillovers are major drivers of technological progress and economic growth [2,3].

Innovation, unlike other parts of the value chain, is immobile, and exclusively occurs within the innovative agent. The main reason for this is the cognitive complexity of the innovation process. This in turn, has traditionally motivated the innovating firms to locate innovation activities in one place, in a process known as innovation stickiness. However, due to the globalization of capital, goods, services and knowledge, recent empirical research has pointed out that the innovation, as part of the value chain, has also become integrated in the global economic flows. New horizontal and democratic relationships, instead of vertical

integrative processes, are taking place between innovative agents [4]. This has transformed the geography of innovation [5]. Today, instead of having several eminent innovation centers on global level, there are numerous dispersed innovation loci [6].

There are four key factors affecting the globalization of innovative activities: (*i*) institutional transformation through liberalization; (*ii*) development of general purpose technologies (for instance, information and communication technologies); (*iii*) transformation of markets, competition and industrial organization (in particular the vertical specialization through creation of networks); and (*iv*) adjustment of the corporate strategies and the business models to the changes in the global environment [7]. Differences exist with respect to levels of innovativeness between different industries. For instance, technology intensive industries, such as the electronics industry, biotechnology, chemical and pharmaceutical industries, go through rapid internationalization of their R&D activities [8].

Both the neoclassical growth theory (Solow–Swan growth model, exogenous growth model) and the endogenous growth theory are based on the same premise that the relatively high levels of poverty faced by developing countries are, in part, result of the differences in the pace of technological development between the North and the South. The proponents of the neoclassical theory assert that technology per se is a universally accessible and applicable good, and that differences with respect to the levels of technological development come as a result of differences with respect to ownership of goods, such as plants or roads. On the other hand, the proponents of the endogenous growth theory assert that differences in ownership of ideas and the level of ability to absorb new technologies are the main reasons for the existing developmental gap between the North and the South. Accordingly, the public policies should be focused on finding the right equilibrium between the technology acquired and the level of skills needed for its absorption and diffusion, i.e. the appropriate level of human capital [9,10].

One of the main benefits of globalization is the creation of the possibility for developing countries to tap into the technological achievements of the developed world. The economic, political, legal and cultural integration has resulted in increase of the total factor productivity and per capita income of the developing countries. Empirical studies show that developing countries that import technologies from the developed world experience rapid increase of total factor productivity [11,12]. However, the term “developing countries” covers a wide array of countries, and the results of the aforementioned studies are applicable exclusively to the emerging upper middle income countries, such as Brazil, China and India. It is unclear whether the results of these studies can be extrapolated to middle income countries, most of which are faced with poverty issues [13].

The distribution of per capita incomes between countries will ascend without change in its scope, only if distribution of technological absorption ability is constant, i.e. all countries are capable of accepting the new technologies on equal footing. To influence the distribution scope, the technologically inferior countries should accelerate their technological development in terms of achieving higher technology growth rate than developed countries. In the long run, this is only possible if the technologically inferior countries substantially enhance the quality level of their educational and scientific systems. The supply of highly educated staff in technologically inferior countries affects the extent and scope of the sophistication of the technology that can be absorbed and used by the local economy. At the same time, the scope and level of sophistication of new technologies injected into the local economy affect the creation of demand for highly educated staff. Globalization benefits might serve as a generator of the technological development of technologically inferior countries such as the SEE countries [14].

The global economic environment is experiencing a number of important changes that accompany the technological development of technologically inferior countries. Globalization affects the increase in the overall technological intensity of goods and services, thus making technology a key factor for the competitiveness of the countries. Also, the complexity of

global competition contributes to the emergence of differentiated products and manufacturers, which in turn implies the need for accelerated innovation in certain industrial sectors. Furthermore, at a time when the technological intensity of goods and services increases, and their life cycles are reduced, research and development costs are on a constant rise. Large multinational corporations are faced with pressures to globalize their R & D activities, as a high added value, within their corporate networks. Under certain circumstances, this creates the opportunity for developing countries for accelerated technological development [15].

Such technological changes lead to creation of specialized types of corporate R&D units. Products and services have become modular as a result of the standardization of matrices of their components [16]. For instance, the development of information and communication technologies enables businesses to allocate different tasks globally through intra-company information networks. The emergence of new technologies that do not require large industrial experience and whose R&D can be easily globalized and separated from the production process (e.g., microelectronics, biotechnology, software development) provide opportunities for technological development of developing countries that have abundant and well–trained scientific and research staff in these areas. The process of modularization of R&D in these industries creates fertile ground for division of R&D activities into basic and advanced. Certain basic activities can be performed in low-cost countries, and thus contribute towards their technological development [17]. Of course, this low-cost strategy undertaken by certain developing countries cannot generate sustainable economic growth in the long run [18].

2. Spatial mobility of knowledge transfer and the ability to absorb new technologies

Innovation and technical change play an increasingly important role in the development of the competitiveness of firms and economic growth in developing countries [19]. The modern theories of economics of innovation and technological change include the spatial context within the innovation matrix. Geographic space is increasingly emerging as a key factor in explaining the origin and diffusion of innovation and technology transfer. It has been argued that the geography of economics is based on the so-called spatial concentrations [20]. This hypothesis is valid for both production and innovation activities [21]. These authors point out that the models of knowledge production can be implemented more effectively in spatially clustered observation units than in units that are analyzed in isolation without taking into account the context of space. The main objective of the economic literature that deals with the study of spatial innovation is to (*i*) study and understand the mechanisms that encourage spatial clustering of innovative activities (clusters give rise to research parks or parks of knowledge) (*ii*) understand the mobility of knowledge and the transfer of technology and (*iii*) understand the increased ability for technological absorption of entities that share the same geo-economic space.

Spatial clustering and creation of geo-economic space are problems closely related to the issues of technology transfer and knowledge spillovers. The knowledge generated in research laboratories, and its spillover into the geo-economic space, represent an important source of technology [22]. However, despite the fact that the geo-economic space plays an important role in determining the degree of success of a technology transfer project, there is a dearth of research articles studying the interaction and relationship of the transfer of technology, knowledge spillover and geo-economic space. Grossman and Helpman [23] analyze the actual mechanism through which technology and knowledge are transferred between individuals, while Krugman [20] points to the fact that the empirical measurement of knowledge is a difficult undertaking because of its invisible, i.e. tacit flows [24]. The analysis of this problem encompasses several issues that form a "Gordian knot": What are the

effective mechanisms for technology and knowledge transfer in general? How could we measure the impact of technology and knowledge in the context of geo-economic space? Are the technology and knowledge spillovers geographically limited?

The creation of technology parks, technological and industrial zones and business incubators only confirms the importance of geo-economic space for successful technology transfer. Numerous examples from the developed countries' practice confirm this observation, such as the Silicon Valley in California, the Research Triangle Park in North Carolina, and the Route 128 near the Massachusetts Institute of Technology (MIT) in Boston, Massachusetts [1]. Alfred Marshall coined the concept of "industrial district", which represents a spatial concentration of firms in same or similar industry [25]. The term "agglomeration economy" pertains to economies of scale that are considered as inputs and external factors to a firm, but internal factors to the region in which the firm operates in synergy with other firms having similar activity. Because of the spatial concentration of firms in the industrial district such inputs are easily available to the firm. The increase of number of firms coming from the same or similar industrial sector in the region generates increase in the number of workers who migrate to the region, and who possess the qualifications required to perform the activities of the firms operating within the region. This process generates a positive communication loop, since migration of skilled workers attracts more companies from the same or similar industry in the region. This inevitably reduces the price of the highly skilled labor in the region [25].

The modern economic thought has started examining the new economic geography [26], and has scrutinized the phenomenon of industrial clustering. Knowledge as an input is important for the overall success of high–tech industrial districts. Studies in this regard start to pay attention to the dynamics of industrial districts at the expense of studying the conditions that dictate the equilibrium of the industrial districts. These studies find that industrial districts have certain trajectory of development. Consequently, the location of industrial districts does not come as a result of the invisible hand of efficiency, but rather as a result of a set of factors that are associated with transiency and serendipity. In order to study the functioning of an industrial district, it is necessary to know its history.

3. Dynamics of high – tech districts in Southeast Europe: case study of the Republic of Macedonia

The first known usage of the term "Southeast Europe" was by Austrian researcher Johann Georg von Hahn (1811–1869) as broader term than the traditional Balkans [27]. Highly heterogeneous and distinctly colorful, the countries of Southeast Europe frequently produce more history than they can handle. Despite the cacophony of complexity, the countries' commonalities have resulted in their joint treatment, exemplified in a multitude of political and socio-economic transnational cooperation models (e.g., the SEE Cooperation Initiative, SEE Cooperation Process, SEE Media Organization, Stability Pact for SEE, etc.). Accordingly, this article gives an overview of the brain drain issue in Southeast European countries. Further in-depth studies may be employed to additionally probe the specifics of individual SEE countries with respect to the issue of brain drain.

The dissolution of the past regimes, weak economic structure, low level of production, low performance results of the educational system, high level of public debt, high unemployment level, low contribution of the SMEs to innovation, and the lack of motivation, commitment and trust, had enormous negative impact on human capital development in the SEE countries. Two contemporaneous processes have been taking place, one associated with "external" brain drain, i.e. experts leaving the country for better professional fulfillment abroad, and the other associated with "internal" brain drain, i.e. specialists leaving their professions for better paid jobs in the private and/or informal sector of the economy [28]. The educational and scientific systems of the SEE countries generally share low level of investments in research

and development (R&D) undertaken by the private sector, the academia and the public authorities (Figures 1-4). This is a result of several intertwined structural problems, including but not limited to budgetary constraints imposed by restrictive monetary and fiscal policies, de-industrialization, high transaction costs of societal transition, external accounts imbalances, low national investment and savings rates, and limited FDI inflows [28]. In contrast, developed countries invest substantially more in R&D. This article uses relevant parameters from the economies of South Korea and Germany for comparative purposes. For example, both South Korea and Germany invest substantially more in R&D in comparison to the majority of SEE countries (2.5-3.5% of GDP, Figure 1). Of the SEE countries, Slovenia invests reasonable amounts in R&D (1.5-2.0%); the other countries significantly lag behind, with markedly less than 1% investment (Figure 1).

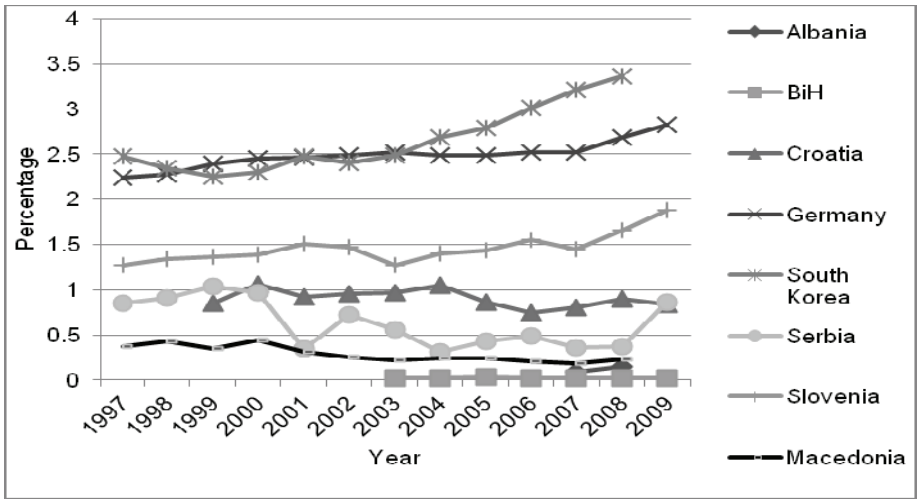


Figure 1 Gross expenditure on R&D (GERD), percentage of GDP. UNESCOstat 2011

In developed countries, the private sector is the key innovation catalyst, and holds the highest percentage of the total GERD, i.e. gross expenditure in R&D (Figure 4). In contrast, SEE countries' academia and public authorities have substantially bigger investments in R&D when compared to the private sector investments (*cf.* Figures 2 and 3).

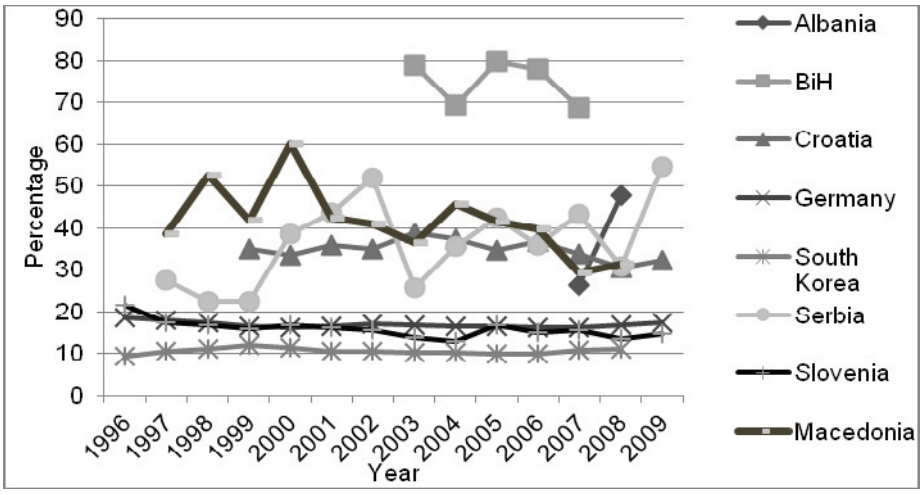


Figure 2 GERD performed by the academia, percentage. UNESCOstat 2011

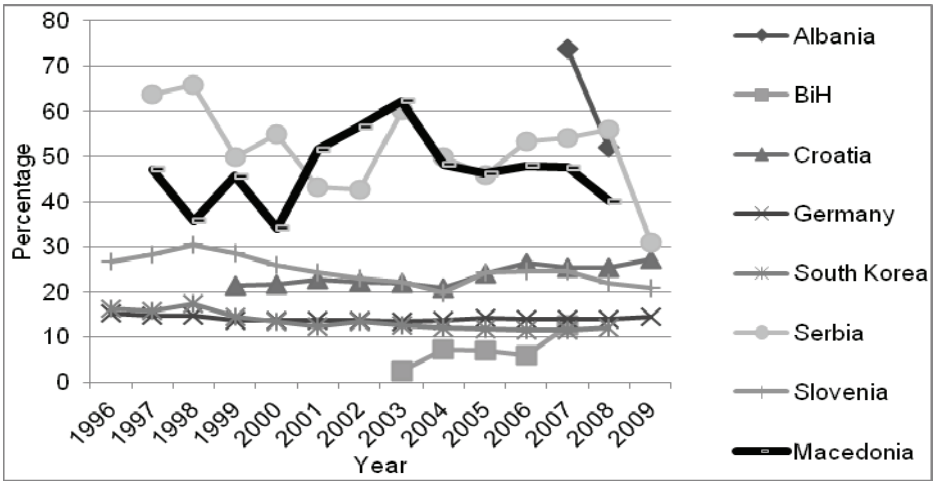


Figure 3 GERD performed by public authorities, percentage. UNESCOstat 2011

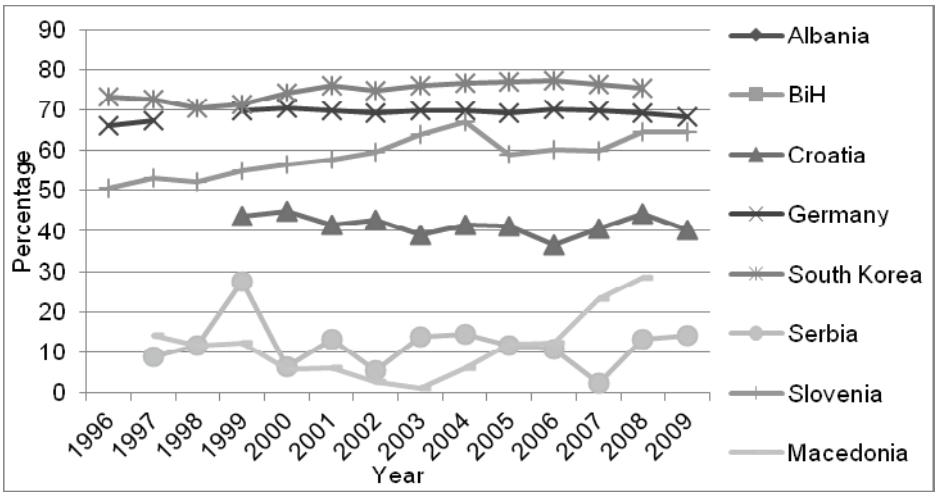


Figure 4 GERD performed by the private sector, percentage. UNESCOstat 2011

3.1 Main determinants of the Triple Helix Innovation model

The triple helix model of innovation argues that competitiveness is derived from the ability to continuously learn and innovate in order to reproduce distinctive organizational competences over time. It emphasizes the changing nature of institutional and organizational contexts of innovation and the strategic role of management in determining how individual actors adapt, integrate, and reconfigure internal and external organizational skills, resources, and functional competences in response to these changes [29].

The triple helix develops according to four dimensions [30]. One of the objectives of this article is to develop and pinpoint the main public policy strategies which will entice the transposition of these dimensions into the context of the SEE countries. The first dimension is the internal transformations in each of the helices. Universities should not only be teaching and doing research but should also be trying to capitalize the knowledge they produce, which implies a new mode of knowledge production [31]. Lateral ties among firms based on strategic alliances should be developed within individual industries. The government should

be taking the role of a venture capitalist as well. The second dimension concerns the influence of one helix upon another. A very successful example in this regard is the US Bayh-Dole Act of 1980, which instituted industrial policy through which the federal government encouraged academia to assist industrial innovation. This was done through granting the academia the rights to inventions created by federal research grants [32]. The third dimension is the generation of a new overlay of institutional structures stemming from the interaction among the three helices. Small and large firms, universities and other research organizations, local, regional and national governments get together to brainstorm new ideas and attempt to fill in gaps in the innovation systems. One of the most representative examples of this third dimension of the Triple Helix is the Research Triangle Park (RTP) in North Carolina. RTP was founded by the government, university and business leaders as a model for research, innovation and economic development. It was established as a place where educators, researchers and business collaborate as partners with the objective to change the economic conditions of the region and the state. It was named according to the geographic location of the region's three most regarded educational and research universities – the University of North Carolina at Chapel Hill, Duke University, and North Carolina State University. In addition to the research capacity, the region possesses a network of organizations, institutions and companies that work together reflecting the spirit of cooperation and learning. Companies represented in the RTP include IBM, Cisco Systems, Ericsson, BASF, etc. Due to the positive impact on society, RTP is a model of high–tech district for innovation, education and economic development that has been applied around the world [33]. The fourth dimension of the triple helix model consists of a recursive effect of the trilateral networks on the spirals from which they emerge and on the wider society. The interaction of universities with industry and government is transformed when the capitalization of academic knowledge displaces distance and inherent public nature of knowledge. This, in turn, is seen as the result of the practices of industrial science, internal entrepreneurial dynamics within academia, and government policies [32].

3.2 Collaboration between businesses and academia: survey results

The survey "Technology Transfer in the Republic of Macedonia" was conducted online, via a software platform Qualtrix. It covered 51 high-tech domestic and foreign owned firms in Macedonia. It researched the perception of the firms' managers with respect to the technology transfer climate in Macedonia.

The survey results show that 31% of the surveyed managers answered that their firm has never been involved in technology transfer. Moreover, almost 52% of the survey respondents, who claimed that their firm participated in technology transfer, answered that the technology was transferred to the firm by another entity. Out of those, 100% answered that the transferring entity was a foreign firm. Thus, there is no mention of technology transfer from universities, governmental institutes or other domestic firms. This lack of public-private partnerships is indicative of the low research culture within the Macedonian business community. It seems that the Macedonian firms' managers perceive the option of technology transfer from a foreign firm as the sole option available. Hence, it will be very difficult for the public policy stakeholders in the research and scientific area to put the triple helix innovation model on the agenda and entice the private sector to stimulate its own R&D involvements.

A large number of survey respondents (92.59%) believe that the government should make bigger budgetary allotments to the R&D endeavors undertaken by the business sector. Moreover, high is the number of respondents (81.48%) who claim that the state does not support public-private partnerships. Thus, the business sector representatives clearly observe and acknowledge the nonexistence of the link between the public authorities and the business sector in the innovation model of Macedonia. This is also the case when asked about their perception of the role of the Macedonian academia in generating and sustaining

the innovation process wheel. Most of the respondents agreed that there is a need for establishing technology transfer offices under the auspices of the Macedonian universities, which will serve as an initial block of the Macedonian triple helix innovation platform. Much remains to be done in the area of raising the general awareness, and more specifically the awareness of certain groups of stakeholders, in order to generate and maintain viable triple helix innovation links.

3.3 Legal infrastructure and dynamics of high–tech districts

Gilson [1] has developed an interesting argument that has raised the theory of spatial character of industrial districts to a new level. He asserts that the dynamics of high-tech industrial districts is primarily dependent on the legal infrastructure. The efficiency of knowledge transfer mechanisms is influenced by two types of legal norms: the first type of legal norms pertains to intellectual property, and the second type of legal norms pertains to workers' mobility, due to the fact that tacit knowledge is most effectively transmitted through movement of workers from one firm to another [1].

The geographic vicinity impacts the nature of knowledge by making it susceptible to the law of increasing returns. In today's global economy, information, due to the nature of information and communication technologies, has lost its geographic anchor. In the long run, this will lead to elimination of agglomeration economies based on knowledge. As knowledge becomes ubiquitous input there will be less industrial clustering. However, the paradox lies in the following: in reality the industry clustering has not lost its importance. This dilemma can be solved by drawing a differentiation line between the notion of knowledge and the notion of information. The key to this puzzle lies in the tacit nature of knowledge. Even though the changes in information technology have made the costs of transferring information inelastic with respect to location, the process of transferring tacit knowledge in a form of know – how and know – why is always dependent on geographical proximity [34].

In general, there are three types of Marshallian externalities (intra–industry economies of localization). The first type refers to economies of specialization. A localized industry might give rise to many specialized local suppliers of industry specific intermediate inputs and services. This will lead to creation of greater variety at lower cost. The second type refers to labor market economies. Localized industries attract and retain pools of workers with similar skills. This in the long run will have an effect on the employment rate and wages in the localized industry. The third type refers to knowledge spillovers. Innovative information flows more easily among agents within the same area due to social bonds that foster reciprocal trust and frequent face to face contacts. This fosters more innovation opportunities and greater innovation diffusion.

The life cycle of the industrial district consists of several intertwining factors, i.e. (*i*) knowledge as an input that generates Marshallian market factor externalities, (*ii*) technological externalities, and (*iii*) the causal relationship between the location of the industrial district and its historical circumstances. Numerous examples from developed countries' practice confirm the observation that there is a strong correlation between the location of high-tech districts and the location of university campuses [34]. However, even these empirical observations cannot explain why, for example, Stanford led to the creation of Silicon Valley, and why Harvard and MIT have prompted the creation of the Route 128, and some other universities have failed to do so. The reasons for this are multi-layered. The presence of successful university campus contributes to the creation of high-tech industrial districts. However, this does not necessarily suffice. In order to create and sustain a successful industrial district, all the stakeholders of the innovation system should form viable and sustainable triple helix relationships. This way, the benefits of the innovative activity taking place within the industrial district would be able to penetrate the entire local economy.

Tacit knowledge transfer is a decisive factor with respect to the success of a technology transfer project. Agglomeration economies are considered an important factor in the initial stages of the technology development and commercialization. Thus, the geographic clustering of high-tech activities in the industrial district occurs within initial stages of the technology transfer. On the other hand, tacit knowledge plays a smaller role in the later stages of technology development and transfer. When the technology reaches its mature phase, most of the technical aspects of production are standardized, and the nature of demand is well known. The costs of transmitting information and knowledge in the geographical space become trivial. Standardization results in decreased impact of agglomeration economies based on knowledge, and acts as a centrifugal force (driven by lower costs of land and labor that are available outside the industrial district). This generates geographical dispersion of production. A striking example in this regard is the production of semiconductors in the Silicon Valley [35].

Part of the Silicon Valley's development is due to the specific culture and social structure that spur rapid transfer of workers from one organization to another. Workers in Silicon Valley firms have entrepreneurial spirit and choose to work in small, highly innovative start-ups, rather than in large, robust and inert corporations. On the other hand, the business culture of the Route 128 differs significantly from that of the Silicon Valley. This is due to the conservative social mores and traditions of New England which influenced the formation of the local labor market and the trajectory of the entrepreneurial development. Stability and loyalty to an organization are the highest ethical values in the Route 128 [36].

The biggest part of the intellectual property of a high tech firm has informal character and is contained in the human capital of the company. For instance, the technological knowledge generated in the Silicon Valley is implicitly and continuously gained through relentless networking of entrepreneurs, researchers and manufacturers. This type of knowledge can be transmitted easily provided that the recipient and the provider of knowledge are in geographical proximity to each other. The easiest way to transfer this type of knowledge is through movement of labor within the geographical cluster. Employers are always keen to protect their intellectual capital, which mainly consists of trade secrets and tacit knowledge, and the most effective tool for this is limiting the transfer of manpower from one firm to another. Because of all this, the individual efforts of the employer to protect its intellectual property rights are in direct conflict with the collective efforts of a society to generate second-degree agglomeration economy through knowledge spillovers in the public domain.

The establishment of an adequate legal infrastructure that will regulate this conflict is one of the key factors which determine the high tech cluster success. The legal systems of California and Massachusetts do not differ substantially with respect to their trade secret laws. In both states, the trade secret law effectively inhibits labor mobility within an industrial district. The key difference between the Silicon Valley and the Route 128 lies in the way non-compete agreements have been treated by the legal system. These contracts, unlike the trade secret law, do not prohibit publication and use of technological knowledge, but rather block the mechanism for technological knowledge spillovers. These agreements prevent high tech firm employees to move easily to another firm, or to establish their own, by bringing in the specific technological knowledge gained by working for their previous employer. These restrictions last for a limited period of time, usually one to two years, and are territorially restricted to a particular jurisdiction (usually the ban applies to work in a specific geographic cluster). These contracts are effective because of the nature of the technological knowledge created in high – tech industries. This type of knowledge has short lifetime spans due to the speed of innovation in high tech industries. Such knowledge loses the competitive edge and becomes obsolete in one to two years. This acts as an inhibitor to the employees' mobility within the respective industry. It is precisely the existence of these agreements and their (non)enforcement by the judicial system that contributes to the creation, or the absence of second degree agglomeration economy [1]. The legal system of Massachusetts recognizes

non-compete clauses, unlike the Californian under which these contracts are null and void. Gilson argues that it is this difference that enabled the Silicon Valley to develop further and to generate a second cycle of technological development.

It would be interesting to apply the research findings of the Gilson's study to the analysis of the nature of technological industrial development zones in the Republic of Macedonia. According to the Law on technological industrial development zones and the Government's innovation strategy these zones are envisaged to turn into high-tech industrial districts. This article analyzes the non-compete agreements which are regulated by the Macedonian Labor Law, and their impact on the formation of high-tech industrial districts, *ceteris paribus*. The Macedonian Labor Law Act [37] sanctions any behavior of the employees which might be proven harmful to the employer's interests. In the course of employment, the employee cannot, without prior consent of the employer, engage in same or similar activities to the business activities carried out by the employer. Otherwise, this would be considered as anti-competitive behavior. The employer has the right to claim compensation within three months of finding out about the anti-competitive activity or within two years after this activity ended. If the employee in the course of the employment acquires technical and business know – how, the employer can restrict his mobility by inserting a non-compete clause in the employment agreement. This clause will be implemented after termination of the employment, and is valid within a period of two years from only in cases where the employment agreement has been terminated on the basis of mala fide or fault of the employee. Such provisions of the Labor Law are similar to the provisions governing non-compete agreements in Massachusetts. If we assume that technological industrial development zones in Macedonia are envisaged as hubs that would generate first cycle of agglomeration economy, and thus lead to technological development at local level, these provisions of the Labor Law act inhibit the possible turn of the industrial district into high tech industrial cluster susceptible of generating second cycle of agglomeration economy. This would disincentivize dispersion of the generated technological knowledge into the wider context of the national economy. Under the current labor law regime even if the technological industrial development zones reach the first stage of agglomeration economy, this would only lead towards technological discontinuity in the national economy of in the long run. The previous analysis does not take into account the rudimentary entrepreneurial and innovative culture in Macedonia, the undeveloped system of local networks of suppliers and distributors, as well as the low levels of human capital. All of these factors are important for the further absorption and diffusion of technologies and innovations arising from technological industrial development zones in the country [38].

4. Conclusions

This article addresses questions related to geography of economics and innovativeness of high tech districts in SEE countries, with special reference to Macedonia. The article tries to build on the theory [1] that legal infrastructure has impact on the formation and maintenance of high – tech districts. Public policy makers in collaboration with the academia and the private sector should develop long-term innovation strategies that will focus on coherent development of capabilities for absorption and diffusion of new technologies among innovative agents. The successful implementation of these strategies would generate a spiral effect of multiplication of technological benefits to the local economy and creation of technological continuity in the local economy (endogenous growth theory [39]). Inevitably, these strategies should take into account the scientific theories that deal with the impact of geo-space on the success rate of innovative technology transfer. This in turn would lead to a possible increase of the competitive technological advantages of the private sector and the local economy in general [40].

References

1 Gilson R J. The legal infrastructure of high technology industrial districts: Silicon Valley, Route 128, and covenants not to compete. New York University Law Review 1999, 74: 575-629.
2 Jaffe A, Trajtenberg M, Henderson R. Geographic localization of knowledge spillovers as evidenced by patent citations. The Quarterly Journal of Economics, MIT Press 1993, 108: 577-598.
3 Dumais G, Ellison G, Glaeser L E. Geographic Concentration As A Dynamic Process. The Review of Economics and Statistics, MIT Press 2002, 84: 193-204.
4 Arora A, Arunachalam V, Asundi J, Fernandes R. (2001) The Indian software services industry. Research Policy 30: 1267–1287.
5 Ernst D. Global production networks and the changing geography of innovation systems, implications for developing countries. J Econ Innovation and New Technologies 2002, 12: 1-27.
6 Cantwell J. Innovation in a global world: Globalisation does not kill the need for national policies. New Economy 1995, 2: 66-70.
7. Ernst D. The New Mobility of Knowledge: Digital Information Systems and Global Flagship Networks, East-West Center Economics Working Papers, No. 56, in: Latham, R. and S. Sassen (eds.), Digital Formations in a Connected World, Princeton University Press, 2003.
8. Reddy P. New trends in globalization of corporate R&D and implications for innovation capability in host countries: A survey from India. World Development 1997, 25: 1821-1837.
9. Maskus K E. Intellectual Property Rights in the Global Economy. Washington DC: Institute for International Economics, 2000.
10. Archibugi D, Pietrobelli C. The globalisation of technology and and its implications for developing countries. Windows of opportunity or further burden? Technological Forecasting and Social Change 2003, 70: 861-883.
11. Coe D T, Helpman E. International R&D Spillovers. European Econ Rev 1995, 39: 859-887.
12. Keller W. Are International R&D spillovers trade-related? Analyzing spillovers among randomly matched trade partner. European Econ Rev 1998, 42: 1469–1481.
13. Stankovic M, Stankovic B, Angelova B, Temelkova J. Is triple helix innovation possible in Macedonia? Int J Knowledge, Culture and Change Management 2012, 11: 221-233.
14. WEF. The Global Competitiveness Report 2010-2011. World Economic Forum, Geneva, Switzerland, 2011.
15. Cantwell J., Santangelo G D. The frontier of international technology networks: sourcing abroad the most highly tacit capabilities, Information Economics and Policy 1999, 11: 101-123.
16. Prencipe A, Davies A, Hobday M. The Business of Systems Integration, Oxford University Press, 2003.
17. Reddy P. Globalization of corporate R&D: Implications for innovation systems in host countries (1st ed.). London: Greenwood, Routledge, 2000.
18. Bell M. The acquisition of imported technology for industrial development: Problems of strategies and management in Arab region. Baghdad: ESCWA, United Nations University, 1987.
19. Aghion P, Howitt P. Endogenous Growth Theory. Cambridge: MIT Press, Cambridge, 1998.
20. Krugman P. Geography and Trade, London: MIT Press, 1991.
21. Feldman M P. The Geography of Innovation. Kluwer Academic Publishers, Boston, 1994.
22. Jaffe A B. Real effects of academic research, American Economic Review 1989, 79: 957-970.
23. Grossman G M, Helpman □. Innovation and growth in the global economy. Cambridge: MIT Press, 1991.
24. Polanyi M. The tacit dimension. New York: Doubleday Anchor, 1967.
25. Marshall A. Principles of Economics, London, Macmillan and Co., 1890.
26. Krugman P. What's new about the new economic geography? Oxford Rev Econ Policy 1998, 14: 7-17.
27. Hösch E, Nehring K, Sundhaussen H. (Eds.) Lexikon zur Geschichte Südosteuropas, Böhlau Wien/UTB Stuttgart, 2004.
28. UNESCO. Science, technology and economic development in South Eastern Europe, available at http://unesdoc.unesco.org/images/0014/001414/141495e.pdf 2004 (accessed January 28, 2013).
29. Porter E M. What is Strategy? Harvard Business Review, 1996.
30. Etzkowitz L. The evolution of the entrepreneurial university. Int J Technology and Globalisation 2004, 1: No. 1.
31. Gibbons M et al. The New Production of Knowledge, SAGE, London, 1994.

32. Etzkowitz L. The evolution of the entrepreneurial university. Int J Technology and Globalisation 2004, 1: No. 1.
33. Weddle R L, Rooks E, Valdecanas T. Research Triangle Park: evolution and renaissance. Prepared for and presented at the International Association of Science Parks World Conference, Helsinki, Finland, 2006.
34. Audretsch D B, Feldman M P. R&D spillovers and the geography of innovation and production, American Economic Review 1996, 86: 253-273.
35. Arthur B. 'Silicon valley' locational clusters: When do increasing returns imply monopoly, Journal of Mathematical Social Sciences 1990, 19: 235-251.
36. Saxenian A. Regional advantage: Culture and competition in Silicon Valley and Route 128. Cambridge, MA: Harvard University Press, 1994.
37. Labor Law Act of the Republic of Macedonia, 2005.
38. OECD. The Former Yugoslav Republic of Macedonia: Review of the National Innovation System. OECD, Paris, 2011.
39. Romer P M. Endogenous technological change, Journal of Political Economy 1990, 98: 71-102.
40. Porter M E. The Comparative Advantage of Nations. Free Press, New York, 1990.

THE NATIONAL CENTER FOR TECHNOLOGY DEVELOPMENT A STEP TOWARDS: KNOWLEDGE BASED ECONOMY

M S Khorsheed

King Abdulaziz City for Science & Technology, P O Box 6086, Riyadh 11442, Saudi Arabia

mkhorshd@kacst.edu.sa

This paper presents the strategic plan for the Technology Development Centre (TDC) established in King Abdulaziz City for Science & Technology in Saudi Arabia. The strategic component of this plan identifies the vision and mission for TDC, important stakeholder and user needs, and three top priority subprograms to address these needs. The paper briefly presents each subprogram and the major achievements within each one of them. The paper also envisions the next step after spanning those subprograms and what will be the focus in the near future.

Keywords
Technology Development, Innovation, commercialization, Intellectual Property, Incubation

1. Introduction

The definition of technology development and commercialization includes, or is related to human resources, institutional equipment, science and technology knowledge, financial provisions, and the outputs of these activities such as patents, scientific publications, applied research . Part of this is the processes of identifying potentially commercializable ideas and technology in business, not-for-profit, university, or government laboratories, developing them to the prototype stage, and moving them into the marketplace for application.

TDC plans and implements programs intended to support these activities, targeting individuals and organizations in both public and private sectors of the economy. The success of these programs depends upon the strength of the Kingdom's national innovation system [1], and in this sense TDC must, within the constraints of its resources and mission, help strengthen the innovation system as a whole if its own, narrower goals are to be achieved.

Many of these national needs relate directly to technology development and commercialization [2], thus it makes sense to use them in framing a future vision for technology development and commercialization activities within the KSA.

1.1 TDC Vision

To be a significant resource of KACST that supports the development of Saudi Arabia's National Innovation Ecosystem and catalyses the Kingdom's transition into a knowledge-based society.

In this vision of the future, research-intensive private firms, government research laboratories, government ministries, universities, technology parks and incubators, financial institutions, inventors, and entrepreneurs will efficiently and effectively identify potentially commercializable ideas and technology; develop them to the prototype stage; and move them into the marketplace.

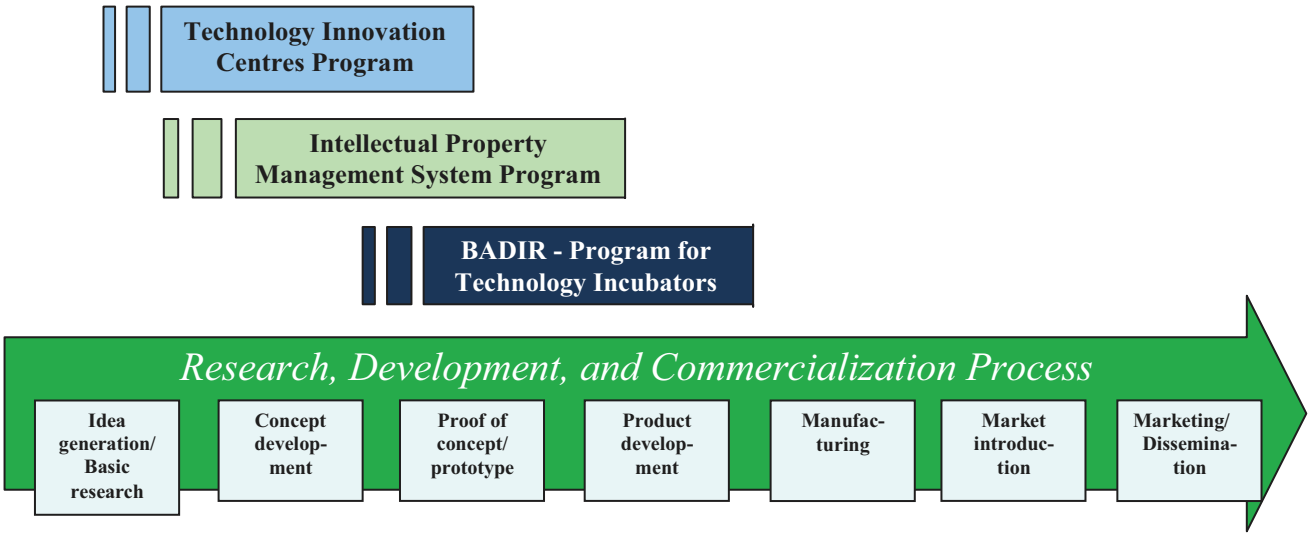


Figure 1 TDC Program Areas in Relation to Stages of the Research, Development, and Commercialization.

1.2 TDC Mission

Initiating plans and implementing programs that facilitate the development of the KSA National Innovation Ecosystem through:

- Facilitating the acquisition and adaptation and/or improvement of existing technologies that show promise of successful commercialization in KSA markets.
- Encouraging networks among major parties involved with the development of technology.
- Brokering common research projects with beneficiaries.
- Suggesting research programs to KACST research institutes, according to national need.
- Assisting in the creation and support of technology parks and incubators.
- Helping create technology development projects in industry .
- Supporting technology transfer operations throughout the innovation process, as well as developing and spreading technology.
- Participating in setting standards and specifications and negotiating methods for technology transfer.

1.3 TDC Program Areas

TDC's charter and preliminary strategic planning activities, especially the vision and mission development efforts and stakeholder workshops, point to three priority program areas for TDC to focus on, namely, incubation, university-industry collaboration and intellectual property management. It is important to note that the primary role for TDC varies across these program areas, and will vary over time in each area as well.

2. BADIR - Program for Technology Incubators

The commercialization of technology through business spinoffs and creation of technology businesses is an effective instrument for economic growth. Technology incubators are key elements in the innovation ecosystem of successful technology-based economies and therefore KACST created the National Technology Incubator Program (BADIR) initiative [3].

BADIR Program for Technology Incubators focuses on priority technologies areas, including ICT, Biotechnology, Nanotechnology, Advanced Manufacturing and Energy by supporting technology innovation, enterprise and entrepreneurship.

BADIR, funded by KACST, will operate five national technology incubators and a national network of affiliate Incubators mostly operating from Universities throughout the Kingdom. They operate within the framework of the National Technology Incubation Policy.

2.1 BADIR Vision & Mission

BADIR vision is “To encourage, facilitate and support the establishment and development of a sustainable technology incubator industry in the Kingdom”. The mission of BADIR is “To support organization that assists individual incubators to foster technology entrepreneurship and the commercialization of technology business opportunities. Those individual incubators will assist entrepreneurs with the transfer of technology created in laboratories and in converting market-driven ideas into business opportunities to exploit local and international markets”.

In order to ensure consistency across technology incubators, a national policy framework has been developed. It includes an independent incubator monitoring and evaluation process. This will ensure international best practice is maintained in all incubator operations. BADIR Program will provide to the Kingdom's technology incubator network, support through incubator staff training, marketing, shared management services support and incubator establishment and development assistance.

2.2 BADIR Incubator Facilities & Services

The BADIR initiative was launched in January 2008 with its first incubator, BADIR-ICT, becoming operational in July 2008, followed by BADIR-Biotech and BADIR Advanced Manufacturing in 2010. BADIR-Nanotech, BADIR-Energy and various Affiliate University incubators are at various stages of development.

BADIR is governed by a Supervisory Board under the Chair of the KACST Vice President (Research Institutes) with representatives from the private sector, technology industries, financial institutions and government that are selected based on their expertise and ability to support the BADIR program within the kingdom. Their role is to provide strategic direction, monitor performance of the program and provide access to networks and expertise.

BADIR Incubators, whilst operationally autonomous, operate within the BADIR corporate structure with industry advisory committees assisting access to specific industry networks and support. Local Saudi management teams and staff, supported by international consultants provide the day-to-day operational management. The key components of the BADIR strategy are focused on best practice incubation, on-going finance and sustainability, quality clients and investor relations.

Each BADIR facility is designed and located to best suit the needs of its stakeholders specific to its technology focus. Both men and women will be catered for in the design of the facilities.

Women clients are supported by women specialist business development staff. Clients operate from BADIR facilities or their own premises.

2.3 BADIR Incubator Business Development Services

BADIR incubator services are designed to help potential and existing entrepreneurs surmount the challenges they face in the Kingdom in their specific area of technology supported by national BADIR programs.

Entrepreneurship Awareness Program assists the development of ideas, commitment and motivation to entrepreneurship. Pre-incubation Program assists people evaluate their ideas and conduct initial market research and planning to ensure their idea is a business opportunity with commercial prospects. Incubation Program assists clients develop their business model, prepare their business plan, commence operation, access sources of finance, and grow.

BADIR has developed a number of strategic relationships with financial and investment organizations to assist approved clients access early stage finance. Assistance is also offered to approved innovators and inventors to assist the development of prototypes and registration of intellectual property.

Business opportunities are evaluated by each incubator based on international best practices in incubation and their impact on the knowledge economy of the Kingdom. The evaluation criteria includes: Technology and business model feasibility, Product and service innovation uniqueness, Market potential, Willingness to accept business coaching and work with BADIR, Business growth and job creation potential.

3. Technology Innovation Centres Program

This program aims to establish KACST centres in collaboration with the industrial sector and hosted at Saudi Universities. When fully implemented, the Technology Innovation Centres (TIC) Program will support ten centres [4]. Individual centre budgets will be supported by SR 15M annually from KACST, including up to SR 10M in base funding and SR 5M in 1:1 matching funds. These matching funds are expected to attract an additional SR 5M annually from industry, yielding a typical total annual centre budget of SR 20M. Each centre will be supported under a five-year agreement with KACST, and will be eligible to apply for an additional five-year award, assuming satisfactory performance.

TICs will emphasize research that addresses problems identified by industry and worked on by teams from a variety of technical fields made up of faculty, students, and in some cases engineers and scientists from participating companies. Centres will vary in their technical foci, but all centres will emphasize three major goals: education and training, excellence in research, and knowledge transfer to industry. As centres mature, they will be expected to:

- Demonstrate that teams of university faculty and students can collaborate effectively with industry on industry-identified problems.
- Increase the level of mutual trust and respect between university faculty and industry.
- Demonstrate actual solutions to selected industry problems.
- Develop competence in the management of technology, research, and collaborative projects among centre faculty, students, and technical staff.

Figure 2 TIC program phasing

3.1 TIC Program Initiation and Phasing

The TIC Program will be implemented in two phases, a Planning and Development phase and a two-part Operational phase. In the Development phase, which will extend for 12-18 months beginning in 2009, emphasis will be placed on building a solid foundation upon which the operational phase will rest. This period will focus on pre-award planning, information gathering, learning, and capacity-building. It will require flexibility and patience among stakeholders eager to see results, because the major goals of the program are unlikely to be achieved in the absence of careful preparation. It will also require close collaboration among TIC program staff and representatives from industry, universities, professional and technical societies, and other stakeholder groups. Following the developmental phase, the operational phase will begin with an initial five-year period of TIC awards to proposers who exhibit high potential for short-term success. This awards process will be accompanied by a strong learning element characterized by seed grants, feasibility studies, and careful monitoring of, and guidance to, operating centres. At the end of this initial 5-year operation period, it will be essential that a number of milestones be achieved:

- 3-5 TICs demonstrate success in the achievement of program objectives.
- TICs demonstrate that teams of university faculty and students can collaborate effectively with industry on industry-identified problems.
- TIC-industry interactions will increase the level of trust and mutual respect between university faculty and industry.
- TICs and the companies they work with can demonstrate promising or actual solutions to selected industry problems.
- Graduates, staff and faculty with TIC experience will be in demand for their competence in the management of technology, research, and collaborative projects.

3.2 TIC Program Cost Model

The program will be launched with awards to three TICs, very carefully chosen to ensure that these centres produce clear evidence within a few years of their capacity to engage in effective industry-university research collaboration, problem solving, and education and training for industry needs. During the first five years of the Program's operation, additional awards will be made to develop and test the feasibility of promising centres and to provide seed or development funding for ideas that could lead to solid proposals for TICs. Also during this period, money will be available for planning workshops, stakeholder meetings, and industry-university conferences focused on mutual problems. During the initial five-year operational phase, the Program will fund one additional TIC each year for the next four years following the initial award of three centres. Each TIC will be funded for a total of five years, assuming favourable periodic reviews of performance, and will be eligible to apply for a second award. In addition, SR 5M will budgeted annually (after allowing for SR 10M in the first year) for program development studies, feasibility studies, and seed grants.

In the cautioning operation phase, years 6 and beyond, an additional set of two TICs will be funded each year. In year 6, the initial 3 TICs will be terminated (unless they compete successfully for a follow-on award). In years 7-10, one TIC will be terminated and two additional TICs funded annually. Additional Program funding, approximately 20% of total annual base awards, will be budgeted for TIC Program administration, planning, monitoring, and evaluation.

- **Seed Funding**: The budget allows up to 10M SR for seed funding in the first operational year. From Year 2-5 half that amount, 5M SR is reserved for this purpose. After Year 5, seed funding will not be provided because sufficient experimentation will have been accomplished by then.
- **Phase Down Funding**: TICs will be phased out after 5 years of support. By this time, they are expected to be sufficiently successful to attract industrial or other funding to continue their core mission objectives. However, funding will be phased down over 2-year window to enable a smooth transition to self-support.
- **Program Management**: Approximately 20% of total centre funding will be required for administrative and management costs.
- **Industry or other Partner Cost Sharing**: KACST will match industry and other partner contributions using 1:1 matching up to SR 5M in public support per centre.

4. Intellectual Property Management System Program

The Knowledge Economy systematically produces, distributes and applies knowledge across all industries to improve employment, competitiveness and performance. Ownership of knowledge assets or intellectual property (IP) is the cornerstone of the knowledge economy. IP ownership allows quantification of individuals' or organizations' share of benefits arising from knowledge-based activities and consequent economic prosperity. Therefore, IP provides the necessary incentives for producers of knowledge to contribute to the economy.

As an intangible asset that consists of human knowledge and ideas, IP takes the following common forms: Patents, Copyrights, Trademarks, Trade secrets, Industrial Design, Integrated Circuit, and Plant Variety.

The intellectual property management (IPM) system typically includes a range of policies, processes, infrastructure and actors that collectively turn new knowledge and inventions into a piece of (intellectual) property with associated property rights and exploit that property commercially to obtain value from the knowledge. That value may be in the form of financial return to the owner of the knowledge or to a licensee, or the value to the ultimate users. IPM system typically includes: Inventors and invention disclosures, Documentation/lab notebooks, Processors of information, Patent application and filing, Databases and systems to perform due diligence on patent applications, Decision makers, IP policies and incentives, Valuation of IP and marketing of IP, Licensing and partnering, Enforcement of IP rights and protection.

The IP Management system is of prime importance for KACST as an institution. It will ultimately help KACST to:

- accomplish its goals for technology transfer and commercialization,
- foster economic development,
- increase the value of KACST research, and
- enhance KACST's scientific reputation around the world.

TDC has dual role with regard to establishing and promoting IPM process in the Kingdom. First, as the technology commercialization arm of KACST, TDC's primary responsibility is to design, implement and manage all aspects of the IPM process for KACST researchers and research centres. Second, as a national centre supporting the Kingdom's aspirations to be a knowledge-based economy, TDC facilitates training and capacity building activities related to IPM for the broader research community in the Kingdom. TDC provides all necessary guidance, support, training and funding to KACST researchers interested in generating IP assets from their research and in understanding the IPM process. TDC also aspires to be the single source within KACST for IP marketing, negotiation and licensing with private sector and users of KACST-generated IP.

Figure 3 Suggested process for filing patent application through IPM system program.

With the KACST system serving as a model for IP management at other research centres, the program's next goal is to contribute to improving the national system of intellectual property rights, and strengthening the relationship between inventors and investors in the Kingdom. As part of this effort, TDC supports the development and implementation of training programs for researchers and IP managers that will contribute to the supply of trained IP managers and technical experts necessary to strengthen the Kingdom's existing patent system, including review of applications and enforcement of existing patents. TDC is also in the early stages of negotiation with some universities and research institutions to provide IPM services to researchers outside KACST through a centralized IPM service centre.

4.1 Program Accomplishments

Since identifying and committing to IPM as a key program under its strategic plan, TDC has completed the following steps for KACST:

- Established a Patent Advisory Committee (PAC).
- Articulated a clear process for invention disclosures.

- Established appropriate review process and system for patent application.
- Established training programs for the research community.
- Initiated preliminary market assessments for KACST technologies.

KACST Patent Advisory Committee: The Patent Advisory Committee at KACST comprises Directors of KACST Research Institutes, TDC, and the Saudi Patent Office. The objectives of KACST's PAC are to:

- Work to increase the number of KACST invention disclosures and patent applications.
- Streamline KACST's invention disclosure and IP review process to facilitate appropriate patent filing as well as publication of KACST's scientific discoveries and applications.
- Engage all KACST Research Institute directors in IP management.
- Help to promote strategic investments in KACST's Research Institutes and facilitate business development opportunities for them.

Invention Disclosures and Patent Application: TDC receives and processes Invention Disclosure Forms for potential patents and other forms of KACST intellectual property protection in a timely fashion. TDC also processes domestic and international filing decisions through its designated Patent Attorney, with the assistance and approval of the relevant Research Institute PAC representative, as required.

Training Programs for KACST Researchers and the Broader Research Community: TDC periodically organizes training sessions offered by internationally recognized experts in IP management. Some of these training sessions are targeted towards researchers creating inventions and interested in filing patent applications, whereas others are targeted to research administrators and decision makers responsible for IP processes, incentives, and institutional policies and funding. Training programs are open to the research community including universities, research organizations and private sector.

Preliminary Market Assessment for KACST Technologies: TDC, in collaboration with KACST Research Institutes, has initiated preliminary market assessments for a sample set of promising technologies. Both product and service innovations are under review. While preliminary, these assessments are useful in offering insight into the target technology's competition, risks and market potential.

5. Conclusions

A National Centre for Technology Development had been established in King Abdulaziz City for Science and Technology in Saudi Arabia. The aim of the centre is to foster innovation through incubation, university-industry collaboration and intellectual property management. The first five years after founding the centre led to establishing, and then spinning off, a number of programs including BADIR Program for Technology Incubators, Technology Innovation Centres and Intellectual Property Management System. Those programs have spawn three national technology incubators in ICT, Bio and Advanced Manufacturing, a number of satellite incubators at various universities, three Technology Innovation Centres in three leading universities and more than 200 patent applications filed on behalf of KACST researchers in different patent offices around the globe.

During the next stage, TDC will focus in future on Technology Development Funding that involves the planning and support for one or more early-stage capital funding programs intended for individual entrepreneurs and small businesses.

The objective is to support early-stage technology development projects that will promote industrial development in the Kingdom. Later, challenge grants or other mechanisms that require some form of cost sharing or matching funds by the entrepreneur or small business may also be appropriate and effective forms of public subsidy.

References

1 Schwab, K., The Global Competitiveness Report 2010–2011, World Economic Forum, Geneva, Switzerland 2010.
2 Skoko, H., Al-Fawzan, M., Khorsheed, M., Wright, N. and Al-Sakran, S., Entrepreneurship Activities In Saudi Arabia, Global Entrepreneurship Monitor, 2009.
3 M S Khorsheed, M Al-Fawzan and A Al-Hargan, Promoting Techno-Entrepreneurship Through Incubation: An Overview at BADIR Program for Technology Incubators, Innovation: Management, Policy and Practice Journal, Special Issue on Research, Innovation and Entrepreneurship Reforms in Gulf Cooperation Council Countries, *In Press*.
4 M S Khorsheed and M Al-Fawzan, Fostering University-Industry Collaboration in Saudi Arabia through Technology Innovation Centers, Innovation: Management, Policy and Practice Journal, Special Issue on Research, Innovation and Entrepreneurship Reforms in Gulf Cooperation Council Countries, *In Press*.

KNOWLEDGE AND TECNOLOGY TRANSFER BETWEEN ACADEMIA – INDUSTRY COOPERATION: A CASE STUDY

Luís Farinha[1], João Ferreira[2]

[1]PhD Candidate in Management at University of Beira Interior (UBI),Covilhã, and Lecturer in Higher Institute of Languages and Administration (ISLA), Leiria, Portugal, luis_farinha@hotmail.com

[2]University of Beira Interior (UBI) and NECE - Research Centre in Business Sciences, Covilhã, Portugal, jjmf@ubi.pt

This paper aims to study the knowledge and technology transfer process between Academy and Industry cooperation and its impact on regional competitiveness. It is followed the methodology of qualitative research through case study, using interviews with institutional actors involved (University, Industry and Political Decision) in cooperation. Through a R&D process initiated by an university, it was possible to analyze the development of a olive harvesting machine in continuous, starting from the effective transfer of knowledge to industry, which performed and jointly tested the prototype in the context of open innovation on the needs of a region, producing the final version of the machine for marketing after completion of the respective patent application process. The study is limited to a case study, requiring careful respective on data extrapolation and results. Stimulate academic R&D and technology transfer to the industry, in order to satisfy market needs, highlighting the role of government in the process of funding open innovative initiatives. Through a practical perspective of a successful case of Academia-Industry cooperation, based on open innovation to satisfy a need for effective market is demonstrated the importance of exploitation and dissemination of this type of relationship, with benefit to the competitiveness of regions.

Keywords

Academia-Industry Cooperation, Innovation, Entrepreneurship, Regional Competitiveness, Portugal

1. Introduction

One of the biggest challenges of European economies resides in the comparatively limited capacity to convert scientific and technological advances into industrial and commercial achievements [1]. As a result, it has been proving to be an increasingly proactive approach undertaken by academic institutions, translated into entrepreneurial role in direct collaboration with Industry [2]; [3]. It also reinforced the entrepreneurial university has the ability to transfer the knowledge produced, enabling the economic and social utility, thus contributing to the development of new products and the improvement of the competitiveness of organizations and countries [4]; [5]; [6].

The growing importance of knowledge and innovation for economic growth and technological competitiveness, as a key competence in all fields, currently assume a strong concern for policy makers, scientists and managers [7].

The interactions Academia - Industry (A-I) became more formal, frequent and planned from the 1970s. It is highlighted in this context, the Massachusetts Institute of Technology (MIT), which potentiate the emergence of new companies from the connection with the University, metamorphosing later the concept of science park established at Stanford University, leaving yet strengthened the bridge between science (universities, public research laboratories, or other scientific institutions financed) and industry (industrial and service), bringing the paths to the much needed competitiveness [8]; [7]. Building new alliances between A-I has become the cornerstone of research policy and innovation, especially in this context collaborative research, contract research, consulting and informal relationships A-I [9]; [10]. However, the literature review has been advocating that different institutional perspectives on the R&D can affect the relations and cooperation processes between public universities and SMEs, given the existence of differences in goals, interests and time horizons. Still, some studies contradict this current, observing a facilitated knowledge transfer between A-I [9]. SMEs are more effective in the use of different practices of open innovation, especially when it comes to introducing new products, achieving higher returns driven by mechanisms of intellectual property protection, compared to large companies benefiting more from their own strategies research [11].

The main objective of this paper is to explore, through a case study, the collaborative interaction between A-I in Portugal, slightly focused in the literature in this perspective, regarding the transfer of knowledge and technology, based on the concepts of open innovation [12], and innovative entrepreneurship, initially advocated by Schumpeter in 1911, today globally disseminated [13], thus contributing to the enrichment of the theoretical framework in this area. We also intent to reflect the possibilities and limits of managing collaborative projects A-I, highlighting, through the analysis of a case study, the main limitations encountered during the execution of the project, from the perspective of each of the institutions involved spheres (Academia – Industry - Political Decision) and thus provide clues and opportunities for improvement in the future.

The paper is structured as following: in the second section is defined the theoretical framework, followed by section 3, with the methodology, the section 4 case study analysis, and in section 5 the conclusions of the study are presented.

2. Theoretical Framework

Noting the slow growth in European economies should support the view that entrepreneurship and innovative SMEs can play an important role in promoting economic growth, reserving the Academia a strong potential impact on knowledge dissemination, choosing the location of new entrepreneurial ventures and the consequent transfer of technology and knowledge [14]. The intensity and quality of science-industry interactions determine effective returns on investment in research, technology commercialization, creating jobs and improving the quality of life, helping to attract and retain skilled labour and talents, thus instilling strengthening the entrepreneurial spirit [7]; [15]. Following this, the less competitive regions will claim to enhance its knowledge infrastructure, trying to attract medium-tech manufacturing and high-tech services [16].

The Academia uses the knowledge to promote regional development of new resources, assuming the role of important cultural and social institution in any country, having been revealed as key player in economic development, in addition to their traditional functions of teaching and research [17]. The Academy has expanded their roles in the innovation process, outlined in the dynamics of the triple helix model [18], where the alliances between Academia, Industry and Political Decision/Government (A-I-G) reached a new prominence

[17]. Knowledge management is a critical factor that influences global competitiveness, despite that it was the creation, acquisition, interpretation, retention and transfer of knowledge to improve performance, aiming to change the intended behaviour based on new knowledge [5]. Taking as the basis the incorporation of knowledge already acquired, disseminated by the Academy, a growing body of research has been considering the dynamics of innovation and entrepreneurship as organizational processes vital to the survival of businesses and their better performance, especially within an environment increasing intensification of global competition [19]; [20]; [21]. On the opposite of closed innovation, where a company creates, develops and markets its own ideas, a philosophy that prevailed during much of the twentieth century, the new open innovation model, the ideas themselves are marketed, as well as innovations from other companies, i.e., inputs are purchased outside the boundaries of the organization, to incorporate the business strategy, exploiting the knowledge and experience of human capital extrinsic to the organization in order to meet effectively the needs of the market [22]; [23].

The business activities are to become increasingly globalized, registering a higher growth of exports in industrialized countries, compared with production and foreign direct investment (FDI) also growing faster than exports over the decades [24].

The collaborative networks contribute actively to increase the competitiveness of regions, both in terms of networks for the development of new technology projects, or to allow access to new resources, skills or cost synergies [25]; [26]; [27].

3. Methodology

3.1. Research position

Checking up a gap in the literature in terms of direct approach to collaborative projects A-I in Portugal, is followed an interpretative approach, through the case study. The use of quantitative methods by themselves cannot capture the essence of the phenomenon in certain areas of greater complexity [28]. The role of the case study, to enter into reality, it can contributes to a better understanding of the facts, through further investigation of the operations, thus registering an increasing trend towards the use of qualitative studies, in the context of alternative methodologies research, interpretative theory-based [29]; [30]; [31]. Through the case study, this research intends to show how the interaction A-I can be exploited and disseminated in order to develop and commercialize new products, from an effective response to market needs, thus contributing to the creation of wealth and employment, and as a result the competitiveness of regions [32].

Were held on November 15th 2012, two in-depth face-to-face interviews during the test machine on the ground, with the Project Coordinator at the University of Évora, Professor António Dias, and the entrepreneur and owner of the farm Torre das Figueiras in Monforte, region of Alentejo, Portugal, Sir. Eng Falcão. It was done yet another in-depth face-to-face interview with the CEO of VICORT, Dr. Miguel Ferreira, on company premises, on December 19th 2012, having been collected supporting documentation. Finally, on depiction of the political decision, an interview was conducted on February 15th 2013, to Professor Carlos Zorrinho, Professor at the University of Évora, Deputy of Portuguese Parliament, ex-Secretary of State Assistant to the Minister of the Interior, ex- Secretary of State of Energy and Innovation (Secretary of State with responsibility for supervising Adi – Agency of Innovation), ex- Head of Mission of PROALENTEJO and ex- National Coordinator of the Lisbon Strategy and the Technological Plan 2005-2009.

3.2. Unit of analysis

The MCCA projetct – Machine for Continuous Olive Harvesting, integrates the list of collaborative projects A-I, in the typology of projects in co-promotion, officially published by the Portuguese Agency of Innovation (Adi) at http://projectos.adi.pt/, developed between 2009 and 2012. This is a typology of R&D projects, conducted in partnership between firms or between them and entities of the National Scientific and Technological System (universities, R&D centres, etc.), lead by firms, including research activities and intellectual, industrial and / or experimental development, leading to the creation of new products, processes or systems or the introduction of significant improvements in products, processes or systems.

The MCCA Project, identified by the code "ADI / QREN No. 5436 (2009/2012)", results of a strategic partnership between the University of Évora (located in the Alentejo region), and the industrial SME VICORT - Vitor Cardoso, Ltd. (located in the Centro region) in Portugal (Figure 1).

Figure 1 The MCCA Project

The objectives of the collaborative project are: design, build, evaluate, and develop a prototype for the MCCA. The MCCA comprises two identical working units symmetrically left and right of a row of trees. Each unit of the MCCA is semi - towed by a farm tractor which receives power. The MCCA offers the following innovative aspects: used as a source of power the agricultural tractor existing in farms; gather the olive trees approaching laterally, not imposing therefore restricted its development (that is not propelled harvesting machines continuously on the market, which involves completely tree, whereby the size of the tree must be limited to the internal dimensions of the machine); smaller size compared to existing machines on the market, which gives it greater versatility and adaptability to existing constraints on farms in terms of size and topography, as well as meet the charges for road transport; less weight which increases the transit ability on agricultural land often found less firm at harvest time.

The general data of the project, including the amount of investment, incentive and total maximum rate of support are defined in Table 1.

Table 1 General framework of the project.

Currency: Euro

Co-promoters	Investment	Total eligible	Total incentive	Incentive non-refundable	Incentive refundable	Maximum rate support
Project	395.030	395.030	255.876	255.876	0	64,8%
University of Évora	125.721	125.721	94.291	94.291	0	75,0%
VICORT	269.309	269.309	161.585	161.585	0	60,0%

As can be seen in Table 1, the total investment is 395.030 Euro, and the maximum rate of support for the project, amounts to about 65% of the total of the project investment.

4. Case study

Case study is structured to reflect the objectives of the research: understand the impact of innovation and entrepreneurship initiatives within the competitive dynamics, understanding the importance of open innovation in the project under study, identify the difficulties and limitations encountered during the execution of the project, and explore improvement and funding opportunities for the future in the field of A-I collaborative interactions.

4.1. Entrepreneurial and collaborative networks perspectives

According to the literature review, it must be borne in mind different perspectives in the field of entrepreneurial activity. The first one is the direct entrepreneur role in collaboration A-I, strengthened by the transfer of knowledge production [2]; [3], contributing to the development of new products, wealth creation and employability, and thereby to increase the competitiveness of regions [4]; [5]; [6]. In this regard, Professor António Dias (AD) adds:

"If we return to the political paradigm we have to produce tradable goods, this is an example of a tradable good, which was obtained thanks to the work of research and experimental development, between a company and a university, and still an agricultural firm. These synergies of collaboration have created a tradable good that can export. Just think that neighbouring Spain has a global colossus in terms of olive, with thousands of hectares of olive groves".

Another theory is that innovative SMEs with entrepreneurial initiatives can play an important role in promoting economic growth [11]. For this type of A-I projects, Professor Carlos Zorrinho (CZ) says:

"(...) often these projects have evolved glued to large companies that funds absorbed. But the truth is that these big companies to absorb the projects, they also kill a part of innovation. It was due primarily invest in good companies already, and capitalize on these companies. We have no shortage of business initiatives; we have a lack of size of business initiatives. This should be a great line, the line to give muscle to companies that are already in international markets, and that substitute imports".

About the perspective of exporting project, Dr. Miguel Ferreira, CEO of VICORT (MF) adds:

"It is our goal to promote the product at the fair, where possible, we will try to do it in a dynamic demonstration of the product, because, recognizing that the domestic market has the capacity and need for this product, it is true that the Spanish market is much bigger than ours, and therefore we want to strengthen it from the point of view of export".

In brief, the networks of cooperation A-I have been to become a cornerstone of research and innovation policies [9]; [10]. However, CZ as well advances the need for greater involvement between the parties:

"(...) at Massachusetts Institute of Technology (MIT), assume that the teacher gives at least three months of collaborative enterprises. So the MIT pays him only nine months. The other three months, they have to find the companies. I found this by Portugal, many cases of highly successful professors, who at one point had to leave the University because his peers did not understand that they could earn more. And the same thing, there is the inability to realize that even a great entrepreneur, if the University will work, should be paid for the value it creates to the University, because that is what creates the robust systems and strong partnerships. That's what makes the success of partnerships in countries that have these strong partnerships".

4.2. Innovation and open innovation

The MCCA is an innovative project, including an open innovation component, receptive to new ideas and critical participation of olive producers, in order to meeting their specific needs. Referring to the entrepreneur, olive producer and leader associative, Engineer Falcão (EF), Professor António Dias (AD) describes this project as being:

"(...) a potential interested as a farmer, and also as leader associative (President of Production Farmer region of Elvas in Alentejo region), and even is also linked to CAP - Confederation of Farmers of Portugal, going with some frequency to Brussels meetings, and therefore has contacts with a lot of realities, speaks to a lot of people (...) actively collaborates in the development of the project, because clearly saw and feel that this may be the solution to his problems and from other farmers".

In strengthening, the CEO of VICORT (MF) in relation to open innovation component, and effectiveness of the project, referring to EF, adds:

"(...) experiencing, seeing, complaining, suggesting, imposing, and it was also important because it brought innovation. In the end, only companies producing equipment for the market and the market have to accept this product. If the product is not capable, the market will not buy. This environment was critical to the farmer who immediately had feedback from the market, for what was the degree of acceptance of the quality of the equipment itself (...). He brought a very important advantage in terms of contribution to the increased level of reliability and performance of the equipment itself. Anyway, this is what also is allowing us now move to the next steps. (...) in this type of projects, beyond what the industrial capacity, the ability of R&D that exists between A-I, it is vital that then act another element which is the acceptance of the product by the end customer, the potential end user".

However, we are convinced that open innovation bringing together a joint perspective of the needs of potential consumers, giving rise to new ideas and solutions to the market.

4.3. Difficulties and limitations of the Project

The literature emphasizes that different institutional perspectives as a result of the difference in goals and interests can lead to the emergence of obstacles to collaborative relationships, especially between public universities and SMEs [9]. Looking on the ground feel these or other potential difficulties, we obtained the following description of AD:

"At the University, I think things have not worked badly. I think the level of interconnection between the company and the lender (Adi), in order to streamline processes, help more companies, sometimes not so familiar with a whole set of this kind of bureaucracy that causes or projects that need. On the other hand, funders also are not very familiar with the reality of companies. These situations might be worth improving".

Looking better understand the difficulties, this time we put the question to the company, that we answered (MF):

"I will not say there is much to iron out. In business, as in academia, the responsible persons involved in the project, have a set of tasks beyond the project itself, are not 100% allocated to the project. This led to some delays, delays by the company's inability, until the University for what the project represented, became involved in the project enough.

Asked about the involvement of political decision MF answers:

"At the level of political decision (Adi), there is very little involvement. The political decision is a bureaucratic decision, a purely administrative decision. (...)What is needed is for this type of projects, when an entity involving industry, there is a possibility the company uses its internal resources to affect the project and the costs that have to be duly recognized. Otherwise, having internal capacity, the company has to outsource to an external entity, with the consequent burdening of the project, because the cost of domestic production is much lower than if the company has to subcontract a third party to produce components (...).The rules of the project itself are extremely rigid, imposed by the European community, are rules that are pre-determined and that in our understanding intended me many times to R&D enterprise start-ups that have no industrial capacity, and is not our case. Our company is a structured enterprise, is easily visible through the ERP system, the recognition of costs, determine which are the production costs of parts and as a result, affect them to the project. The important thing is that Adi, in fact, to recognize them".

Exposing the fact the respondent's representative political decision, CZ advances:

"I myself had the supervision of the Agency for some time. My idea then was to create a Business Institute that would comprise a multitude of institutes that exist in the country, Institute for Quality, Institute for the promotion of SMEs, Institute for Export, Institute for Innovation, creating a single entity as there are in many countries, a Business Institute, with many more features, with many more ways, and I could do this kind of direct monitoring. The Adi I found, on the one hand, with few people with few resources, and too dependent, because it is a publicly owned company, owned by IAPMEI (Institute of Support to SMEs and innovation) and the Foundation for Science and Technology, with a great need to raise funds for her own work, and therefore a little a provider of services in design verification, standing in the middle of the process and not at the beginning of the process. Again I think we need a revolution, we must make choices, we cannot spread the funds in Portugal, the resources

and the means by dozens of structures, for dozens of projects for dozens of industries, and we have to make choices".

According to the observed, there were no major obstacles to interaction A-I, and has however highlighted some limitations in terms of interaction with the political decision, either by the inelastic UE rules in terms of recognition of internal costs of companies, either by lack of capacity to monitor projects in the field.

4.4. Funding opportunities

After the project phase, with the definition of a prototype of a machine (pre-series version), it must realize what mechanisms can be used to enhance product placement in the international market. AD adds: "We had contact with someone from the venture capital, and we see how far we can take this forward". About clues and opportunities to the future of this kind of projects, CZ adds:

"There is a phase in which mainly the support that should be given is support certification for the company to collect capital. Today more and more, is to develop a concept of Cloud Funding, which I think will have a great future. We just make a proposal for the creation of an independent certifying innovative products that can certify the product without promotion, i.e., without taking away the ability of innovation, but that it can be assigned a rating faithful, so that then you can say for example the Internet, we have a product exception in area X, with the level of risk Y, certificate, and there may be people coming with fifty euro, with other hundred or a hundred and fifty, and making a global funding. These models are new and innovative".

According to respondents, the financing opportunities of this type of projects may be at the level of venture capital, business angels or through innovative systems of financing funds.

5. Conclusions

The research and innovation policies have tended to focus on collaborative context A-I [9]; [10]. In entrepreneurship and innovative diagram, SMEs with Academia can plays a central role in promoting economic growth [14]. The networks A-I potentiate a strong contribution to improving regional competitiveness through the development of new projects and new technologies to the market [25].

Through a case study, it became possible to explore the interaction A-I in Portugal, from a project surrounded in a spirit of open innovation, financed with public funds.

As main difficulties and limitations encountered throughout the project, highlights the legislative rigidity of EU regulations applied by Adi, not allowing the recognition of internal costs on component development, related raw materials in stock and has not been acquired specifically for the project, and corresponding attribution of man/hours and machine/hours, so there is need to resort to subcontracting in some of these cases, with direct losses in terms of time consumed and increase of production costs. As noted opportunities for improvement, the respondent's representative political decision, mentioned the importance of creating a recognized certification such innovation initiatives, with the assignment of a rating faithful. Through this certification, promoters could more easily obtain financing from venture capital and / or with an innovative "cloud fund" model.

The limitations of the study, we acknowledge that this research was confined to just one case study, may differ from the totality of reality felt in projects co-promotion in Portugal. As a suggestion for future lines of research, we propose the development of a quantitative study, extensive to the population of this type of projects (431 from 2008 to 2012), thus seeking to obtain answers to these questions in analysis.

References

1. Klofsten M, Jones-evans D. Comparing Academic Entrepreneurship in Europe – The Case of Sweden and Ireland. Small Business Economics. 2000;14:299–309.
2. Abramo G, D'Angelo CA, Di Costa F, Solazzi M. University–industry collaboration in Italy: A bibliometric examination. Technovation [Internet]. 2009 Jun [cited 2012 Oct 6];29(6-7):498–507. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0166497208001405
3. Mueller P. Exploring the knowledge filter: How entrepreneurship and university–industry relationships drive economic growth. Research Policy [Internet]. 2006 Dec [cited 2012 Oct 6];35(10):1499–508. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0048733306001600
4. Bernasconi A. University entrepreneurship in a developing country: The case of the P. Universidad Católica de Chile, 1985–2000. Higher Education [Internet]. 2005 Sep [cited 2012 Oct 6];50(2):247–74. Available from: http://www.springerlink.com/index/10.1007/s10734-004-6353-1
5. Dayasindhu N. Embeddedness , knowledge transfer , industry clusters and global competitiveness : a case study of the Indian software industry. Technovation. 2002;22:551–60.
6. Etzkowitz H. Research groups as " quasi-firms ": the invention of the entrepreneurial university. Research Policy. 2003;32:109–21.
7. Ranga LM, Debackere K, Tunzelmann N von. Entrepreneurial universities and the dynamics of academic knowledge production : A case study of basic vs . applied research in Belgium. Scientometrics. 2003;58(2):301–20.
8. Ojewale BA, Ilori MO, Oyebisi TO, Akinwumi IO. Industry – academic relation : utilization of idle capacities in polytechnics , universities and research organizations by entrepreneurs in Nigeria. Tecnhovation. 2001;21:695–704.
9. Bjerregaard T. Industry and academia in convergence: Micro-institutional dimensions of R&D collaboration. Technovation [Internet]. Elsevier; 2010;30(2):100–8. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0166497209001692
10. Perkmann M, Tartari V, McKelvey M, Autio E, Broström A, D'Este P, et al. Academic engagement and commercialisation: A review of the literature on university–industry relations. Research Policy [Internet]. Elsevier B.V.; 2012 Oct [cited 2012 Oct 26]; Available from: http://linkinghub.elsevier.com/retrieve/pii/S0048733312002235
11. Spithoven A, Vanhaverbeke W, Roijakkers N. Open innovation practices in SMEs and large enterprises. Small Business Economics [Internet]. 2012 Oct 20 [cited 2012 Nov 6]; Available from: http://www.springerlink.com/index/10.1007/s11187-012-9453-9
12. Chesbrough H. Business model innovation: it's not just about technology anymore. Strategy & Leadership [Internet]. 2007;35(6):12–7. Available from: http://www.emeraldinsight.com/10.1108/10878570710833714
13. Wong PK, Ho YP, Autio E. Entrepreneurship, Innovation and Economic Growth: Evidence from GEM data. Small Business Economics [Internet]. 2005 Apr [cited 2013 Feb 12];24(3):335–50. Available from: http://www.springerlink.com/index/10.1007/s11187-005-2000-1
14. Soete B, Stephan A. Introduction: Entrepreneurship, Innovation and Growth. Industry & Innovation [Internet]. 2004 Sep [cited 2012 Oct 6];11(3):161–5. Available from: http://www.tandfonline.com/doi/abs/10.1080/1366271042000265357
15. Wong P-K, Ho Y-P, Singh A. Towards an "Entrepreneurial University" Model to Support Knowledge-Based Economic Development: The Case of the National University of Singapore. World Development [Internet]. 2007 Jun [cited 2012 Oct 6];35(6):941–58. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0305750X07000381

16. Leydesdorff L, Meyer M. Triple Helix indicators of knowledge-based innovation systemsIntroduction to the special issue. Research Policy [Internet]. 2006 Dec [cited 2011 Aug 23];35(10):1441–9. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0048733306001508
17. Sharabati-Shahin MHN, Thiruchelvam K. The role of Diaspora in university–industry relationships in globalised knowledge economy: the case of Palestine. Higher Education [Internet]. 2012 Aug 23 [cited 2012 Oct 6]; Available from: http://www.springerlink.com/index/10.1007/s10734-012-9566-8
18. Etzkowitz H, Leydesdorff L. The dynamics of innovation□: from National Systems and "' Mode 2 '" to a Triple Helix of university – industry – government relations. Science And Technology. 2000;109–23.
19. Marques JPC, Caraça JMG, Diz H. How can university–industry–government interactions change the innovation scenario in Portugal?—the case of the University of Coimbra. Technovation [Internet]. 2006 Apr [cited 2012 Oct 6];26(4):534–42. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0166497205000751
20. Nilsson AS, Rickne A, Bengtsson L. Transfer of academic research: uncovering the grey zone. The Journal of Technology Transfer [Internet]. 2009 May 16 [cited 2012 Oct 6];35(6):617–36. Available from: http://www.springerlink.com/index/10.1007/s10961-009-9124-4
21. Russell W, Robinson RB, Carolina S. MODELING KNOWLEDGE-BASED ENTREPRENEURSHIP AND INNOVATION IN JAPANESE ORGANIZATIONS. International Journal of Entrepreneurship. 2005;9:19–45.
22. Costello GJ, Donnellan B, Gleeson I, Rochford C. THE TRIPLE HELIX , OPEN 32 INNOVATION , AND THE DOI RESEARCH AGENDA. 235:463–8.
23. Sarkar S, Costa a. Dynamics of open innovation in the food industry. Trends in Food Science & Technology [Internet]. Elsevier Ltd; 2008 Nov [cited 2012 Nov 6];19(11):574–80. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0924224408002392
24. Carlsson B, Mudambi R. Globalization, Entrepreneurship, and Public Policy: A Systems View. Industry & Innovation [Internet]. 2003;10(1):103–16. Available from: http://www.tandfonline.com/doi/abs/10.1080/1366271032000068122
25. Arranz N, Fdez. de Arroyabe JC. The choice of partners in R&D cooperation: An empirical analysis of Spanish firms. Technovation [Internet]. 2008;28(1-2):88–100. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0166497207000958
26. Semlinger K. Cooperation and competition in network governance: regional networks in a globalised economy. Entrepreneurship & Regional Development [Internet]. 2008;20(6):547–60. Available from: http://www.tandfonline.com/doi/abs/10.1080/08985620802462157
27. Audretsch DB, Hülsbeck M, Lehmann EE. Regional competitiveness, university spillovers, and entrepreneurial activity. Small Business Economics [Internet]. 2011 Apr 8 [cited 2011 Dec 28]; Available from: http://www.springerlink.com/index/10.1007/s11187-011-9332-9
28. Beach R, Muhlemann a. P, Price DHR, Paterson a., Sharp J a. The role of qualitative methods in production management research. International Journal of Production Economics [Internet]. 2001 Dec;74(1-3):201–12. Available from: http://linkinghub.elsevier.com/retrieve/pii/S092552730100127X
29. Barratt M, Choi TY, Li M. Qualitative case studies in operations management: Trends, research outcomes, and future research implications. Journal of Operations Management [Internet]. Elsevier B.V.; 2011 May [cited 2012 Nov 2];29(4):329–42. Available from: http://linkinghub.elsevier.com/retrieve/pii/S027269631000046X
30. Baxter J, Chua WF. Alternative management accounting research — whence and whither. Accounting Organizations and Society. 2003;28:97–126.
31. Glaser BG, Strauss a. L. Discovery of Substantive Theory: A Basic Strategy Underlying Qualitative Research. American Behavioral Scientist [Internet]. 1965 Feb 1 [cited 2012 Nov 23];8(6):5–12. Available from: http://abs.sagepub.com/cgi/doi/10.1177/000276426500800602
32. Kelley D, Bosma N, Amorós JE. The Global Competitiveness Report 2010-2011. GEM [Internet]. Geneva; 2010 [cited 2013 Feb 14];85. Available from: www.gemconsortium.org

ON THE CHALLENGES OF THE SCIENCE TO BUSINESS (S2B) MARKETING: ROLE OF POTENTIAL AND PARTNERSHIP IN EARLY STAGE TECHNOLOGY TRANSFER

Szabolcs Prónay PhD[1], Norbert Buzás PhD[2]

[1]University of Szeged, Faculty of Economics and Business Administration, 1 Kalvaria av., Szeged, Hungary, n.buzas@gmail.com

[2] University of Szeged, Directorate of Research, Development and Innovation, 13 Dugonics sq., Szeged, Hungary, n.buzas@gmail.com

Knowledge creation and innovation are the cornerstones of today's knowledge-based economy. The number of intellectual properties and patents are in a turbulent augmentation. The intellectual property market is dealing with the same challenge as marketing had in the second half of the last century when the main task was no longer the manufacturing but the selling of products. This situation is particularly challenging for basic research stakeholders - especially universities. In our paper we shed light on the above situation as we analyze the opportunities and challenges universities face during their attempt to commercialize their intellectual property. As a theoretical framework for our investigation we have chosen the science-to-business (S2B) marketing. Our research focuses on the characteristics of S2B marketing with regard to product portfolio management, pricing and difficulties in the use of communication devices. Specific techniques and practices are presented and examined in the paper. We set together best practices from North America, Far East and Eastern Europe in order to deepen our understanding about the applicability of S2B marketing in local circumstances.

Keywords
Innovation management, Science-to-business marketing, Technology transfer,

1. Introduction

Continuous knowledge creation and innovation are the cornerstones of today's knowledge-based economy, which encompasses a very broad spectrum from units specialized in applied research in multinational companies to academic institutions performing basic research. Due to technological development, the processes taking place in the area of intellectual properties are similar to those occurring in western market economies in the second part of the last century, when the main challenge of marketing was no longer product manufacturing but selling the manufactured product. Knowledge creation and the number of innovations are dynamically growing; however, the commercialization and utilization of produced intellectual properties are taking place in increasingly saturated and refined markets. This situation is particularly challenging for basic research and early stage development stakeholders, such as universities.

In the light of the above situation, in our paper we analyze the opportunities and challenges associated with the commercialization of intellectual property created in universities. As a theoretical framework for our investigation, we have chosen an approach yet less widespread in our country – but already applied abroad – the science-to-business (S2B) marketing. According to the basic idea of this new S2B marketing trend – emerging besides

the already known B2C and B2B – the commercialization of scientific innovations and intellectual properties requires a specific marketing approach.

These specificities originate from the product development based on technological push characterizing basic research, which, in contrast to demand pull, is not built on market-demand-based product development, but searches market demands for emerging scientific results. Although with changes in university-industry relations [1] and the transformation of research financing, university research projects also frequently show the effects of demand pull, universities aim to act as a classic knowledge creator in many cases, therefore they seek the utilizability of the results generated based on their own knowledge base even if there is no market demand for them at first sight.

Our study focuses on describing the specificities of S2B marketing, with special regard to product portfolio management, difficulties in pricing and applicable communication devices. Our aim is to set up a theoretical framework which generates a 6P marketing mix matching the characteristics of S2B marketing by completing McCarthy's traditional 4P toolbox [2] with two additional tools, the partnership- and potential-based approaches.

2. The role of entrepreneurial universities in knowledge creation

Higher education is experiencing serious changes both nationally and internationally. A common feature of the changes is that the state attempts to reduce the finance of higher education, thereby setting the task of increasing own income creation as an actual and short-term objective for universities. Instead of the traditional system of knowledge creating universities, this transformation brings the system of entrepreneurial universities into life [3]. In this system, the university has no longer merely educational and research tasks, but it also needs to carry out their commercialization, i.e. it has to create income from these two activities [4]. These new activities of universities, which go beyond traditional academic tasks (education, research) and are typically connected to market, are in general called the third mission of university.

It is important to emphasize that these changes transform the nature of higher education not only on national but on international level as well; the increase in the significance of the third mission can be counted among the tendencies of global economy [4]. The OECD [5] provides concrete guideline regarding this transformation, which focuses on universities becoming entrepreneurial universities. It defines the activities to be performed in the domain of the third mission for universities, which includes the following:

- knowledge creation and technology transfer: commercialization and sale of intellectual properties, basic research results and innovations of universities
- commercialization of educational capacities: beyond traditional higher educational framework, also in the form of professional training, adult education
- commercialization of university capacities: leasing buildings, machines, equipments
- fund raising: acquiring external financing for applied research projects

Becoming an entrepreneurial-university is of course impossible without proper business relations, thus without a proper enterprise sphere [4]. In East Central Europe, this macro-environmental factor is not too favourable for higher education institutions, the reason of which is the underdevelopment of business research-development and innovation infrastructure characterizing the region. Apart from some multinational companies performing considerable R&D&I activities, the companies of the region (whether multi, whether SME) can become involved to a very limited extent in advancing experimental developments and scale up, which typically take place outside the walls of universities on international level as well [6][7].

In addition to the drawbacks of regional conditions, it is important to mention the positive R&D&I changes experienced in the economic environment, from which the emerge of SMEs

as the partners of university innovation activities is outstanding. The increase in the innovation potential of small and medium enterprises is underpinned partly by targeted tender supports [8], partly by the development as suppliers of multinational companies. Although this process is not yet in an advanced state, it is important to realize that for entrepreneurial universities a new type of partnership can be created with local small and medium enterprises.

3. Science to Business (S2B) marketing

S2B (Science to Business) marketing is related to innovation marketing, but it interprets its content specifically in relation to higher education institutions (primarily research universities). Thus according to our understanding, S2B marketing is the entirety of marketing devices related to knowledge creation and innovation activity taking place in research institutions, especially universities, whose aim is to facilitate the market utilization of emerging intellectual properties and innovations.

The Fachhochschule Münster University of Applied Sciences has taken a pioneering role in defining the area of S2B marketing and elaborating this discipline, where they have been dealing with S2B marketing research since 2002 and uniquely an independent research centre (Science-to-Business Research Centre) functions in this area.

S2B marketing is a specific marketing area, which is positioned on the border of three already specific marketing areas. In what follows, we present which marketing areas are related to S2B marketing, but at the same time we refer to the main separating points, which justify the separated analysis of this area:

- Innovation marketing: Innovation marketing can be regarded as a form of marketing system which offers a market-oriented and complex approach of the innovation process [9]. Nevertheless, it is important to emphasize that this complex approach of innovation marketing covers mostly the entire innovation process, and assumes that innovation takes place in the studied organization from the emergence of idea to the birth of the prototype. In the case of universities, however, the situation is different, since mainly an early stage (basic) research result is commercialized, which differs from appearing with a prototype in the market in many respects [10][11], primarily in the related risk [12]. Consequently, the domain of innovation marketing only partly provides a proper basis for analyzing the commercialization of innovation activities of universities; it is justified to introduce a marketing area focusing on this issue in particular, the category of Science to Business (S2B) marketing.
- B2B marketing: The customers of academic knowledge creation are mainly organizational actors (companies, research institutions, the state itself in given cases). The university, however, functions differently from an enterprise in many respects, thus it can also develop partner relations with other enterprises in a very particular way.
- Non-business marketing: In several countries of the world, universities are mainly related to the non-business sphere, thus the specificities of non-business marketing can be applied regarding the marketing activities they perform [13]. Nevertheless, on the one hand, the concept of entrepreneurial university, and on the other hand, the characteristics of technology transfer require activities which go beyond the framework of non-business marketing in the commercialization of innovation results of universities.

The question arises whether S2B marketing requires a separate marketing approach. In our opinion it does because although it is related to the above mentioned three areas, due to exactly its diversity, it cannot be identified with none of the areas respectively. Furthermore, we consider the separated approach justified because this area analyzes the focus of scientific activity, the knowledge creation of the university itself, thus it may expect the interest of a significant part of scientific opinion owing to the personal involvement of actors.

The characteristics of S2B marketing can be summarized by the following:

- It is related to regional image: The effect of the country of origin is also known in the case of products [14] [15], but in the case of S2B marketing it emerges specifically. The enterprise attitude related to a university innovation considerably depends on which university the given innovation was created in. Renowned universities and knowledge regions (Silicon Valley, Harvard, Leuven) have significant competitive advantage in contrast to, for example, Eastern and Central European institutions.
- "Hit or miss" character: The innovation results often require considerable investments and their return is uncertain. It is especially true for the results of basic researches and early developments in the focus of S2B marketing. The significant part of them entails almost no measurable market potential, however, the results which bring market success later on are typically so resounding that they may produce significantly greater income compared to the result achieved by an applied research or development. This character originates from the fact that basic research results generally differ from all already existing solutions – contrary to a development which carries on existing results – thus they can represent a quality leap [16].
- Double risk: According to what has already been mentioned, the market success of basic research results is very difficult to estimate. This represents a risk for the customer of the intellectual property, but at the same time it means a risk for the seller as well, because it can easily occur that they sell the intellectual property for a fraction of the real (later realized) value [12].
- Researcher vs. marketing: the research results considered as the subject of S2B marketing are produced by basic researchers, for whom scientific aspects and objectives are often more relevant that marketing aspects. As a result, S2B marketing has to cope with a specific problem: the producers of its products are not inevitably interested in marketization (or not only and not primarily interested), thus they may disregard market aspects concerning the direction of product development and the related confidentiality.

Based on this we can generally establish that the success of S2B marketing depends on the collective of three factors, namely the potential in technology, the specificities of the targeted market and the characteristics of the involved persons. By involved persons we mean firstly the potential customers, secondly the researchers and thirdly the managers performing S2B marketing. The potential customers are mostly similar to the customers of B2B marketing, mainly institutions dealing with applied research, industrial companies, investors and only rarely consumers. The S2B marketing managers generally work in the technology transfer office of the university. In the followings, we analyze the specificities of S2B marketing within the framework of a model we have set up, through which we intend to create a theoretical basis for S2B marketing stakeholders, primarily for the marketing managers working in this area.

4. The marketing mix model of S2B

In the foregoing, we have described the concept and general approach of S2B marketing. In what follows, we summarize the S2B marketing devices and the specificities of the related marketing activities in a model we have developed.

We have used McCarthy's [2] widely known [17][18] marketing mix model as a basis, which concentrates the marketing toolbox into four factors. We have applied these four factors to S2B marketing on the one hand, and extended it with two additional factors on the other, thus we have developed a 6P marketing mix model based on McCarthy's 4P model. We have summarized each component in Figure 2.

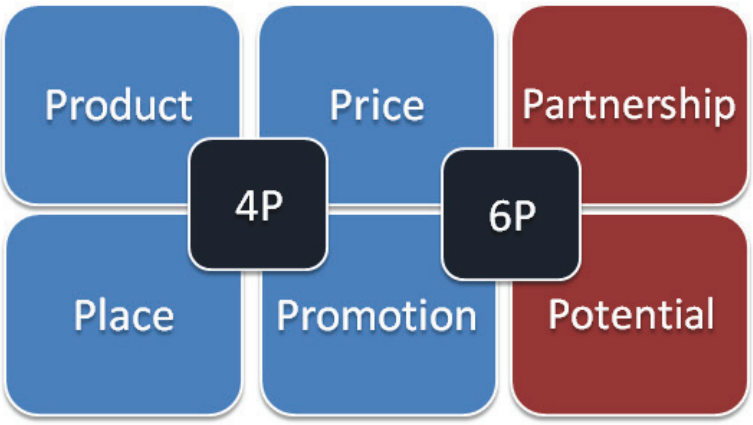


Figure 1: Marketing mix 6P model of S2B

In the followings, we provide a detailed description of each marketing mix component, focusing on the S2B marketing characteristics a certain component has in every case. It means that we do intend to overwrite the literature views concerning the four factors of the general marketing mix but to complete them in our model.

4.1. Product

In the course of developing product policy, marketing experts carry out the elaboration of the specificities and characteristics of the product and the management of the product mix, also known as product portfolio [18]. Product policy and innovation are traditionally linked within the category of new product development, as the creation of a new product is normally connected to a kind of research-development or innovation activity. New products may originate basically from two sources: from an innovation developed to satisfy a so far unsatisfied demand (it is called innovation of demand pull type) or from a technological solution which could not be produced on the earlier technological level and there was no demand for it (innovation of technological push type). In the former case technological implementation, in the latter arousing demand is the most important marketing task [19].

In S2B marketing, the results of innovation processes, i.e. the produced intellectual properties are considered as a product. Portfolio management is the central component of S2B product policy. A particular problem of marketing related to university research-development is that (marketing) decision-makers themselves are not aware of their own product range. In a university, several research workshops, departments and laboratories performing continuous research-development activity operate, but only a very limited number of emergent innovations are reported by the researchers to the technology transfer office of the university.

In the area of S2B marketing, the focus of product policy may vary based on the type of the research-development activity. In the followings, we provide details about the main marketing activities related to product policy according to research-development activity:

- In the case of basic research: The main marketing task is the up-to-date management of the product portfolio, which involves portfoling and up-to-date registering the emergent – moreover, the earlier emerged – innovation results, and evaluating the processes.
- In the case of applied research: The parameters of the product are often defined by the business partners. In this case, S2B marketing managers' first task is keeping contact with partners, ensuring proper information flow and ensuring the proper specification of products.
- Experimental development: In this field, the marketing latitude of East Central European universities is rather narrow. Partner relationship development, closer cooperation with

partners and attracting investors can basically found experimental developments [20]. In practice, however, experimental development rarely occurs under university management due to the lack of funds in the university, thus experimental developments are preceded by the commercialization of the intellectual property by the university or its exportation to a spin-off company.

- Service – One of the central components of the OECD [5] proposals is the commercialization of university capacities and the offer of university services on market basis. Assessing the capacities and marketizing them in a proper form (service package) are related marketing tasks.

As a conclusion, we can establish that the conscious and continuous portfolio management stands in the focus of the product policy activity of S2B marketing. In this activity, on the one hand, registering the existing intellectual properties represents a challenge, and on the other hand, portfolio cleaning is difficult because although keeping intellectual properties in a portfolio is quite expensive (due to patent maintenance costs), parting with certain innovation results may raise business and personal concerns.

4.2. Price

The price formation of S2B marketing is generally done with individual pricing, since individuality is an inherent characteristic of innovations. This represents an opportunity in terms of higher pricing due to individuality on the one hand, but it also means a barrier on the other because it is difficult to find a starting point to define the price [21].

The traditionally most simple cost-push pricing [18] cannot normally be applied in S2B marketing, since the costs are so high that the price matched to them generally exceeds the customers' reservation price. Nevertheless, it has to be noted that these costs do not normally arise directly due to the production of the given intellectual property, but they are the fixed costs of regular research work, thus their return is not a primary concern.

As a consequence of the above, the counter value of intellectual properties can generally be defined with market-based pricing. It renders it more difficult that due to its individuality and novelty, the future profitability of an innovation is very hard to define.

As a result of the above issues, uncertainty is mitigated by that, in contrast to general marketing, not only a complete divestiture may occur but its partial forms as well: licensing, leasing and cost share.

Therefore, the most important considerations in terms of the price policy of S2B marketing are the utilization of pricing opportunities deriving from individuality on the one hand, and the flexible choice of commercialization and pricing methods on the other.

4.3. Place

The commercialization of intellectual properties is similar to the commercialization policy of B2B marketing in terms of requiring considerable personal negotiation. Commercialization normally happens through a short channel and the product itself is very complex, its overall understanding necessitates profound scientific knowledge. Nevertheless, it characterizes commercialization policy that frequently neither commercialization, nor purchase is carried out by skilled researchers but by economic experts and managers, thus, in a unique way, they only partially know the given product. From the aspect of the seller, it means that marketing managers need to have well-developed information channels towards researchers. From the aspect of the customer, it considerably increases the risk of purchase [12], thus even in the case of experienced investors – moreover, often particularly in their case – besides measurable data, intuition has a significant role in making the buying decision.

One of the main challenges of S2B commercialization policy is finding customers. The standard devices of locating potentially interested people are structured databases, as well as business conferences and partner meetings. The latters are crucial, since they represent not merely opportunities to sell, but platforms to collect important industrial feedbacks. In a partner meeting, innovation marketing managers can evaluate the extent of potential and occasional deficiencies the industry finds in their product based on the experience of personal discussions. Since the negotiating partners are expert businessmen, we may get new information about earlier undiscovered competitors and competitive technological solutions in such meetings.

Based on this, the significance of S2B commercialization policy lies in intensive presence and developing relationships [22], whose devices range from online databases to partner meetings resulting in personal contacts.

4.4. Promotion

The narrowly defined objective of S2B marketing communication is familiarizing the intellectual property and arousing the interest of potential customers; its broadly defined objective is to promote the institution, the university itself and its innovation activity.

The traditional communication related to innovations is confined to scientific publications and conferences. S2B marketing communication applies a more market-oriented approach, which rather focuses on image building and broad marketing communication. We can divide S2B marketing communication into internal and external dimensions.

The main point of S2B internal marketing communication is to adequately inform researchers and to build trust. It includes proper internal PR development, which is served by regular events, internal workshops, where those involved in university knowledge creation can consult and get feedbacks from the business partners of the university, thus they can expand their essentially scientific position with business views. Supporting and managing the development of a communal character, research communities and clubs are important in internal communication.

In external marketing communication, great emphasis needs to be put on form besides the detailed but clear content description of intellectual properties. The single image, publications matching this image and online interfaces are essential components of successful image building and communication [23]. According to what has already been mentioned, S2B marketing specifically depends on regional image, i.e. in addition to the characteristics of the intellectual property, its place of origin is also important, thus positioning the institution from innovation aspect has to be emphasized. The main stages of communication are online space and professional workshops. In the case of the latter, the personal nature is important in accordance with the discussion on commercialization policy, consequently choosing the proper commercialization staff is also crucial.

As a conclusion, successful S2B marketing communication is characterized by proactivity and market orientation, in the course of which both intellectual properties and their producing institutions are presented with a content comprehensible for managers as well and in a form that matches the common image.

4.5. Partnership

It characterizes S2B marketing that due to the complexity of the product, many actors participate in both the production and the commercialization of the product. To develop good synergy between involved parties, special attention has to be paid to the cooperation with them, i.e. to partnership. In S2B marketing by partnership we mean the activities whose aim is to create accordance between external and internal stakeholders.

The main point of S2B internal partnership is to create an atmosphere of partnership within the organization. This includes the cooperative collaboration with researchers on the S2B marketing managers' part, ensuring the two directional (industry – researcher; researcher – industry) information flow. It is useful to mention two unique methods of creating an atmosphere of partnership. One method is when the so-called "opinion leader" researchers are supported by the technology transfer office, thereby gaining their support, and it can develop a good relationship with the entire research community through their mediation. The other is the establishment of a research centre within the institution, where interdisciplinary cooperation is created within institutionalized framework. Thus a partnership can also be developed between the research areas located further from each other. Moreover, joining in the work of the centre, S2B marketing managers can also create a broader system of relations within the university. Furthermore, research centres have larger capacity and better bargaining position towards external commercialization partners.

The main point of S2B external partnership is that the university steps out of its role performing applied research work given merely as a business task – particularly typical of Central and Eastern Europe – and is present as a competent partner for industrial actors [4]. It requires openness on the university stakeholders' part in terms of the direction, actors and content of the relationship. The direction of the relationship has to be concentrated on the international stage, beyond traditional local partners [16]. As for the content of the relationship, process orientation has to take over the place of implementation and commercialization orientation. Such partnerships have to be developed which focus on not mere implementation but on joint development, since in the case of the latter, much greater commercialization potential can be achieved than by the simple commercialization of early stage researches or completing industrial assignments.

Consequently, the aim of devices called partnership by S2B marketing is to represent the university as a competent and open partner in the eyes of both its external and internal stakeholders.

4.6. Potential

In addition to traditional marketing mix components, we consider this group of activity important to be introduced because intellectual properties are distinguished from general products by the much higher uncertainty associated with them and the necessity of focusing in the long term.

The commercialization of intellectual properties often (in almost each case for universities) happens before the level of the concrete, marketizable product, i.e. we can talk about a "product" in only a limited way in this sense. What changes hands in the course of such transaction is rather a kind of promise, a potential. For this to become an actual product, further investments and developments have to be applied, which requires considerable time and energy expenditure, and as a result, patience [16].

The university has to consider the innovations it has produced as potentials, which, however, it has to evaluate based on market-based efficiency analysis. We have already outlined in product policy that keeping in portfolio may entail considerable costs, thus it requires serious considerations. The product as potential approach means that market feedbacks regarding the quality of this potential have to be obtained in several phases in the course of research-development. If the potential is considerable, further developments and expenditures are justified, and it is worth choosing a higher price and only partial divestiture in the course of commercialization. In the case of innovation results, however, which have lower potential based on market feedbacks, it is useful to consider complete commercialization or, in a worse case, their removal from the portfolio (e.g. assigning back to the researcher).

The evaluation of potential and the related portfolio management can be performed on a high level through elaborating proper protocols [18]. These protocols cover the steps of collecting market feedbacks, the aspects of evaluation and the conditions of keeping in portfolio, as well as the course of being removed from it.

In the case of potential evaluation, the question of security is also important to be noted. To preserve the potential of an intellectual property, the protection of its novelty content is essential. In practice it requires cautious communication, avoiding novelty destruction and extended confidentiality protocol.

As a conclusion, the evaluation of S2B potential represents activities which rest on market-based utility approach and form the portfolio evaluating intellectual properties with a long-term focus, according to defined protocols and by strict confidentiality.

5. Conclusion

In our paper, we have made an attempt to provide a Central East European interpretation and extension of a marketing area with more than ten years of history, the science to business (S2B). This discipline includes the specificities of the marketing activities of institutions, primarily universities dealing with knowledge creation.

Defining S2B marketing as a separate marketing area is necessary due to the characteristics of intellectual properties. In contrast to general products, the innovations commercialized in the course of S2B marketing mostly cannot considered to be products but rather a kind of promise, possibility, potential. Considerable risks can be attached to their commercialization both on the seller's and the customer's side, since the market utility deriving from their further development is difficult to estimate and can be utilized only in the long term. These products are specific because their "producers" (universities) often only slightly know their own product, moreover, on institutional level they are often not aware of the innovations hiding in certain departments. However, the problem with the innovation results which once have got in the portfolio is that keeping them in the portfolio is unnecessary and expensive.

S2B marketing directly concerns a very broad range of stakeholders, who typically have different knowledge and motivations. The researchers know the product itself the most, but they are often the least interested in its commercialization. On the other hand, the customers and sellers interested in commercialization are often able to get familiar with the technological details of the innovation only in a limited way.

These characteristics require a special marketing approach, regarding which we have aimed to create a theoretical basis by setting up a theoretical model for the further analysis of this area. In the model, we have applied the components of the 4P marketing mix known through McCarthy to the specificities of S2B marketing on the one hand, and extended it with two additional marketing devices on the other. The first device is associated with the already mentioned specificity of innovations, their character of potential, therefore we have named it potential evaluation. The other device starts out from the wide range of S2B marketing stakeholders, and it concerns the development of proper partnership between them and the role of university as a competent partner, therefore we have named it partnership. We hope that the connections and ideas outlined in our study prove to be useful for those involved in the profession of innovation and inspiring for the authors of further S2B marketing analyses.

Acknowledgement

This work was partially supported by the European Union and the European Social Fund through project FuturICT.hu (grant no.: TAMOP-4.2.2.C-11/1/KONV-2012-0013)

References

1 Schmoch, U.: Interaction of Universities and Industrial Enterprises in Germany and the United States – a Comparison, Industry and Innovation 1999, 6, pp. 51-68
2 McCarthy E J : Basic marketing, a managerial approach, Homewood, Ill., R.D. Irwin, 1960.
3 Skilbeck M: The University Challenged – A Review of International Trends and Issues with Particular Reference to Ireland, The Higher Education Authority, Dublin 2001
4 Litan R E, Mitchel L, Reedy E.J.: Commercializing University Innovations: A better way – working paper, National Bureau of Economic Research, Cambridge, 2007
5 OECD: On the Edge: Securing a Sustainable Future for the Higher Education. Paris, 2004
6 Clark W. W. Jr.: Commercialization of R&D: The role of science parks, Marketing&Menedzsment, 2001, Vol. 2 pp 48-56
7 Petruska, I.: The marketing of research and development at the university; Periodica polytechnica. Social and management sciences. 2001, 9., 1.:35-42.
8 Mogyorósi P: Innovációs pályázati rendszerek és források (Innovation financing and tenders) In Buzás N: Innovációmenedzsment a gyakorlatban (Innovation management in practice) Budapest 2007: 297-306
9 Vágási M, Piskóti I, Buzás N.: Innovációmarketing (Innovationmarketing), Akadémia Kiadó, Budapest, 2006
10 LEIA Technological Development Center: Marketing of Innovation, Report produced for the EC project INNOREGIO:dissemintatino on innovation and knowledge management techniques, 2000.
11 Livingstone A.: Report on UBC Spin-off Company Formation and Growth. The University of British Columbia, University-Industry Liaison Office, 1997
12 Veres Z., Buzás N.: Management des risques bilatéraux dans le transfert de technologie (Manging the billateral risk in technology transfer), La Revue du management technologique, 2006, 15, 2: 47-74
13 Buzás N: Nonbusiness innováció-marketing (Nonbusiness innovation marketing), In. Dinya L, Farkas F, Hetesi E, Veres Z.: Nonbusiness Marketing és Menedzsment (Nonbusiness Marketing and Management), KJK Kerszöv: Budapest, 2004: 237-249
14 Jaffe, E. D., Nebenzahl, I. D.: National Image and Competitive Advantage – The Theory and Practice of Country-of-Origin Effect. Copenhagen Business School Press, Handelshøjskolens Forlag, Copenhangen, Danmark, 2001
15 Porter M.E. The Competitive Advantage of Nations, Free Press, New York, 1998
16 Borg E.A.: Knowledge, information and intellectual property: implications for marketing relationships, Technovation 2001, 21: 515-524
17 Józsa L, Piskóti I, Rekettye G, Veres: Decision-orientated marketing, KJK Kerszöv, Budapest, 2005
18 Kotler P, Keller K. L.: Marketing Management, Pearson Education, New Jersey, 2006
19 Rekettye G. Hetesi, E.: Kínálatmenedzsment (Supplymanagement), Akadémia Kiadó, Budapest, 2009
20 Buzás N.: A vállalkozói szellem szerepe a spin-off cégek alapításában (The role of enterpreneurship mentality in starting a spin-off company), in Czagány L., Garai L. (ed): A szociális identitás, az információ és a piac (Social identity, information and market), , JATE Press, Szeged:. 2004, 257-266
21 Reeves R.: Commercial management of university research and patents – working paper, University of Bologna, 2006
22 GrØnholdt L, Martensen A, Kristensen K.: The relationship between customer satisfaction and loyalty: cross-industry differences Total Quality Management, 2000,.11,.4-5-6:.509-514
23 Park C.W, Jaworski B.J, MacInnis D.J.: Strategic Brand Concept-Image Management, Jounal of Marketing, 2006, 50, 4: 135-145

INTERNATIONAL STUDENT EXCHANGE AS A TOOL FOR DEVELOPING INTER-REGIONAL INNOVATIVE ENTREPRENEURSHIP

Tiit Elenurm

Estonian Business School, 3 Lauteri Str, Tallinn, Estonia, tiit.elenurm@ebs.ee

This paper explores action learning experience of applying international exchange students in cross-cultural teams in the role of international business information "gatekeepers" for Estonian innovative start-up enterprises focused on international business. International student teams add value especially for enterprises that screen markets for innovative services in several distant regions. Most active have been innovative entrepreneurs involved in IT, design, and tourism start-ups. The main barrier to applying the creative synergy of cross-cultural teams is not limited analytical skills, but the lack of the real time cross-cultural communication competence and social skills within the student teams and for communication with busy entrepreneurs. Action research was carried out in 61 different projects during several years and results may have been influenced by regional and global recession and recovery trends. Cross-cultural challenges revealed in the research are reflected and the vision of developing this international business opportunity screening cooperation for enhancing inter-regional innovative entrepreneurship is discussed. Ways to increase regional competitiveness by involving students as inter-regional "gatekeepers" are presented. The role of open innovation in involving universities to the regional innovation system and to inter-regional cooperation by applying international student teams is explained.

Keywords

Action research, cross-border teams, innovative entrepreneurship, inter-regional cooperation, student

1. Introduction

Students of business schools as future entrepreneurs and employees play a crucial role in developing international networking practices. Internationalizing entrepreneurship education has become an important educational priority [1]. One task of a business school is to raise the awareness of students about international networking and cross-border information search tools and co-operation opportunities in co-creative entrepreneurial teams. Learning by doing assumes searching and combining relevant information from different stakeholders in order to identify new international business opportunities. Students can be involved in international teams for projects where the capabilities of enterprises for finding foreign business partners and for participating in international networking are improved. The international composition of the team increases its potential to trace international business opportunities in different countries. Teams may however, face cross-cultural co-operation challenges both inside the team and in transactions with entrepreneurs that act as clients of such teams.

Two main research questions in the present paper are:

1. What are the main challenges in the action learning process, where international student teams are applied as business information "gatekeepers" for export-oriented small and medium-sized enterprises?
2. What are the development opportunities of such action learning practices for increasing the role of universities in the regional innovation system and in contributing to inter-regional innovative entrepreneurship?

In order to address these research questions, the cultural aspects of co-creative business opportunity identification by using international student teams are at first discussed. The paper then provides an overview of action learning projects at the Estonian Business School that apply international student teams for business information search and assessment. Finally, a vision for developing international networking and involving students in a community of cross-border business information gatekeepers in the export management module and in the open innovation context is presented.

2. Cross-border business opportunity identification

In internationalisation studies cross-border networking has for some time been promoted as tool for overcoming the "resource poverty" of born globals [2]. Participation in formal and informal entrepreneurial networks has been discussed as a factor of successful entrepreneurship since the last decades of the 20th century [3]. Participants of the knowledge sharing process in a network have to understand their core competencies and competency gaps, but also the competencies and competency gaps of their partners in the context of their cultural differences. The focus on business opportunities has been stressed as a key feature of entrepreneurial culture by many entrepreneurship researchers, although the sources of entrepreneurial opportunities have been interpreted in different ways either stressing information sources for identifying existing opportunities or innovative ideas for creating new opportunities [4]. Open innovation is currently one of the most debated topics in the management literature [5]. Assistance of students to entrepreneurs that try to commercialize their innovations internationally can be seen as one way to implement the open innovation paradigm.

Action-based entrepreneurship education has gained international popularity [6]. Such initiatives often apply teamwork and networking for new entrepreneurial initiatives and expose students to real-life consultancy assignments [7].There is however, less evidence about projects, where the cross-cultural composition of the group, e-learning combined with face to face group discussions and a course on regional business opportunities all serve as the tools for monitoring international business information and for finding new foreign partners for SMEs in East European catch-up economies. We use the metaphor "gatekeeper" in order to explain the role of an external student group that understands the information needs and knowledge gaps of SMEs and is able to monitor, select and present international business information that is relevant for SME internationalisation.

3. Applying Action Learning in International Teams

The cross-cultural action learning in internationalization projects for SMEs that we have applied since spring 2006 has focused on combining the following learning drivers in order to enable the gatekeeper role of student teams:

- international outsider view plus insider insights into company problems;

- empathy towards company representatives plus smart questioning of their stereotypes;
- consensus on a realistic task plus dialogue for re-defining the preliminary task in order to solve the real problem;
- specialization inside the team plus creative synergy leading to new insights;
- pointing out unique competencies in team members based on their knowledge base plus cross-cultural alignment of teamwork habits;
- demonstrating rapid hands-on results plus presenting broader innovative ideas;
- learning from other teams plus sharing knowledge with other teams;
- trying to become a change agent plus learning from the company feedback.

During the period from 2006 to 2011 international student teams have conducted projects for 61 Estonian SMEs in order to support their internationalization efforts. Among business sectors represented in these team projects, most active have been innovative entrepreneurs involved in IT, design, and tourism start-ups. Electronics, mechanical engineering, furniture production, health and other service fields have been more often represented by enterprises that already have some international business experience and are interested to broaden their international markets and/or to move higher in the value chain.

Classical action learning as developed by Revans [8] represents a problem-based approach to learning, where co-learners co-operate as members of small groups whose goal is to complete a task and achieve learning through the process of problem-solving and reflection. Action learning processes that are reflected upon in the present paper have been carried out within the framework of the course *International business opportunities in the Baltic Region.* This course has been from 2006 to 2011 conducted 10 times by following the action learning logic. In each of the courses 36 hours were allocated for classroom activities spread over three and a half months. Students were asked to create teams to assist SMEs find new international business opportunities and foreign partners. The project work assessed by the SMEs and by the tutor on the basis of the written reports and oral presentations counted for 40% of the final course grade. Students had to learn how to search for additional information and how to attain a mutual understanding of the realistic scope of their task within the team and during meetings with the representative of the SME.

Enterprises volunteered their internationalisation project tasks on 1-2 pages after receiving information about co-operation opportunities. Mailing lists of Estonian Business School alumni, the Estonian Association of Small Enterprises, Tallinn Science Park Tehnopol, Creative Estonia and Tallinn City Business Development Department have been used for finding interested enterprises. SMEs were encouraged in the preliminary task to specify their key problems in the field of international business development, so student teams could produce useful information for them. Project requests presented by SMEs at the beginning of the action learning process did not offer the student teams a finalised task with detailed instructions. Analysis of the briefs received from the enterprises was the departure point for the action learning process. Reflections on the part of the students about aligning the understandings of their team with those of the representative of the SME about the task served as important input for the action research and learning. The emergent nature of the action was supported by progress reports presented by the teams in the special e-learning forum. Students were encouraged to raise questions to be answered by the course facilitator, but also by other students through the WebCT e-learning forums and in recent years in the Moodle e-learning environment.

The teams that have been created at the Estonian Business School involved students from the Baltic countries and Poland, from the Southern European countries such as Italy and France, and from Germany, Netherlands and the Nordic countries. Some students from Turkey have participated in recent years. As the rule, not more than two students from one country could join the same 4-5 member team. Asia has been represented mainly by Chinese students. Reflection of first two years of action learning projects, 2006-2007, is presented in [9]. During recent years the share of web-based start-up enterprises that are looking for contacts and market research outside the Baltic Sea region has increased among project proposals.

4. Challenges of Intercultural Teamwork

The diversified composition of student teams, involving students from different countries, increases the international gatekeeper potential of the company project team as students can rely on contact networks and creative ideas that are enabled by their diverse cultural backgrounds. Diversity within teams can support critical thinking skills and the willingness to appreciate different perspectives [10]. Intercultural teams however, often become dysfunctional because of miscommunication and conflict [11]. Student teams face “free rider” and time management problems [12].

In the process of facilitating the student teams, the challenge of cross-cultural aligning of different teamwork habits emerged, especially between Southern European, Northern European and Asian students that assumed different approaches to structuring their tasks and giving feedback to other team members. Students from Germany tended to focus on balancing the inputs of all teams members by insisting on agreements that should be based on a clearly defined project time schedule. They were unhappy if these agreements were not followed by the team members or if the SME representatives postponed meetings referring to their time pressures. Students from China often

Italian and French students were often eager to discuss the preliminary task and ideas at some length before deciding on their input for a specific subtask. They preferred to go to the first meeting with the SME representative without sufficiently studying the information that was available at the SME website or other online sources. At the same time, Estonian SME representatives did not welcome the conversation style with such student teams that used face-to-face meetings to ask questions, where such answers could easily be found from their website already before the meeting.

Chinese students were sometimes confused if the team had to set independently its rules and specify the roles of team members but they made crucial contribution if they had clear task. This observation corresponds to some research on potential influence of Chinese culture of entrepreneurship in [13].

Estonian students have seldom tried to take the leadership role in the team and have been more rarely asked by the team to be the key oral presenter of the final report than French or Italian students. The real contribution of Estonian students to intra-team communication and in some cases to communication between the SME and the student team appeared to be more modest than anticipated by foreign exchange students at the first stage of the action learning process. Foreign students were more able to focus on their team project compared to Estonian students that combined university studies and full-time work in some organisation.

5. The Role of Open Innovation and Orientation of Entrepreneurs

SME representatives have generally pointed out the positive impact of the international composition of the student team in their feedback presented in the form of brief written assessments, and in additional interviews with SME representatives interested in clarifying their point of view. Some of them however, were eager to see teams that matched their potential foreign markets even more in terms of nationality and the experience of the students. Even innovative entrepreneurs, having potential to succeed as a born global, tend to be more interested in neighbouring Nordic and Baltic markets, whereas majority of exchange students are from France, Italy, Spain or some other South European countries. In recent years some exchange students have arrived from South America and from other more distant regions and a challenge is to match country-specific competencies of these students and internationalization visions of Estonian SMEs.

SME respondents confirmed that some ideas from the student reports have been new and represent real value for the further development of their enterprise. Most often such ideas were related to improving the SME website, presenting an amended SME profile to potential foreign clients and using e-commerce opportunities for international business. Some student teams managed to identify gaps in the available product information and offered new ideas about re-packaging services.

The entrepreneurs have pointed out the added value the Western European student team members offered in identifying gaps in introducing their products to international clients. Information for creating new international business contacts has been most often identified as the most valuable contribution of the student teams.

Open innovation approach [14] is crucial for preparing entrepreneurs to co-operation with international student teams. Entrepreneurs that managed to facilitate creativity of team members and received innovative ideas from student teams disclosed to students essential information about their own strategic priorities. They encouraged students to challenge their existing business models. Some entrepreneurs have however been reluctant to disclose enough information about their business development. They are worried of being open about information that they consider business secrets. Such entrepreneurs can be found both among experienced and new entrepreneurs. Experienced entrepreneurs sometimes tend to have quite extended interpretations of business secrets and try to use international student team members in some narrow field for collecting contact data of potential clients. Such task that does not help students to understand and if needed to challenge the “big picture” of cross-border business efforts, does not utilize diversity, creativity and synergy of the international team. Some young start-up entrepreneurs have ambition to become global innovators but they are not open to constructive criticism by outsiders. Such entrepreneurs, for instance in web-based and mobile businesses, could however benefit from outsider views in order to understand better how unique their web application really is and how interested potential users in different cultures and regions would be to download and use it.

The tool developed for assessing imitative, individually innovative and co-creative entrepreneurial orientations [15] has been used in the learning process in order to prepare teams for communication with entrepreneurs that follow one of these orientations. This tool includes 15 choices between statements that reflect introducing business ideas developed and tested by others, creating innovative business solutions that qualify as individual intellectual property and co-creating new business concept by applying teamwork and open innovation methods. Co-creative orientation that is focused on knowledge sharing for

business model development is the most suitable framework for co-operation between international student teams and entrepreneurs. Such orientation can lead to developing and implementing additional innovative business ideas that involve some team members to further joint entrepreneurial activities.

6. Contribution of Universities to Regional and Inter-Regional Innovative Entrepreneurship

A systematic approach to developing partnerships between Erasmus exchange students and SMEs interested in international business information gatekeepers assumes the creation of a knowledge base that will help to match the international business information search requests of enterprises and the profiles of interested students. Estonian Business School has started this work in co-operation with its student self-government.

A new export management module, 30 European credit transfer system points (ECTS), has been launched in February 2013 in co-operation between the Tallinn University of Technology,
the Estonian Business School and the University of Tartu. In the export management module context the project work for screening cross-border business opportunities of innovative Estonian SMEs is an alternative elective to internship in larger established exporting companies. Master's students that choose to work with innovative start-ups have to be ready to contribute to commercializing product, to process or business model innovations at international markets. They need skills for assessing the export readiness of a new venture and for understanding the business potential of the innovation but also knowledge gaps of innovative entrepreneurs in the export development field. International teamwork during the course *International business opportunities in the Baltic Region* supports their project work for innovative SMEs and enables cross-cultural teamwork training. This experience can be used in further export activities, where participants of the export management module can use the network of foreign students based on the contacts that they developed during the course inside their project team and with other teams.

The added value of this component of the Export management module will depend on information exchange between the Estonian Business School, the Tallinn Technical University and the Tartu University in order to find the best match between pre-knowledge of master's students participating in the export management module, Erasmus exchange and other foreign students choosing this course and SMEs that are interested in services of international student teams.

It order to broaden cross-regional scope of creating new contacts and export opportunities for entrepreneurs, an important task is to involve more exchange students from countries that are in the process of accession to the European Union and intensifying business contacts with EU countries, including Balkan countries and Turkey. Research on motivations and success factors of entrepreneurs in Turkey has given evidence that social skills and reputation are considered important by Turkish entrepreneurs [16]. More efficient involvement of students from potential export markets in regions far from the Baltic Sea assumes co-operation with academic institutions in these regions in order to prepare exchange students to the "gatekeeper" role before their arrival to Estonia. Students could collect information about domestic enterprises interested in business contacts in Baltic and/or Nordic regions before they leave their country and start their exchange student semester.

Universities can contribute more to the national innovation system and facilitate innovative entrepreneurship in their region if they develop and apply their inter-regional academic contacts in more systematic ways for enhancing the role of inter-regional student and faculty mobility in creating and expanding business networks. Universities can themselves act in the role of "gatekeepers" for such business information sharing that will support more innovative entrepreneurship co-operation than traditional channels for establishing business contacts.

7. Conclusions

Applying international student exchange for screening cross-border business has demonstrated the value of international student teams especially for enterprises that have innovative products and services and intention to screen different foreign markets and possibly start exporting to several countries.

The main barrier to applying the creative synergy of the cross-cultural team in proposals that can be implemented in a SME is not limited analytical skills, but the lack of the real time cross-cultural communication competence and social skills within the student teams. Students should be encouraged to study cross-cultural differences within their team and also between the business culture in their home country and the business culture of the SME they are trying to assist.

Estonian SME representatives pointed out to the student teams the need to plan meetings in advance, but they themselves often did not attend agreed appointments as their attention and time was driven by new business opportunities. A relatively high degree of centralization inside Estonian SMEs was reflected in situations, where the entrepreneur was travelling abroad and the project team had extreme difficulties to obtain project-related information from any of the subordinates of the entrepreneur.

Co-operation between universities and entrepreneurs assumes leaving the academic ivory towers and overcoming time allocation and information hoarding obstacles in order to involve academics in communities of practice [17]. Intensive cooperation between academic institutions and entrepreneurs can be developed in action learning, where all stakeholders have to understand knowledge gaps and intentions of other participants**.**

References

1 Bell J, Callaghan I, Demick D, Sharf F. Internationalizing entrepreneurship education. Journal of International Entrepreneurship. 2004; 2 (1-2): 109-124.
2 Mort G S, Weerawardena J. Networking capability and international entrepreneurship: How networks function in Australian born global firms. International Marketing Review. 2006; 23(5): 549-572.
3 Breschi S, Malerba F, eds. Clusters, networks, and innovation. Oxford: Oxford University Press; 2005.
4 Henry C, Hill F, Leitch C. Entrepreneurship education and training: can entrepreneurship be taught? Part I. Education & Training. 2005; 47(2/3): 158-169.
5 Chiaroni D, Chiesa V, Frattini F. The open innovation journey: How firms dynamically implement the emerging innovation management paradigm. Technovation. 2011; 31(1): 34-43.
6 Rasmussen E, Sørheim R. Action-based entrepreneurship education. Technovation. 2006; 26 (2): 185-194.

7 Sijde P, Ridder A. Students exploring and experiencing innovation in an entrepreneurship programme. International Journal of Continuing Education and Life Long Learning. 2006; 16(5): 280-291.
8 Revans R. Action Learning. London: Blond & Briggs; 1980.
9 Elenurm T. Applying cross-cultural student teams for supporting international networking of Estonian enterprises. Baltic Journal of Management. 2008; 3(2): 145-158.
10 Day N, Glick B. Teaching diversity: a study of organizational needs and diversity curriculum in higher education. Journal of Management Education. 2000; 24(3): 338-352.
11 Humes M, Reilly A. Managing intercultural teams: the Eorganization exercise. Journal of Management Education. 2008; 32(1): 118-137.
12 Caspersz D, Skene J, Wu M. Principles and guidelines in managing student teams. In Proceedings of the 14th Annual Teaching Forum, 3-4 February 2005. Perth: Murdoch University http://www.lsn.curtin.edu.au/tlf/tlf2005/refereed/caspersz.html 2013 February
13 Wang R. Chinese Culture and Its Potential Influence on Entrepreneurship. 2012; 5(10): 76-90.
14 Chesbrough H, West J, Vanhaverbeke W. Open innovation: researching a new paradigm. Oxford: Oxford University Press; 2006.
15 Elenurm T. Entrepreneurial orientations of business students and entrepreneurs. Baltic Journal of Management. 2012; 7(2): 217 - 231.
16. Benzing C, Chu H M. Entrepreneurs in Turkey: A Factor Analysis of Motivations, Success Factors, and Problems. Journal of Small Business Management. 2009; 47(1): 58-91.
17 Buckley S, Du Toit A. Academics leave your ivory tower: form communities of practice. Educational Studies. 2010; 36(5): 493-503.

IMPACT OF HUMAN, STRUCTURAL AND RELATIONAL CAPITAL ON EDUCATIONAL NEEDS OF SMES IN CROATIA

Jadranka Švarc[1], Jasminka Lažnjak[2], Marina Dabić[3]

[1]Institute Ivo Pilar, Marulićev trg 19, 10000 Zagreb, Croatia, jadranka.svarc@pilar.hr

[2]University in Zagreb, Department of Sociology, I. Lučića 3, 10000 Zagreb, Croatia, jlaznjak@ffzg.hr

[3] Faculty of Economics and Business,Trg J. F. Kennedyja 6, 1000 0 Zagreb, Croatia, mdabic@efzg.hr

Abstract

Competitiveness of companies in knowledge economy is determined by their intangible assets dominated by intellectual capital and their propensity towards education and training. The purpose of research is to analyse the relationship between the three components of intellectual capital (human, structural and relational) and educational needs using the example of Croatia. The relationships with other companies' characteristics such as business performance, size, type of industry, etc. are also analysed.

The analysis revealed that companies with higher level of intellectual capital are more aware of the benefits and of the need for entrepreneurial education, show better business performance while employees' satisfaction, motivation, risk taking and innovativeness is higher.

In order to find out which types and modes of entrepreneurial education companies need, we have examined their preferences towards five aspects of education and training. They revealed that the most needed knowledge is about financial aspects of business and "soft" skills like leadership and management principles. Entrepreneurs prefer problem solving lectures to standard lectures and need consultations related to taxes and legal issues. They feel a need to cooperate with other entrepreneurs and need consultancy how to deal with investors and local community.

Keywords

Education needs, Entrepreneurship Education, Intellectual capital, Non-educational needs, SMEs

1. Introduction

Competitiveness of companies in knowledge economy is determined by their intangible assets dominated by intellectual capital and their propensity towards education and training. The expert knowledge and competencies of the employees (human capital), the internal organization of company (structural capital) and its customer service (relational capital) are decisive factors of company performance and success [1], [2]. Inevitable orientation of today's enterprises on intellectual capital as the key of competitiveness, promote education and training of employees at the centre of the firm's development strategies [3], [4].

Entrepreneurship education and training is an essential precondition for s small and midsized firm's development and very probably closely related to the company's level of intellectual

capital [5]. However, the relationship between intellectual capital and education is insufficient explored and rather poorly represented in the literature, especially in countries which are newcomers in market economy like Croatia. Although Croatia has a tradition in studying intellectual capital [6], especially in method of measuring the intellectual capital which is internationally applied [7], the empirical studies of relationship between intellectual capital of companies and their educational needs are not performed. Trying to fill this gap in the empirical research, we conducted the study whose primary objective was to analyse the educational needs of SMES and their relationship with the companies' intellectual capital in Croatia. The relationships with other companies' characteristics such as business performance, size, type of industry, etc. are also analysed.

The paper is structured in five main sections. After the introduction, the second section provides the conceptual model of research and hypotheses. The third part describes research methodology and sample, while the fourth section discusses the results of research (scales of intellectual capital, testing the hypotheses). The fifth part describes the educational needs and the final sixth section brings the main findings and conclusions.

2. Conceptual model and hypotheses

The purpose of research is to analyse the influence of three components of intellectual capital (human, structural and relational capital) on educational/training needs of SMEs for company's development using the example of SMEs in Croatia. We have tested if the level of intellectual capital is related to the current stand of the company, performance, size and type of industry. The analysis includes also the examination of preferences in types of educational and non-educational needs (Figure 1).

Our basic proposition, therefore, was: the higher the level of intellectual capital (all three components) the greater is the need of enterprise for education and training and the better is the company's performance and current stand.

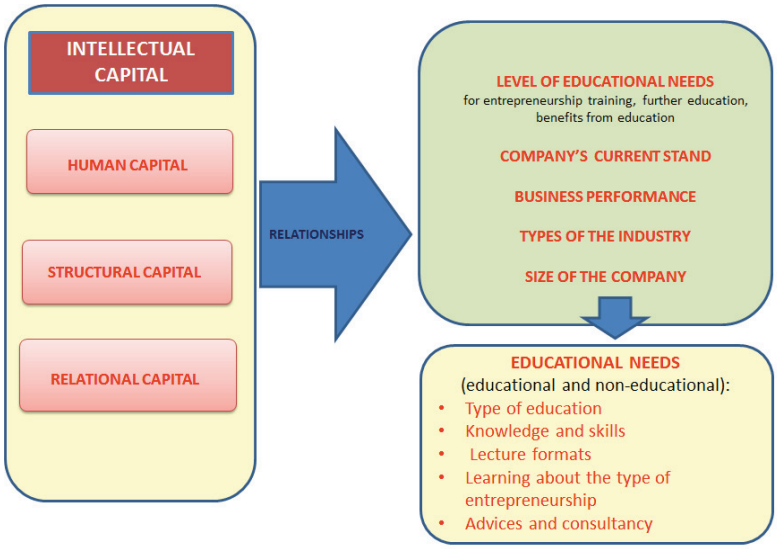


Figure 1 Conceptual model of research

Following this basic presumption, the following hypotheses were formulated:

H1: Intellectual capital (all three components) is positively related with the level of educational needs: the higher the level of intellectual capital the perception of the need of enterprise for education and training is greater

H2: Intellectual capital is positively related with the firm's performance: the higher the level of intellectual capital the higher the firms' performance;

H3: Intellectual capital (all three components) is positively related with the current stand of companies regarding employees' satisfaction, motivation, risk taking and innovativeness: the higher the level of intellectual capital the current stand of companies is better;

H4: There is difference in the level of intellectual capital among different types of industry;

H5: The level of intellectual capital differs significantly with the size of company (number of employees).

3. Methodology

The components of intellectual capital (human, structural and relational) are considered as multidimensional concepts. In order to measure the dimension of intellectual capital the three scales have been constructed one for each dimension. Scales are constructed as a series of items in a form of a Likert-type attitude scale of 1-7 (from strongly disagree, to strongly agree).
Human capital scale consists of 20 items that comprise the following dimensions: motivation, satisfaction, employees' knowledge, skills and creativity, employees' social skills. The scale of structural capital includes 28 items with the following dimension: organizational structure, organizational learning, organizational culture and strategic culture. Relational capital scale consists of 22 items that cover the following dimensions: relations with customers and suppliers, relations with competitors and allies, relations with society, environmental protection, media and corporate reputation, relations with public sector, relations with investors and other stakeholder.

The level of educational needs of the companies is measured by the three indicators: /1/ needs for entrepreneurship training; /2/ need for adequate further education and /3/ estimated benefits from education and training.
The current stand of companies include four components related to employees: /1/ satisfaction with work, working conditions and climate, /2/ risk taking, /3/ innovativeness and /4/ financial vs. non-financial motivation.
Company's performance is caught through the three characteristics of the company: /1/ company is a fast growing company ("gazelle"); /2/ company has stable turnover; /3/ sales are constantly growing.
Besides, we have analysed the relationship between intellectual capital and /1/ types of the industry and /2/ size of the company

3.1 Data collection and sample

The research is based on on-line survey structured in four main parts. The central part of the questionnaire relates to the identification of three types of capital – human, structural and

relational capital. The second part relates to identification of the educational needs that includes 5 aspects: type of education, needed knowledge and skills, learning formats, learning about the types of entrepreneurship, need for information and advisory services. The third part relates to the characteristics of the companies such as: employees' satisfaction, risk taking, innovativeness, company size, etc. The fourth part relates to socio-demographic characteristics of the respondents including industrial sectors. There are additional questions about the open innovation, usual type of education and learning practices, etc.

The survey was constructed and data were collected within the Tempus Joint Project 144713 "Fostering Entrepreneurship in Higher Education (FoSentHE[1]). The questionnaire was addressed to the owner and managers of the companies and data were collected by on-line survey in the period July 15 and September 30, 2011. The non-probability purposive sample of 253 companies limits the interpretation of results because it is not representative for SMEs and industrial categories from Croatia. That is the main limitation of the study. There is no proof of reliability of data due to the on-line data gathering. Therefore the results are only indicative, and do not provide a strong platform for generalisations.

Almost a half of the enterprises in the sample (47.5%) are micro companies which employ up to 8 employees. Another 30.8% company employ between 8 and 100 persons while only 21.7% are midsized companies with 100 and more employees. Majority of respondents, around 60% are younger managers under the age of 40 and the remaining 40% are over the age of 40 year. Sample consists of companies form all economic activities which are almost equally represented. The majority of firms are in Personal services (15.8%), followed by Transportation including community and utilities (13.8%), Wholesale trade and retail (13.0%), finance, Insurance and real estate (11.5%). Construction, Manufacturing and Business services participate with about 10% each. The least number of companies are coming from Healthcare, Education and Natural resources (inc. Agriculture, Mining and Forestry).

4. Analysis and results

4.1 Scales of the intellectual capital

In order to study the intellectual capital we have, firstly, constructed the scales of human capital based on the questionnaire and tested their reliability. Cronbach's Alpha revealed high reliability for all three scales of human, structural and relational capital. The value of Cronbach's Alpha ranges from 0.951 for structural capital and 0. 934 for human capital to 0.903 for relational capital.

The quite low mean values for each type of capital (human, structural, relational) revealed that the level of all three types of capital is estimated as relatively low (from 4.92 to 5.06 on a scale of 1 to 7) (Table 1) with small difference between the three components of the intellectual capital, especially between structural and relational capital (ranging from 4.92 to 5.06). Despite the small differences it could be stated that the respondents estimated the

[1] The project was coordinated by Prof Marian Dabić, Faculty of Economics and Business, University of Zagreb, Croatia, in the period 2009-2012.

human capital as the most developed, followed by relational capital while the structural capital is least developed.

Table 1 Intellectual capital values

	N	Minimum	Maximum	Mean	Std. Deviation
Human capital index	253	1,50	7,00	5,0684	,93616
Structural capital index	253	1,44	7,00	4,9218	1,02269
Relational capital index	253	1,17	7,00	4,9533	,98112

The relatively low levels of intellectual capital are probably conditioned by the company's size included in the sample. As showed in the previous chapter, almost a half of the enterprises (47.5%) are micro companies and employ up to 8 employees. Such small companies rely primarily on the skills and experience of the owner or chief manager (human capital) while the internal company's relationships, working procedures and other elements that build structural capital are not highly relevant for such a small companies. The more detailed analyses of the company's size and intellectual capital (see Chapter 4.6) current characteristics) shows that structural and relational capital are significantly lower in micro enterprises (up to 8 employees). Both the capitals are rising rapidly with the number of employees but the structural capital is the highest in the firm with 8 to 19 employees while the relational capital is raising at same level regardless of the employment growth.

4.2 Intellectual capital and the level of educational needs (Hypothesis 1)

The level of educational needs of the companies is measured by the perception of the three aspects of education (Table 2). Since the values of responses for all three aspects of educational need are relatively low and do not exceed 5.3 on a scale of 1 to 7 we can conclude that need for education is not very pronounced and recognized by respondents.

Table 2 Level of educational needs: values of components' means

Level of educational needs	Mean
The needs for entrepreneurship training (V92)	4.55
The need for adequate further education (V9)	5.21
Benefits from education and training. (V 93)	4.53

Note: The needs for education were measured by the Likert scale ranging from 1 to 7

One way ANOVA was used to test the differences between three types of intellectual capital (IC) and level of educational needs in companies. Although there was a significant difference among companies in all three types of IC: F_{hc} (6, 246) = 2.983, p= .008; F_{sc} (6, 246) = 4.779, p= .000; F_{sc} (6, 246) = 5.562, p= .000; post hoc Tukey comparisons of the three types of IC indicate that there is significant difference in the level of structural and educational capital and needs for education. However, comparison between human capital and educational needs was not statistically significant at p< .05.

When we used ANOVA to test the expressed need for adequate further education for employees there was a significant difference among companies in all three types of IC: F_{hc} (6, 246) =19.438, p= .000; F_{sc} (6, 246) = 17.130, p= .000; F_{sc} (6, 246) = 14.114, p= .000; Tukey post hoc comparisons of the three types of IC indicate that there is significant difference in the level of all three types of IC need for adequate further education for employees.

Also, ANOVA in the test of the differences between three types of intellectual capital (IC) and the benefits from education and training shows that there is a significant difference among companies in all three types of IC: F_{hc} (6, 246) = 3.486, p= .003; F_{sc} (6, 246) = 4.890, p= .000; F_{sc} (6, 246) =5.941, p= .000; Tukey post hoc comparisons of the three types of IC indicate that there is significant difference in the level of all three types of IC and benefits from education and training only in the groups with extremely negative and extremely positive attitude toward benefits from education and training.

Although the need for education is relatively low, the analysis of variance (ANOVA) reveals that structural and relational capital are positively associated with all three variables of the level of educational needs, as given above (Table 2). It means that the higher the level of all three dimensions of intellectual capital the greater is the need for education included in this analysis. It clearly shows that the values of attitudes about the need for entrepreneurship education and the benefits from it grow together with the growth of intellectual capital. Since the analysis of variance indicated the positive relationship between intellectual capital and the level of educational needs measured by the aforementioned variables we can conclude that the first hypothesis is confirmed.

4.3 Intellectual capital and company's performance (Hypotheses 2)

Company's performance is caught through the perception of the three aspects of business performance: company is a fast growing company ("gazelle"), company has stable turnover and company has constantly growing sales.
One way ANOVA was used to test the differences between three types of intellectual capital (IC) and fast growing company (gazelle) There were significant differences among companies in all three types of IC: F_{hc} (6, 246) =8.497, p= .000 ; F_{sc} (6,246) =14.165, p= .000; F_{rc}(6,246)= 13.272, p=.000.
Also, One way ANOVA showed that there were significant differences among companies in all three types of IC and sales growth. F_{hc} (6, 246) =15.248, p= .000 ; F_{sc} (6,246) =23.218, p= .000; F_{rc}(6,246)= 22.388, p=.000.
When we repeated ANOVA to test the difference between three types of IC and stable turnover the analysis also showed significant differences among companies. F_{hc} (6, 246) =18.554, p= .000 ; F_{sc} (6,246) =21.299, p= .000; F_{rc}(6,246)=21.594, p=.000.
Tukey post-hoc test comparisons indicate that the companies with constant fast growth, the highest sales growth and stable turnover have significantly higher level of three types of IC.

The analysis of variance revealed that intellectual capital (all three components) is positively related to the selected aspect of companies' business performance. Fast growing companies, companies with stable turnover and growing sales have a higher level of all three types of intellectual capital. We can conclude that companies with higher intellectual capital have better business performance. Therefore, our Hypothesis 2 is confirmed.
In general, companies that recognize the importance of intellectual capital for sustainable and successful growth also show better results in the business performance.

4.4 Intellectual capital and the current stand of company (Hypothesis 3)

In order to explore the relationship of the current stand of the company and intellectual capital four indicators were identified:

- satisfaction of employees measured by satisfaction with the work they do, working condition and working climate ;
- employees' risk taking measured by developing/utilizing new products within standard circumstances as well as in situation with the scarce resources;
- employees' innovativeness measured by number of patents and constantly developing new products;
- motivation measured by financial and non-financial measures to motivate employees.

One- way ANOVA was used to test the differences between three types of intellectual capital (IC) and different aspects of the current position of the company. The level of all three types of IC differs significantly for developing new products, across all three variables of working climate and two variables of risk taking. The significant difference between IC and non-financial motivation after Turkey post hoc comparisons indicates that significant difference is only in the case of human capital.

In other words, the higher the level of intellectual capital the higher is the satisfaction of employees with the work they do, working condition and working climate. The level of capital also positively influence employees' risk taking in developing and utilizing new products within standard circumstances as well as in situation with the scarce resources. Employees invest more efforts to develop new products when the level of intellectual capital is high. Finally, in the companies with the higher the level of intellectual capital, the non-financial measures to motivate employees are important. Financial motivation measures turned out not to vary significantly regarding different levels of IC.

We can generally conclude that higher levels of intellectual capital have the positive influence on employee's satisfaction with work and working climate their innovativeness, motivation and risk-taking. By this we consider that Hypotheses 3 is confirmed.

4.5 Intellectual capital and the types of industry (Hypothesis 4)

All the companies that answered the questionnaire were classified into the 9 types of industry (Table 3). The analysis of variance (ANOVA) revealed that there is no significant difference among the different types of industries and the three types of intellectual capital. It means that the level of intellectual capital (all three components) is equal regardless the sector of economic activity. Somewhat higher values of structural and human capital are in the business services, while relational capital is highest in trade, as might be expected. However, there is no statistical difference which would point to the differences between the industries and the level of intellectual capital. Based on the results of the analysis the hypothesis 4 is rejected.

Table 3 Companies by types of industries

Industry	Frequency	Percent	Cumulative Percent
Natural resources (incl .Agric., Minig, Forestry)	16	6,3	6,3
Construction	27	10,7	17,0
Manufacturing	26	10,3	27,3
Transportation, Communication, Utilities	35	13,8	41,1
Wholesale Trade and Retail	33	13,0	54,2
Finance, Insurance, Real estate	29	11,5	65,6
Personal services	40	15,8	81,4
Business services	27	10,7	92,1
Healthcare and Education	20	7,9	100,0
Total	253	100,0	

4.6 Intellectual capital and the size of the company (Hypothesis 5)

Again one-way ANOVA was used to test the significant difference in the level of IC among companies divided in six groups by size. The companies differ significantly in the level of structural and relational capital across the groups by the number of employees : F_{sc} (5, 247) = 3.144, p = .009; F_{rc} (5, 247) = 3.255, p = .008.
The analysis indicated statistically significant difference in the level of capital and the given size of the company in the structural and relational capital while the level of human capital is not associated with the size of the company. The value of the structural and relational capital is significantly lower in the micro companies (up to 8 employees) and is growing with the number of employees. Both the capitals rapidly grow in the companies with more than 8 employees. This further growth has the same level for relational capital regardless the employment growth while structural capital is the highest in the companies with 8-19 employees. It slightly declines with the further size of company. We concluded that Hypothesis 5 is partly confirmed.

5. Which aspects of education are needed

Since the analysis of variance (ANOVA) confirms that all three types of capital are positively associated with the needs for education (Hypotheses 1) we sought to verify the relationship between the intellectual capital and certain aspects of the needs for education. In order to find out which types and modes of entrepreneurial education companies need in Croatia, we have examined their attitudes and preferences towards the five aspects of education and training:

1. type of education such as university degree education, non-degree education, learning on the site of enterprise, distance learning, etc;
2. needed knowledge and skills such as management principles, leadership, marketing, etc;
3. learning formats such as traditional learning, distance learning, problem-based learning, etc.

4. learning about the types of entrepreneurship (rural, women, social, ethnic, network marketing etc;
5. need for information and advisory services such as how to get in contact with business angels, how to deal with intellectual property rights, investors, taxes, local community, universities, etc.

These five aspects consist in total of 51 statements which describe the various educational needs and were measured by the Likert scale. It should be stated that the need for all aspects of education are estimated rather low since the values of all the statements on the Likert scale 1-7 range in the most cases between 4 and 5. The lower values of 4 are recorded only for “distance learning” and some specialist types of entrepreneurial education (like rural or ethnic entrepreneurship) pointing that these aspects of education are in fact unnecessary.

The analysis revealed that preferred type of education is the education on the site of enterprise followed by the degree programmes (bachelors, masters, etc.) in entrepreneurship, while the least preferred is distance learning and partnership with universities.

The knowledge and skills which are perceived as the most needed to develop the enterprises are related to knowledge about financial aspects of business, building and sustaining a successful enterprise, leadership, creativity and innovation, entrepreneurial marketing and business management principles. The least needed knowledge is related to starting a new business and introduction to entrepreneurship. It can be concluded that entrepreneurs in the sample possess the knowledge and skills needed to start-up and maintain a new business, but they are lacking more complex and "soft" knowledge about marketing, leadership, management principles, creativity and innovation that are needed to sustain the successful company in a long run.
The most preferred type of lecturing formats is the problem-based teaching format followed by workshops and group discussion format, while the least preferred are the distance learning and standard lecture format. It very probably means that entrepreneurs are saturated with both the university-type of ex-cathedra lectures and introductory lessons to entrepreneurship.
The most needed knowledge regarding the specialised type of entrepreneurship is about “network marketing” followed by “technology and entrepreneurship” and “strategic collaboration among entrepreneurs”. The least important is knowledge in entrepreneurship in ethnic, arts, agriculture, women entrepreneurship and family business.
Finally, the most important consultancy and advisors services are related to how to deal with taxes and legal issues, how to cooperate with other entrepreneurs and how to set a strategy for the enterprise. It is worth mentioning that respondents also need consultancy how to deal with investors and local community. The least important information is needed for getting in contact with universities and business angles.

To sum up: entrepreneurs wish education that could be delivered, if possible, on the sight of enterprises but also appreciate university degrees programmes that will enable them to build and sustain successful businesses while knowledge about how to start the business and maintain a new company is needles. The most needed knowledge is about financial aspects of business and “soft” skills like leadership, creativity, innovation, entrepreneurial marketing and business management principles. They prefer problem solving lectures to standard lectures and need consultations related to taxes and legal issues. They feel a need to cooperate with other entrepreneurs and need consultancy how to deal with investors and local community.

6. Conclusions

The analysis of the relationship between intellectual capital and educational needs of SME's in Croatia indicates that the respondents in our survey are aware of the importance of both, entrepreneurial education and all three types of intellectual capital for the firms' competitiveness and development. In our research we have tried to investigate how these two concepts are related to each other and to other elements of the enterprises. Five hypotheses were tested and three of them are completely confirmed: intellectual capital (all three components) is positively related with the perception of the level of educational needs (H1), firm's performance (H2), and current stand of the companies (H3).
We can conclude that companies with higher level of intellectual capital are more aware of the benefits of education and of the need for entrepreneurial education. They show, also, better business performance while employees' satisfaction, (non-financial) motivation, risk taking and innovativeness is higher. The hypothesis 5 (H5) is partly confirmed since the level of relational and structural capital differs with the size of company while the human capital is not related to the company's size. Finally, the hypothesis 4 (H4) is rejected since there is no difference in the level of intellectual capital among different types of industry.

Despite the fact that the level of intellectual capital of the companies in the sample is relatively low as well as their need for education (means do not exceed the value of 6) there is a high consistency in the positive relationship between three components of IC and demand for entrepreneurial education. In order to find out which types and modes of entrepreneurial education companies in Croatia need, we have examined their attitudes and preferences towards the five aspects of education and training. The analysis showed that entrepreneurs prefer education on the sight of enterprises but also appreciate university degrees programmes that will enable them to build and sustain successful businesses. The knowledge about how to start the business and maintain a new company is needles. The most needed knowledge is about financial aspects of business and "soft" skills like leadership, creativity, innovation, entrepreneurial marketing and business management principles. Entrepreneurs prefer problem solving lectures to standard lectures and need consultations related to taxes and legal issues. They feel a need to cooperate with other entrepreneurs and need consultancy how to deal with investors and local community.

References

[1]. Santos-Rodrigues, H, Figueroa-Dorrego, P, Fernandez-Jardon, C M. The main intellectual capital components that are relevant to the product, process and management firm innovativeness, International Journal of Transitions and Innovation Systems, 2011, Vol.1, No.3, pp.271 – 301
[2]. Edvinsson, L, Malone, M S. Intellectual Capital. Harper Collins Publishers Inc., 1997. New York.
[3]. Cooper, A, Gimeno-Gascon, F,Woo, C. Initial human and financial capital as predictors of new venture performance. Journal of Business Venturing,1994, 9(5): 371-396
[4]. Dabić, M, González-Loureiro, M, Podrug, N. Evolving theory of entrepreneurship: the entrepreneur's intangible approach, Working Paper Series in Entrepreneurship, No. 2 July 2012, Florida International University
[5]. Pena, I. Intellectual capital and business start-up success, Journal of Intellectual capital, 2002, 3 (2), 180-198
[6]. Kolaković, M. Theory of intellectual capital, Ekonomski pregled, 2003, 4 (11-12) 925-944 (in Croatian)
[7] Pulić, A. Measuring the Performance of Intellectual Potential in Knowledge Economy,1998, accessed at: www.vaic-on.net in June 2010.

THE CAUSAL RELATIONSHIP BETWEEN ENTREPRENEURSHIP AND UNEMPLOYMENT IN NIGERIA

Abubakar S. Garba,

Department of Business Admin and Management, School of Management Studies,
Kano State Polytechnic, Nigeria, abubakarsg@yahoo.com

Abstract
The aim of this paper is to examine the causal relationship between entrepreneurship and unemployment. The paper uses vector autoregression (VAR) model to analyse the dynamic relationship between the variables. Granger causality test was conducted as a standard first difference VAR model. The properties of the variables were examined using unit root test. There is no evidence of long run equilibrium relationship between entrepreneurship and unemployment but it is found that unemployment Granger caused entrepreneurship. The proliferations of mass unemployed into entrepreneurship couple with the unfavourable business climate create high competition and difficulties for the existing and newly entrant unemployed to sustain their business. Therefore, there is frequent entry and exit from entrepreneurship by the unemployed persons. The government is expected to play a key role in providing the necessary infrastructural facilities and streamline its policies towards entrepreneurial development. Giving the high unemployment in the country the paper provides useful information to policy makers in formulating entrepreneurial policy aims at tackling the problem of unemployment in Nigeria.

Keywords
Causality, Entrepreneurship, Refugee/shopkeepers effect, Schumpeterian effect, Unemployment,

1. Introduction

Entrepreneurship has gained prominence not only in the developed economies but also in the developing countries that are confronted with diverse socio economic challenges. Entrepreneurship is proves to be efficacious in reducing poverty and unemployment in a countries that were able to develop well articulated policies for entrepreneurial and private sector development. In many instances the action of government and the structure of the reward system play an important role in determining the rate of entrepreneurs and quality of their outputs.

There has been a growing concern by the governments of many countries to address the problem of unemployment through business start up. Recently, the president of Nigeria at the 53rd annual conference organised by the Nigeria Economic Society (NSE) had stressed the need to come up with practical solution that could strengthen government's drive to

overcome poverty and unemployment. He also hoped that unemployment ratio would be drastically reduced by 2015. It became apparent that the government alone cannot address the perennial problem of unemployment in the country. Unemployed persons are particularly encouraged to engage in entrepreneurship as means for self sustenance and improving the quality of their lives. There are two strands of arguments with respect to the causal relationship between entrepreneurship and unemployment. On the one hand it is believe that entrepreneurship will reduce unemployment in the country. On the other hand unemployment could motivate people to become self employed by starting their own business.

This dynamic relationship between entrepreneurship and unemployment is still unclear. But many studies confirmed the duality of causal relation between these two variables. It is observed in Nigeria that the rate of both business start up and unemployment are increasing. The question is whether the increasing rate of business start up is caused by the increasing rate of the human population or rather is attributed to the high rate of unemployment. It may be interesting also to find whether dual causal relationship will still hold in the Nigerian context. Therefore, the aim of this paper is to examine the causality between entrepreneurship and unemployment.

2. Entrepreneurship and Unemployment

The refugee/shopkeepers and Schumpeterian effect hypothesis provide the basic understanding of the relationship between entrepreneurship and unemployment (Audretsch, Carree and Thurik, 2001). In a situation where unemployment forces people to engage in entrepreneurship is termed as refugee/shopkeepers effect while where entrepreneurship brings about reduction in unemployment is termed as Schumpeterian effect. There is increasing number of studies on the relationship between unemployment and entrepreneurship. Most of the studies use cross sectional or longitudinal data at micro level and time series data at macro level (Meager, 1992).

The entry into entrepreneurship by unemployed people has drawn the attention of many researchers and policy makers (Audtretsch, Carree, van Stel and Thurik, 2005). The propensity to start a business because of unemployment is important in a public policy (Audretsch and Jin, 1994). Many governments in both developed and developing countries are supporting unemployed people to start up business. Evan and Leighton (1990) in the US examined the formation of small business by both unemployed and employed workers. There is a frequent entry and exit among unemployed into self employment because they started business for various reasons and goals. Some of the unemployed consider entrepreneurship as a temporary arrangement to earn for a living and other see it as a permanent engagement to sustain and prosper their lives. Evans and Leighton (1990) in US discovered that entry into self employment is higher for unemployed than for those who are working.

The relationship between entrepreneurship and unemployment is not clear but empirical studies reveal the two causal relationship. One strand of the studies confirmed that unemployment stimulates entrepreneurial activity while the other body of literature confirms that high entrepreneurial activity influences reduction of unemployment (Audretsch and Thurik, 1998, Audretsch et al 2005 and Thurik, Carree, Stel and Audtretsch, 2008). Unemployment is positively related to greater propensity for a new firm start up in 23 OECD countries (Audretsch et al, 2001). Other studies found positive influence of unemployment on entrepreneurship (Reynolds, Storey and Westhead, 1994; Storey, 1991; Evans and Leighton, 1989 and Highfield and Smiley, 1987. The results confirm the present of refugee or shop keepers' effect that unemployment stimulates entrepreneurship. In contrast Garofi (1994) in UK, Audretsch and Fritsch (1994) in Germany and Audretsch et al (2001) in 23 OECD countries indicate that unemployment is negatively related to new firm start up. Audretsch and Thurik (2000) believe that new business could possibly generate employment thereby cutting down the rate of unemployment. Carree (2002) in US found that there is no significant relationship between the two variables.

Ritsila and Tervo (2002) believe that there is no clear cut relation between unemployment and entrepreneurship. Hamilton (1989) and Faria, Cuestas and Mourelle (2010) suggest that the relationship between entrepreneurship and unemployment can be bidirectional and non linear. At low level of unemployment any increase in unemployment will lead to a new business formation. But once unemployment reaches critical level, any further increase in unemployment will lead to decrease in new business formation. Unemployment will no longer induce people to become entrepreneurs. There will be a few business opportunities left and many unemployed who had tried to be self employed will reveal their bitter experience of business failure because of high competition in the environment. Hamilton (1989) attempted to provide reconciliatory explanation on the relationship between entrepreneurship and unemployment for time series and cross section studies. Government can support unemployed through some policies to stimulate business formation so that the difference between time series and cross sectional analysis can be bridged.

The same argument permeates among researchers and policy makers and had received attention not only in the developing economies but also in developed countries. For instance European countries that are confronted with the problem of high unemployment reacted positively toward entrepreneurship development programs. Stel et al (2007) suggested that entrepreneurship can be considered as a remedy or solution to the problem of high unemployment and stagnation of economic growth. In fact it has become an ongoing debate among European and other OECD countries on how to resolve the problem of unemployment. The trade off between lower wages but less unemployment or higher wages but more unemployment has been an issue in a policy analysis (Thurik, 2003). But this kind of trade off is seen as an illusion to some people (Audretsch and Thurik, 2000). Individual decision either become self employed, employee or remain unemployed is dependent on the relative price in the market (Knight, 1971). People are motivated to start up business when they perceive an opportunity that yields satisfactory level of benefits. Unemployed person may prefer to start up business that gives lower return than being unemployed.

The theory of occupational choice suggest that high rate of unemployment will stimulate start up activity in order to earn income for a living. Unemployed people have lower endowment of human capital and entrepreneurial talent to sustain their new business start up and may exit too soon from the business arena (Stel et al, 2007 and Audretsch et al, 2001). But this assumption could be wrong in the sense that some unemployed can have such outstanding qualities to excel when they choose to start a business. Some even believe that necessity is the mother of invention. The need for survival can promote their interest to sustain the business.

In another dimension entrepreneurial activity reduces unemployment and could have positive effect on economic performance. Stel et al (2007) and Audretsch et al (2001) have attempted to reconcile this ambiguous relationship using data from 23 OECD countries between 1974 to 1998. Phehn-Dujowich (2012) in US discovers that the unemployment Granger caused entrepreneurship. Storey (1991) provides an explanation which looks like a consensus on the relationship. All things being equal time series studies show that unemployment positively relate to entrepreneurship while cross sectional or pooled cross sectional studies reveal negative relationship. Attempt to resolve these differences have not been completely successful. Any general comment on this relationship has to be done with caution because it may be dangerous and has to be explained within a particular context.

3. Data and Methodology

Time series data were collected from official sources. The number of the registered unemployment was obtained from National Bureau of Statistics (NBS) and number of registered business from Corporate Affairs Commission (CAC) for the period 1980-2010. The paper uses two equation vector autoregression (VAR) model to examine the dynamic relationship between the variables. Following the non existence of cointegrating relation among the variables, Granger causality test was conducted as a standard first difference VAR model. The properties of the variables were examined using unit root test.

Econometric model

$$\ln ENT_t = \beta_0 + \beta_1 \ln UM_{t-1} + \lambda_2 \ln ENT_{t-1} + e_t \quad \text{----------(1)}$$

$$\ln UM_t = \beta_0 + \beta_1 \ln ENT_{t-1} + \lambda_2 \ln UM_{t-1} + e_t \quad \text{----------(2)}$$

Where lnENT is the logarithm of entrepreneurship, lnUM is the logarithm of unemployment and β, λ, are the estimated parameters.

4. Results and Discussion

The preliminary unit root tests for the individual variable is shown in table 1. The ADF and PP test results suggest the existence of a unit root in a level form for the two variables. The variables became stationary after first difference or integrated order I(1). The finding is

consistent with the literature which suggest that in most cases macroeconomic variables are I(1).

Table 1: Unit root Test

	ADF		PP	
Variable	Level	First diff	Level	First diff
lnENT	-2.136114 (0)	-5.560018(0)***	-1.838272(5)	-7.885586(16)***
lnUM	-0.363459(0)	-5.764612(0)***	-0.263667(6)	-5.959307(7)***

Note: lnENT and lnUM is the natural log of entrepreneurship and unemployment respectively. Asterisks (***) indicate level of significant at 1% level. The figures presented are the t statistic in constant without trend test and values in bracket are lag length.

Having the same order of integration allows testing the long run equilibrium relation between entrepreneurship and unemployment using Johansen cointegration test. But the outcome reveals that there is no cointegration vector in the model. If cointegration is found then it is necessary to conduct Granger causality test under the platform of vector error correction model (VECM) in order not give room for misspecification problem. In this case Granger causality test was conducted as a standard first difference VAR (2) model. The estimated output for the two models, one for each variable are presented in table 3 and 4 (see Appendix A). The result shows that the lagged variables estimating entrepreneurship are statistically significant. This finding indicates that entrepreneurship can be explained by its own past, current and past trend of unemployment in the country.

The Granger causality result shown in table 2 indicates that entrepreneurship does not Granger caused unemployment. But there is no evidence to accept the null hypothesis that unemployment does not Granger caused entrepreneurship. It is therefore concludes that unemployment does Granger caused entrepreneurship in Nigeria. The result confirms the presence of refugee's effect in the country and consistent with the findings of Phehn-Dujowich (2012) and Baptista and Preto (2007). This result is expected looking at the growing number of unemployed in the country. The search for employment position becomes highly competitive as obtaining a good degree is no longer guarantee to secure job immediately upon graduation. Semi skilled and unskilled persons also face the same challenges in the labour market. This category of people usually have low opportunity cost for paid employment compared with skilled and professionals. They may choose to be unemployed when they enormous desire to work for others in which they have neither freedom nor adequate pay to cater for their welfare. Venturing into entrepreneurship can be a good option for the unemployed but people prefer paid employment because of the guarantee of regular flow of income. To become an entrepreneur requires overcoming this fear of risking a regular flow of income.

Table 2: VAR Granger Causality/Block Exogeneity Wald Test

Null hypothesis	Chi-square	df	Probability	Decision
ENT does not Granger caused UM	1.258593	2	0.5330	Accept
UM does not Granger caused ENT	14.13880	2	0.0009	Reject

However, the decision to become an entrepreneur is contingent on some socio-economic factors. In a country where unemployment became high, the unemployed may not have the opportunity to trade off between paid employment and self employment. The only option

could be entering into entrepreneurship for self sustenance and perhaps for economic prosperity. The unpleasant and harsh business environment poses a lot threats to existing and prospective entrepreneurs. It is evident in Nigeria that unemployment is on the increase accompanied by the deteriorating business climate. The findings in this study that entrepreneurship does not Granger caused unemployment can be justified on the ground the business environment is not conducive which led to closure of many businesses that provide employment. The competition for the opportunity created in market became very intense because of the high number of new entrant into business arena. There will be a few business opportunities left and many unemployed who have tried to become self employed will communicate their bitter experiences of business failure because of high competition and lack of enabling environment (Hamilton, 1989).

The government contribute toward increasing the number of business start up by supporting the unemployed. Various government regimes in the past attempted to promote entrepreneurship in order to address the problem of unemployment and poverty through enactment policies and programs such as National Poverty Eradication Program (NAPEP), Poverty Alleviation Program (PAP), Family Economic Advancement Program (FEAP) and Family Support Program (FSP). The government also establishes National Directorate for Employment (NDE) in 1986 which charged with the responsibility of training and supporting unemployed to become self reliant by starting their own business. More recently the government introduces entrepreneurship courses in all tertiary institutions across the country which is aimed at providing necessary training and business skills to the students so that they can start their own business upon graduation. This is particularly designed to relieve the graduates from facing the problem of unavailable vacancies in the labour market. It is not clear whether this effort will be translated into converting unemployment or it will also fail like other preceding programmes.

Moreover, the causality running from unemployment to entrepreneurship is a clear indication of necessity based entrepreneurship in the country. The proliferation of necessity entrepreneurs could help in addressing the problem of unemployment to some extent. The unemployed who were able start up business may provide services or goods and earn income to sustain their lives. This will in turn reduce the rate of social vices and welfare expectation from the government. It is also argued that most of the necessity entrepreneurs are not high impact as such they cannot make significant contribution to the economic performance of the country. They usually started out of sheer necessity and may exit as soon as they face some difficulties or got a better pay job.

5. Conclusion and Implication of the paper

Entrepreneurship is very imperative in any attempt to deal with the problem of unemployment. The government plays a crucial and supportive role to unemployed to become entrepreneurs or self employed. The high population in Nigeria could only make positive impact when majority of economically active people are involve in productive entrepreneurial activity. The problems of poverty and unemployment could drastically undermine the government effort for development and continue to be a threat to country's

economic progress. This study found that unemployment Granger caused entrepreneurship which is also an indication of the presence of necessity entrepreneurship and a refugee's effect in Nigeria.

There is no evidence that entrepreneurship could reduce unemployment because the business environment is no longer conductive for new entrant entrepreneurs who were unemployed and those who are already operating their own business. They both find difficulties in sustaining the business for a longer period of time. The problem is largely as a result of dearth of infrastructural facilities occasioned with high competition for market share among old and new entrants. Although unemployment necessitates unemployed to start up business, the unfavourable business climate also make many entrepreneurs to close their business. That is why there is a frequent entry and exit into entrepreneurship among the unemployed.

Therefore the government is expected to play a key role in providing the necessary infrastructural facilities and streamline its policies in developing entrepreneurship. Boasting electricity supply will immensely help in cutting down the cost of doing business in the country. Providing necessary training and skills acquisition mechanism will ensure the transformation of the unemployed to entrepreneurs. Giving the high unemployment in the country the paper provides useful information to policy makers in tackling the problem of unemployment in Nigeria.

References

Audrestch, D. B. and Thurik, A. R. Capitalism and Democracy in the 21st Century: from the Managed to the Entrepreneurial Economy. *Journal of Evolutionary Economics*, 2000; 10: 17–34.

Audretcsh, D. B. and Thurik, A. R. The Knowledge Society, Entrepreneurship and Unemployment. EIM Small Business Research and Consultancy, Research Report 1998; 9801/E

Audretsch, D. B. and Fritsch, M. The Geography of Firm Births in Germany, *Regional Studies*, 1994; 28(4):359-365.

Audretsch, D. B., M. A. Carree and Thurik, A. R. Does Entrepreneurship Reduce unemployment? Tinbergen Institute Discussion Paper, 2001; TI 2001-074/3, Rotterdam

Audretsch, D. B. and Jin, J. A. Reconciliation of the Unemployment – New Firms Start up Paradox. *Small Business Economics,* 1994; 6: 381-385

Audretsch, D. B., M. A. Carree and Thurik, A. R. Does Self employment Reduce unemployment? A paper on Entrepreneurship, Growth and Public Policy, 2001; 07/2005 Max Planck Institute of Economics, Jena, Germany

Bapista, R. and Preto, M.T. The Dynamics of Causality between Entrepreneurship and Unemployment. *International Journal of Technology, Policy and Management,* 2007; 7(3):215-223

Carree, M. Does Unemployment Affect the Number of Establishments? A Regional Analysis for U.S. States, *Regional Studies*, 2002; 36(4):389-398

Donli, J. G. An Overview of Nigeria's Economic Reforms, *Seminar Organized by Central Bank of Nigeria,* 2004; *Kwara State.*

Evans, D. S., & Leighton, L. S. Some empirical aspects of entrepreneurship. *American Economic Review,* 1989; 79:519–535.
Evans, David S. and Leighton, L. Small Business Formation by Unemployed and Employed Workers, *Small Business Economics*, 1990; 2(4): 319-330.
Faria, J. R., Cuestas, J. C. and Mourelle, E. Entrepreneurship and Unemployment: A Non linear Bidirectional Causality. *Economic Modelling,* 2010; 27(5):1282-1291
Garofi, G. New Firm Formation and Regional Development: The Italian Case, *Regional Studies*, 1994; 28(4):381-394.
Hamilton, R. T. Unemployment and Business Formation Rates: Reconciling Time Series and Cross section evidence. *Environment and Planning,* 1989; 21:249-255
Highfield, R. and Smiley, R. New Business Starts and Economic Activity: An Empirical Investigation, *International Journal of Industrial Organization*, 1987; 5:51-66.
Ingrid, V., van Stel, A., Thurik, A. R. and Urbano, D. The Relationship between Business Ownership and Unemployment in Spain: A Matter of Quantity or Quality? *Estudious De Economica Aplicada,* 2006; 24(2):435-457
Knight, F. H. *Risk, uncertainty, and profit.* The University of Chicago Press, Chicago, IL, 1971; originally published in 1921 by Houghton Mifflin Company
Meager, N. Does Unemployment lead to Self employment? *Small Business Economics,* 1992; 4:87-103
National Bureau of Statistics. Annual Socio-Economic Report, 2011; National Bureau of Statistics, Nigeria.
Plehn-Dujowich, J. M. The Dynamic Relationship between Entrepreneurship, Unemployment and Growth: Evidence from US Industries, SBA Research Report, 2012; 394
Reynolds P., Storey, D. J. and Westhead, P. Cross National Comparisons of the Variation in New firm formation rate. *Regional Studies,* 1994; 28(4):443- 456
Ritsila, J. and Tervo, H. Effect of Unemployment on New Firm Formation: Micro Level Panel Data Evidence from Finland. *Small Business Economics,* 2002;19:31-40.
Stel, A., Thurik, R.,Verheul, I. and Baljeu, L. The Relationship Between Entrepreneurship and Unemployment in Japan. Tinbergen Institute Discussion paper,2007; TI 2007-080/3
Storey, D. J. The Birth of New Firms- Does Unemployment Matter? A Review of the Evidence. *Small Business Economics,* 1991; 3:167-178
Thurik, R. Entrepreneurship and Unemployment in the UK. *Scottish Journal of Political Economy,* 2003; 50(3):264-290
Thurik, A. R., Carree, M. A., Stel, A. and Audretsch, D. B. Does Self employment Reduce Unemployment?. *Journal of Business Venturing,* 2008; 23(6):673-686

Appendix A

Table 3: VAR Estimation for entrepreneurship

Variables	Coefficients	Std. Error	*t*- statistics
Constant	6.172986	1.85336	3.33069***
$lnENT_{t-1}$	0.762459	0.17541	4.34681***
$lnENT_{t-2}$	-0.306493	0.17050	-1.79761**
$lnUM_{t-1}$	0.381865	0.11857	3.22069***
$lnUM_{t-2}$	-0.329275	0.12112	-2.71869***
R square	0.702542		
Observation	31		

Note: *** and ** indicate level of significant at 1% and 5% respectively.

Table 4: VAR Estimation for unemployment

Variables	Coefficients	Std. Error	*t*- statistics
Constant	-2.289901	3.20837	-0.71373
$lnENT_{t-1}$	-0.057388	0.30365	-0.18900
$lnENT_{t-2}$	0.302952	0.29515	1.02642
$lnUM_{t-1}$	0.847051	0.20525	4.12691***
$lnUM_{t-2}$	0.110386	0.20966	0.52649
R square	0.975104		
Observation	31		

Note: *** and ** indicate level of significant at 1% and 5% respectively.

PROGRESS IN TURMOIL TIMES: TURKEY'S NEW EXPORT STRATEGY

Melih Bulu[1], Metin Gürler[2]

Abstract

Turkey and the EU agreed on Custom Union (CU) in 1996. Since then, the trade volume between Turkey and the EU has increased significantly. As time passed by, even though there was a negative trade balance with the EU countries, CU caused a shift in Turkey's export pattern towards industry intensive products.

Starting from 2009, shrinking market volume in the EU due to economic crisis forced Turkish exporters for new markets. Turkish exporters realized that they are able to compete with other global players in these new markets. Their experience accumulation, while exporting to the EU market, created a competitive advantage that is useful for them in global markets.

Today, Turkey is using this competitive advantage while exporting products to other potential export destinations such as Near and Middle East Countries (Neighboring Countries) and African Countries.

Keywords: EU-Turkey Trade, Trade with Neighboring Countries, Turkey's Trade Strategy, Export Strategy

1. Introduction

The EU (formerly EC) became Turkey's main trading partner for a long time. More than half of Turkey's exports were being made to the EU countries till Global Crisis. This ratio dropped under 50% in 2008 for the first time after the Customs Union Agreement (CUA). The declining trend continued in 2009, 2010, 2011 and reached its lowest level as 39% in 2012.

Crisis in the EU area forced Turkish exporters to look for new markets. Turkey's neighbors were mainly importers of the industrial products. Industrial production was not developed in most of the Neighboring Countries. Therefore, Turkish exporters focused in these countries.

The main hypothesis of this article is that CUA provided a competitive advantage to Turkey that was not estimated at the beginning of the CUA. This advantage was mainly developed by Turkish industry during a long period exporting to the EU countries. Turkish producers learned the EU standards and improved themselves. Turkish industrial producers reached a level that their products could compete with other industrialized countries in the EU market. After Global Crisis, the import demand for Turkish goods declined in the EU but it did not affect the total exportvolume increase of Turkey. Turkey gradually increased exports to newpotential destinations using industrial production advantage gained from CUA with the EU.

[1] **Associate Prof. Dr., İstanbul Şehir University,melihbulu@sehir.edu.tr**

[2] **PhD candidate, Marmara University ,metin@codexcom.com**

2. Literature Survey

Akkoyunlu-Wigley and Mihci's (2004) studied panel data for the period 1994-2000. Estimation results show that both export and import ratios of trade with EU decreased the cost-price margin in manufacturing industry. Trade with EU created a positive wealth and efficiency effect upon the Turkish manufacturing industry due to falling price-cost margins and similarly estimation results for the period mentioned above indicate that imports from member countries have caused a decline in concentration ratio for manufacturing industry. Finally, increasing trade with EU countries created an increasing competition so that it has had a significant effect on Turkey's changing export market structure and pricing behavior of manufacturing industry.

There are various studies on cost-benefit analysis of CUA between the EU and Turkey. Potential advantages and disadvantages of CUA membership were discussed in different studies. Lejour and Mooij (2005) evaluated accession of Turkey to the EU. They concluded that Turkey will gain more than the EU members with the integration and some sectors in Turkey would expand substantially by the integration with the EU , such as "textiles" but it will affect negatively Central and Eastern Europe Countries who have the same comparative advantage in labor intensive agricultural and textile sectors with Turkey. The largest economic gains can probably be obtained through reforms of national institutions in Turkey that improve the functioning of public sector and provide transparency to investors and traders.

Bekmez and Başarır (2005) has developed a single country multi-sectoral CGE(Computable General Equlibrium) model for Turkey and simulated Turkey-EU trade with different scenarios. They concluded all competitive sectors would increase profit shares with the different rates of change, while monopolistic sectors would lose their profits. Under full membership with EU sectoral average variable costs will increase but it will not affect the sectoral profits. According to Bekmez and Başarır Turkish Government needs to compensate its losses from full membership by receiving revenue assistance from the EU. Thus, Turkish economy, as a whole, will be better off with a full membership, even though some sectors individually lose a portion of their profits.

Yıldırım and Dura (2007) mainly analyzed three subjects: a) the literature about the effects of the EU-Turkey CU(different approaches for static and dynamic effects of the CU between Turkey and the EU), b)similarity and compatibility with forecasted the CU effects and actual Turkey-EU CUA, c) determine the deficiency in empirical literature in the CUA to guide researchers who are interested in this field. They concluded that CU's net static effect is trade creation; however, this trade creation is against Turkey, because growth of exports to the EU is smaller than the growth of imports from EU after CUA which means for Turkey an increasing trade deficit with EU. Besides, there is a loss in tariffs revenues. Since dynamic effects occur in medium and long term the analysis of dynamic effect is more difficult than the static one. They concluded that there might be more studies on some areas of CU effects such as competitiveness (absence of testing indices for competitiveness), technological improvement and terms of trade.

Neyaptı et al. (2007) analyzed EU-Turkey trade by using their econometric model. They concluded CUA had contributed to the increasing volume of trade of Turkey, coupled with a decline in income elasticity of trade over the CU period. They analyzed the demand functions of Turkey for import from EU(export of EU to Turkey) and of EU for import from Turkey(export of Turkey to EU).They found the following results: i) real exchange rate of Turkey is positively related with imports whereas negatively related with exports, ii)Turkish

GDP is positively related with the import (EU's export to Turkey) and EU's GDP is positively related with import from Turkey (the export of Turkey to the EU), iii)income elasticity for both export and import declined in CU period but the effect on export is more than the effect on import. They also found that if countries in trade with Turkey have a high political stability and better governance they have high trade volume with Turkey. They also investigated the trade pattern of Turkey in 1994 and 2001- Turkey's own crises- and found out that in 1994 both exports and imports were being affected, while in 2001 only exports were being affected.

Gündüz and Esengün(2007) analyzed the impacts of the Customs Union on the foreign trade of Turkey and EU-15 using various times series analysis for the data set of period 1987-2003. They also concluded that CU has created a structural difference on Turkey's trade . As a result of the study, it was revealed that the growth of import values of Turkey was greater than the growth of export values during first years after the Custom Union and total trade increased after CU.

According to a study by Koçyiğit and Şen(2007), the extent of intra-industry trade (ITT) in Turkey's foreign trade is moving towards to intra-industry type trading with the world totally and the European Union (EU) partially. That is, the free trade between Turkey and European Union is leading to an adjustment of the production structure in Turkey's economy. The growth of ITT between Turkey and the EU showed that Turkey's industrial base was dramatically changing from low technology products group to high technology industries, especially since the Customs Union Agreement with the EU put into effect in 1996.

Kızıltan, et al. (2008) analyzed the effects of Customs Union on foreign trade of Turkey with European Union by econometric models using dummy variable approach. According to the result of analysis, it is observed that CU had affected not only relevant sectors individually but sum of these sectors positively as well. Among the results, it has been found that the analyzed foreign trade at 1985-2005 period showed an increasing effect of CU on foreign trade of Turkey with EU (12) countries especially in the first ten years after CU. The results of the time series analysis indicated that trade deficit with EU has a positive trend after CUA and when the data set observed some broken years such as 1994 and 2001 where Turkey has financial crisis in homeland and 1999 Turkey was affected with global financial crisis started in 1998 in southern east Asia and a terrible earthquake in industrial region of the country. At those years, trade deficit declined but at following years the trend started to move up again. They also concluded that after 2001 trade deficit is not the result trade with EU but coming from trade with other countries especially where huge amount of energy from Russia and intermediate products and raw materials from China were being imported.

A study made by Gökdemir and Kahraman (2008), analyzing the first ten years of CUA, could not find major effects on Turkey's trade in a positive or negative way. They searched the relationship with Turkey and the EU after CUA and expectations of Turkey with CUA. They also dealt with the economic side effects of CU analyzing the static effects(trade creation, trade diversification and consumption) and dynamic effects(increasing competitiveness, effects on FDI, effects on scale of economies and technological improvement). They finally concluded that in the period between 1996 and 2005 exports volume to EU did not increase as was expected with CUA. They explained that this result came out because of the Free Trade Agreements of EU with other third countries who have the same comparative advantage in textile and the exclusion of agricultural commodities trade in CUA. China's membership of WTO in 2005 also affected the expectations since China also has a comparative advantage in labor intensive sectors such as textile as Turkey.

Seymen (2009) concluded similar results in her study on trade between EU and Turkey. She concluded that enlargement in EU with new members caused more positive effect than CUA

on Turkey's trade volume with EU. She analyzed the long period 1969-2008 and with the help of some indices such as Entropy Index, Bilateral Trade Concentration Index and Herfindahl-Hirshman Concentration Index, she studied on static effects occurred after CUA and other factors that might affect the changes in trade between Turkey and EU.

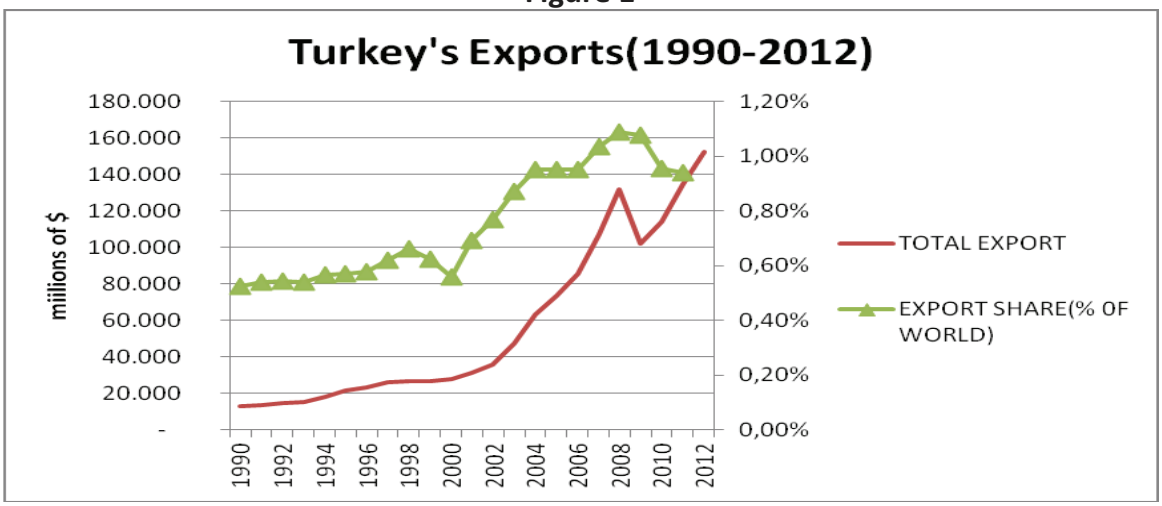
Türker (2009) analyzed how CU affected Turkey's competitive capacity (one of the dynamic effects of CU) of foreign trade in regards to all sectors in SITC between 1990-2005. He divided data period into two as 1990-1995 and 1996-2005 and used Revealed Comparative Advantage to measure the competitiveness power. Türker's analysis found out two remarkable results. First, Customs Union generally has not raised Turkey's competitiveness. Second, CU has contributed positively on the effect of Turkey's competitiveness at some sectors but the revealed effect was significantly low comparing with other competitor countries. He also analyzed dynamic effects of economic integrations such as changing competitiveness power, scale of economies, growth rate of industrialization and technological improvement.

Another important claim was that CUA would change the production and export structure of Turkey. Some believed that Turkish industry would not compete with EU and Turkish industrial companies would be affected negatively. Because of high standards, EU is one of the most difficult markets to export. EU consumer's demand standards are always high. Moreover, most of the exporters in the world are still trying to sell their products to EU countries. Studies show that since 1996, Turkey's export content has changed significantly. Turkey became an industrial product exporting country. Naturally, Turkey's production infrastructure was developed after CUA.

3. Structure of Turkey's Exports

After CUA in 1996 Turkish exports and share to the world increased (Figure 1). Turkey increased export share during global crisis. Turkey's export reached to the highest level in history in 2012 as 152.5 billion $ with a growth rate of 13,1% comparing to previous year.

Figure 1

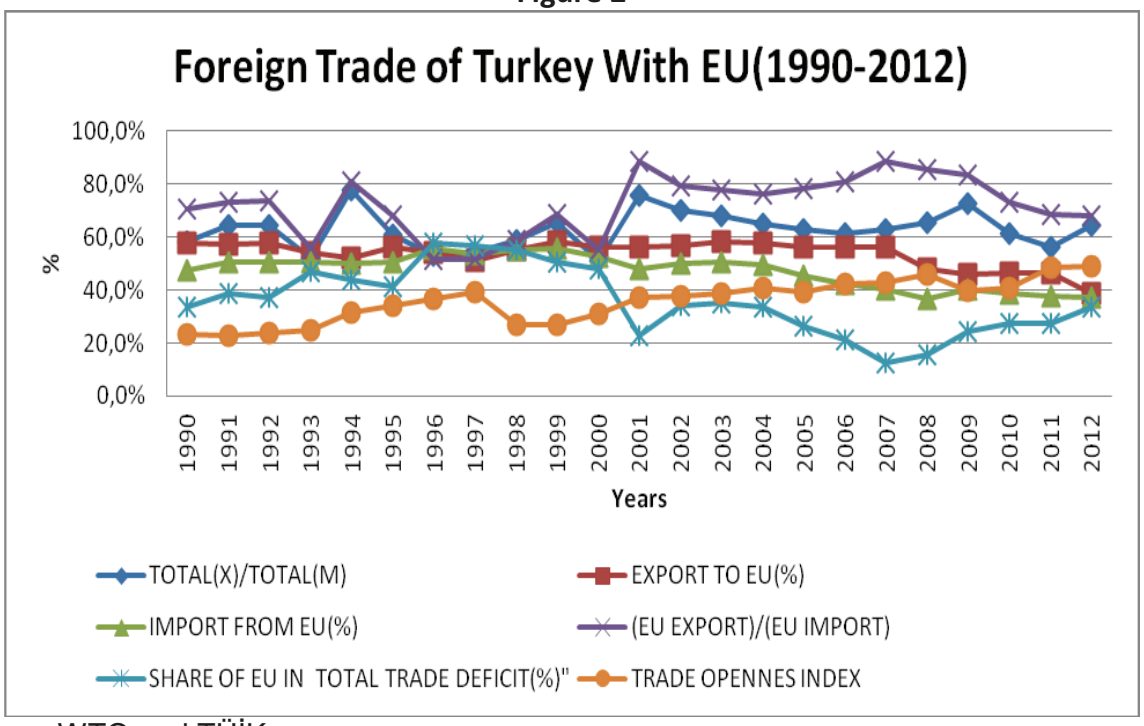


Source: WTO and TÜİK

In Figure 2, we see some trade indicators of Turkey. The first indicator is the "trade dependence index" (United Nations ESCAP,2007) also known as "openness index", it measures the ratio of international trade to the total value of net output (gross domestic product). Turkey's trade is being opened to the world widely after CUA. The ratio reached its highest value as 48,7% in 2012. The declines in 1997, 1998 and 1999 can be explained with

the negative effects of Southern East Asia and Russian financial crisis and the terrible earthquake happened in a major industrial region of Turkey. In the figure, we easily see the increasing trade deficit with EU according to the decreasing import demand for Turkish exports in EU countries. In recent years export/import coverage for total trade is increasing whereas for EU trade it is decreasing because of significantly high import value from EU (increasing import share of EU) and decreasing export volume to EU (decreasing export share of EU). Finally we can conclude that Turkey's trade is enlarging towards not to EU countries but to the rest of the world. Turkey shifted exports to the other countries during and after the global financial crisis.

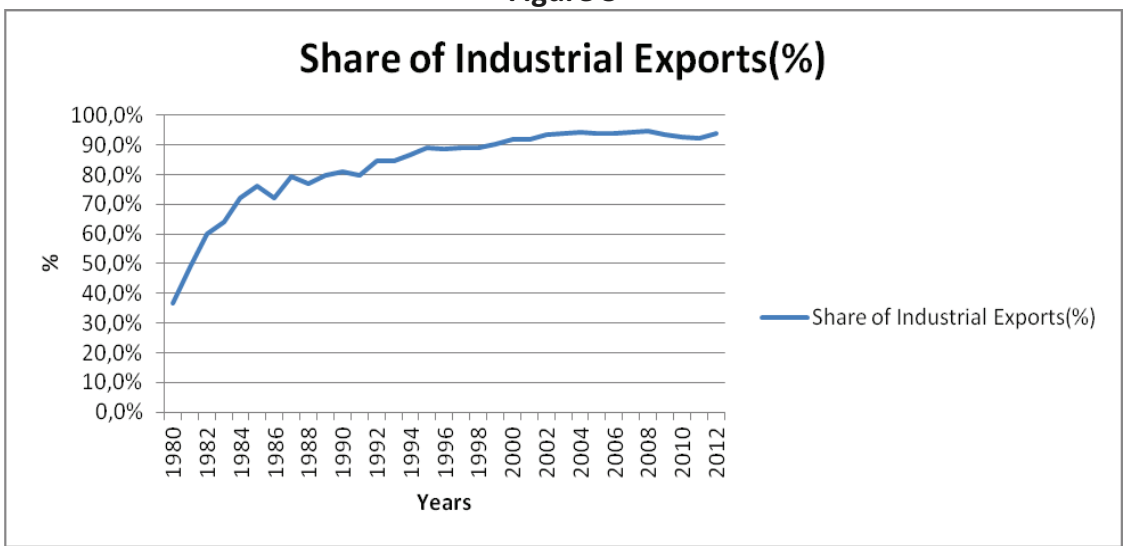
Figure 2



Source: WTO and TÜİK

Figure 3 shows export composition of Turkey for the period 1980-2012. The share of industrial products increased to 93,9% in 2012 from 88,4% in 1996. It was just 36,6 % in 1980 when Turkish economy was opened to the international trade and export-led economic policy was put in action. Obviously, CUA is one of the main reasons of this increase, because Turkish exporters realized that EU is a very attractive market for industrial products. Thus, they invested in new industrial production facilities.

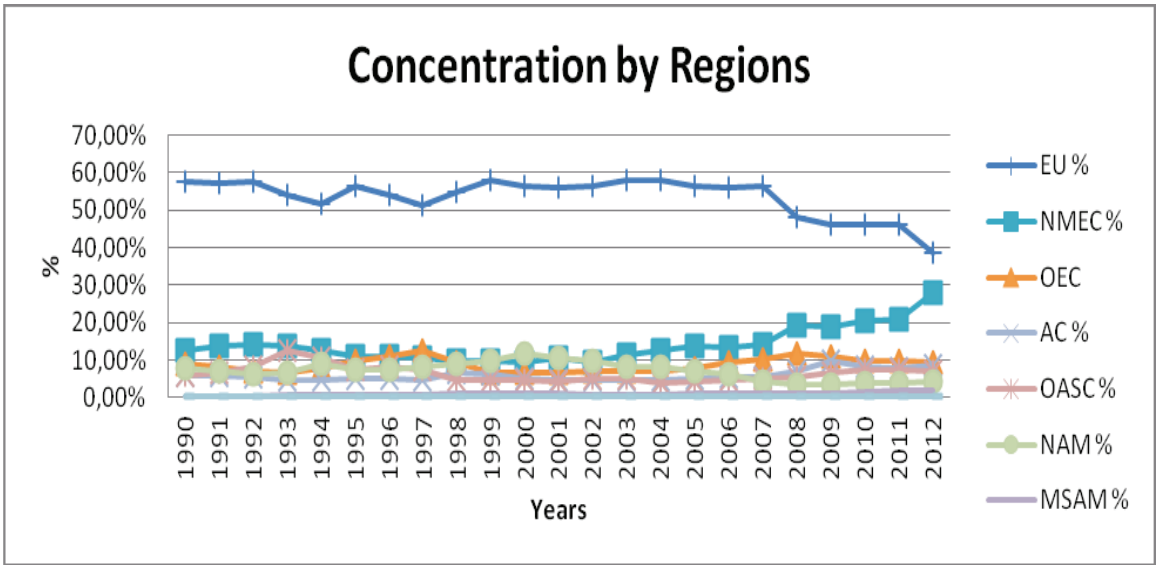
Figure 3



Source: TÜİK

Figure 4 shows the share of exports destinations of Turkey. The EU countries have a significant share in total exports of Turkey. Between 1999 and 2007, the EU share in Turkey's total exports fluctuates in the range between 51% and 58%. However we see a sharp decrease to 48% in 2008 and export share decreased to 46,3% in 2009. In 2012, it reached to 38,8%, the lowest level in history. Obviously, the global crisis is one of the main reasons of this decrease in 2007 and following years. However, the decrease in export share of EU with Turkey continues, even though the weight of the crisis is getting less. On the other hand, Turkey's export share to Neighboring Countries (Near and Middle East Countries, NMEC) was not affected by the global crises in 2008 and 2009. The increasing trend in Turkey's exports to Neighboring Countries has continued since 1999. The share of Turkey's exports to Neighboring Countries (NMEC) was 9,7% in 1999. This share reached to 19,3% in 2008 and then increased to 20,7 in 2011 and finally reached to its highest level with a rate of 27,8% in 2012.

In Figure 4 we can see the shares of different country groups in Turkey's exports. The share of Africa, Near and Middle East and Neighboring Countries is increasing. North America and Middle and South America also have a positive trend in the export increase. Australia and New Zealand have a small share in Turkey's export. On the other hand, shares of the EU and Other European Countries are decreasing. Global economic crisis had a significant effect on the EU countries. Therefore, we can explain the sharp decrease in EU exports of Turkey by global economic crisis. Turkey is obliged to explore alternative markets due to shrinking market of EU. However, this created an opportunity for Turkey to explore and enlarge its exporting area.



Source: TÜİK

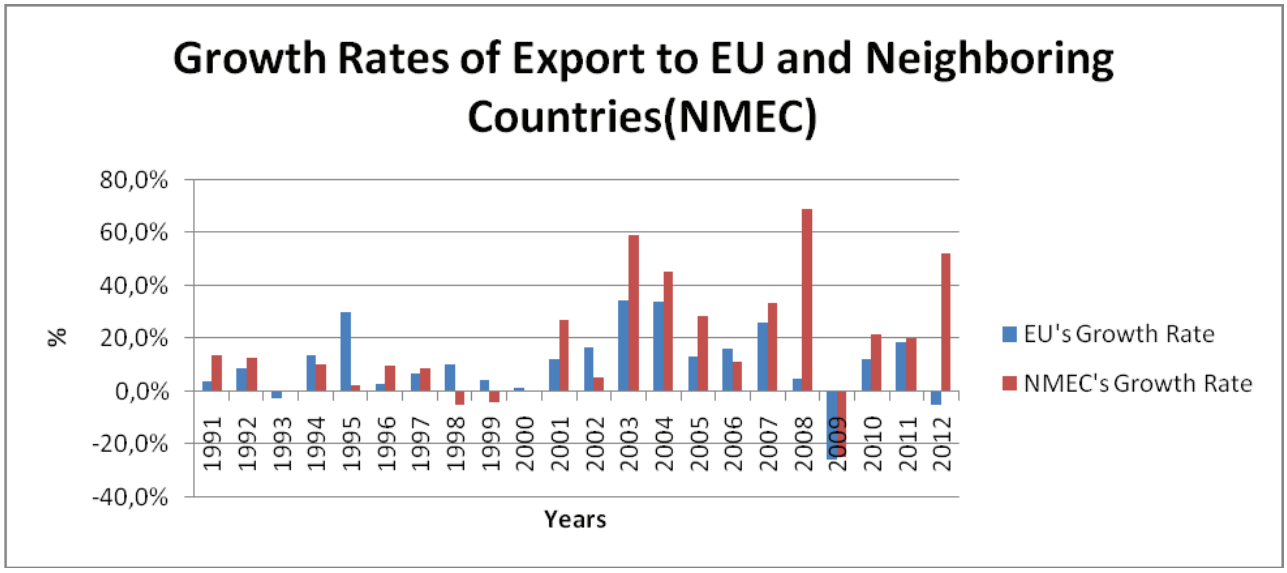
EU:European Union; NMEC:Near & Middle East Countries; OEC:Other European Countries; AC:African Countries; OASC:Other Asian Countries; NAM:North America; MSAM:Middle and South America; ANZ:Australia and New Zealand.

Figure 5 shows that the increase in Turkish exports to the EU countries did not show a major increase until 2000. Then an increasing trend started in 2001 with the economic crises of Turkey. The positive increase continued until the 2009. In 2009, with the negative effect of Global Economic Crisis, a sudden decrease in the growth rate of exports to EU is observed as -25,8% and then we see a recovery in 2010 again. But due to effects of crisis in EU, demand for imports is still decreasing in 2012.

As we see both in Figures 4 and 5, Turkey's exports to Neighboring Countries started to fluctuate in the period 1996-2007. In Figure 4 the fluctuation in the range 9,3%-14,06% can be easily seen after Customs Union Agreement. During this period, Turkey's exports to EU countries increased(of course there is a positive effect of enlargement in EU, number of members increased from 15 to 25 in 2004). In Figure 5, we see Turkey's growth rate of exports to its Neighboring Countries (NMEC) was negative in 1998(-5%) and in 1999(-4,3%) but started to increase in 2000 and again it has got a small but positive growth rate as 0,3%. This positive trend continues until 2009. In 2009 the Global Economic Crisis caused a negative growth rate as -24,5% as it did in EU's share; however, we see a quick recovery in 2010 again with a growth rate of 21,4%. And in 2012 it reached its second highest level 52,1%.

Export change percentage of the EU and Neighboring Countries(NMEC) figure shows that there is a drop in Turkey's export to the Neighboring countries at the beginning of the CUA; however this trend changed in 2000 and Turkey's exports to Neighboring Countries increased more than EU countries except in 2002 and 2006. Especially in 2003 and 2004 there is a major increase in exports to the Neighboring Countries(NMEC). The growth rate in exports to NMEC's in 2008 reached its highest level with 68,6% during the global crisis year.

Figure 5

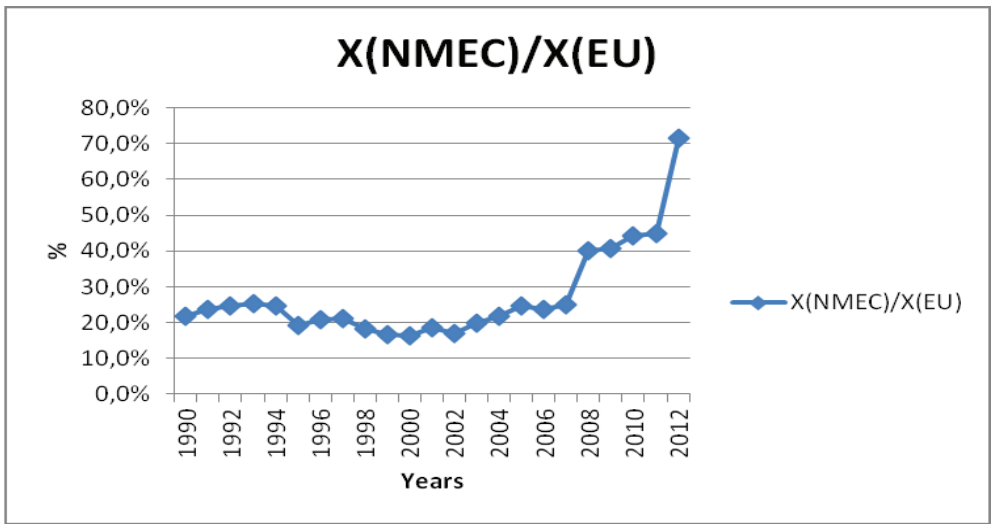


Source: TÜİK

Figure 6 shows that there is a decreasing trend in Turkey's exports to Neighboring Countries against EU Countries after the CUA. The ratio of export to Neighboring Countries to export to EU has a quite sharp decreasing trend for the three years 1998, 1999 and 2000. There is a stabilization period of four years between 1999 and 2002. During this period Turkey's exports to Neighboring Countries have a ratio over its exports to EU countries in the range 16,4%-18,6%. However, this ratio was 20,7% in the first year of the CUA.

Turkey's exports to Neighboring Countries(X-NMEC) started to increase in 2003(11,6%) and this change continued for the last 9 years. According to 2012 export data, Turkey's export to Neighboring Countries(X-NMEC) reached an export share ratio of 27,8% and the ratio of exports to Neighboring Countries(X-NMEC) to the exports to EU countries(X-EU) was reached 19,9,% after the stable period and in 2012 it reached its highest level in the history with 71,7%.

Figure 6



Source: TÜİK

Global economic crisis caused EU market to shrink. Turkey faced with an emergency situation. Turkish producers tried to hedge their risk by finding new export destinations. The best alternatives were the neighboring countries. Besides, Middle East and African countries were the serious alternatives. Turkish exporters focused on these markets and accelerated Turkish exports to these countries. This change was an obligation; however, we can't say that the drop of Turkey's export share in the EU is only related to the Global Crisis. Because data shows that Turkey's export share to neighboring countries and Near and Middle Eastern Countries started to increase after 2000. Turkish exports to African countries started to increase with Global crisis and reached 9,9% in total exports share to the highest level in 2009 and reached 8,8% in 2012. In 2008, the ratio was 6,9% and before 2008 Africa Countries share was in the range 4,5%-6,76% in the period 1990-2007. Consequently, there is an ongoing increasing trend in Turkish export to Neighboring Countries (East and Middle Eastern Countries). Global Economic Crisis accelerated this trend. Besides, African Countries became new export destinations of Turkish exporters. By the way, it seems that latest changes caused permanent changes in the heaviness of Turkey's export destinations.

4. Conclusion

CUA neither increased Turkish exports share to EU countries nor caused a big trade deficit for Turkey. On the other hand, the share of industry intensive products in Turkey's exports increased. Turkey became an industrial product exporter. Turkish industrial producers learned to compete with all main industrial producers of the world in the EU market. This challenge caused Turkish exporters to improve their capabilities significantly. These changes provided a competitive quality for Turkey while trading with Neighboring Countries (Middle and Near East Countries) and African Countries. Thus, we see a steady increase in Turkish exports to these countries for the last decade. Global economic crisis accelerated this change. Shrinking EU market forced Turkish companies to diversify their exports to alternative markets. Especially Neighboring and African Countries are now becoming Turkey's new export destinations.

Turkey learned to compete with CUA in global export markets. This capability is helping Turkey to export to the new markets. Perhaps, numbers were not showing a trade surplus with EU countries; however, gained experience in EU market is one of the most important competitive advantages for Turkish companies.

Therefore, we conclude that difficulties may bring advantages. They increase your strength and increasing strength may provide competitive advantage in a different time or place. Turkish producers faced with such a challenge in 1996 with CUA and they were able to adapt their production systems accordingly. This transformation created an advantage today while exporting to Neighboring Countries (Middle and Near East Countries) and African Countries.

Reference

Akkoyunlu-Wigley, Arzu and Sevinç Mıhçı,(2004) "Effects of Customs Union with European Union on the Market Structure and pricing Behaviour of Turkish Manufacturing Industry", European Trade Study Group (ETSG), Nottingham, 9-11 September 2004.

Bekmez, Selahattin and Aydın Başarır, (2005)"Avrupa Birliği Türkiye için Ne kadar Karlı? Bir Genel Denge Analizi" Atattürk Üniversitesi,İktisadi ve İdari Bilimler Dergisi, Cilt: 19, Nisan,Sayı: 1,pp.167-182.

Gökdemir, Levent and Elif Kahraman, (2008) "Customs Union In Its Tenth Year: What Has Been Expected?, What Has Occured?" Fırat University,Journal of Social Science,Volume: 18, No: 2 ,pp: 277-296.

Gündüz, Orhan and Kemal Esengün,(2007) "The Impact of Custom Union on the Foreign Trade of Between Turkey and EU (15)", GOÜ. Ziraat Fakültesi Dergisi, 24 (1),pp. 43-49.

Kızıltan, Alaattin,Mustafa Ersungur and Özgür Polat,(2008) "Gümrük Birliğinin Türkiye'nin Avrupa Birliği ile İhracat ve İthalatına Etkisi" ,Atatürk Üniversitesi, İktisadi ve İdari Bilimler Dergisi, Cilt: 22 Ocak, Sayı: 1,pp.83-100.

Koçyiğit, Ali and Ali Şen, (2007) "The Extent of Intra-Industry Trade between Turkey and the European Union: The Impact of Customs Union",Fatih University, Journal of Economic and Social Research, 9(2),pp. 61-84.

Lejour, Arjan.M. and Ruud.A. Mooij, (2005), "Turkish Delight: Does Turkey's Accession to the EU Bring Economic Benefits?" KYKLOS, Vol. 58-No. 1, 87–120

Neyaptı, Bilin, Fatma Taşkın, and Murat Üngör,(2007) "Has European Customs Union Agreement really affected Turkey's trade?" Applied Economics ,Taylor and Francis Journals,Vol.39,Issue:16,pp. 2121–2132.

Özkale,L., 2009, "Turkey and the European Union: a Never-Ending Story or an Irrevocable Membership?" Eurolimes, Journal of the Institute for Euroregional Studies Oradea-Debrecen "Jean Monnet" European Center of Excellence, V.8-Autumn, p. 120-128.

Seymen, Dilek., (2009) "Has CU Changed the Country Concentration of Trade Between Turkey and EU?" Süleyman Demirel University,The Journal of Faculty of Economics and Administrative Science, Volume.14, No.1, pp.199-220.

Türker, Oğuzhan,(2009), "Gümrük Birliği Sonrası Türkiye'nin Dış Ticaretinin Rekabet Gücü", Erciyes Üniversitesi, İktisadi ve İdari Bilimler Fakültesi Dergisi,Sayı:32,Ocak-Haziran,pp.281-302.

TURKSAT(2011),Foreign Trade Statistics Yearbook.

UNESCAP(United Nations Economic and Social Commission for Asia and Pasific),2007,"Trade Statistics in Policymaking-A Handbook of Commonly Used Trade Indicies and Indicators".

Yıldırım, Ertuğrul and Cihan Dura,(2007), "Gümrük Birliği'nin Türkiye Ekonomisi Üzerineki Etkileri Konusundaki Lieratüre bir Bakış", Erciyes Üniversitesi Iktisadi ve Idari Bilimler Fakültesi Dergisi, Sayı: 28, Ocak-Haziran, pp. 141-177.

WTO&UNCTAD,2012,A Practical Guide to Trade Policy Analysis.

THE INTERNATIONALIZATION OF GREEK FIRMS: DETERMINANTS FOR RELOCATING TO NEIGHBORING REGIONS OF BULGARIA

Christos Georgiou[1], Nicos Komninos[2]

[1]Federation of Industries of Northern Greece (FING), 1, Morichovou Sq., Thessaloniki, Greece, xgr@otenet.gr
[2]Aristotle University of Thessaloniki, URENIO Research, University Campus, 54124 Thessaloniki, Greece, komninos@urenio.org

Abstract

Greece is a small economy on the periphery of the EU and until recently has primarily been a recipient of Foreign Direct Investment (FDI). However, in the last twenty years, with the opening up of Central and Eastern European markets, Greek entrepreneurs seized the opportunity to expand abroad in search of new, unsaturated markets and cheaper resources in terms of human capital and/or raw materials. This process led Greece to become a key investor in the region and Greek firms entered upon a learning curve that might enable them to further expand abroad into relatively unfamiliar markets. The investigation of the Greek case is of great importance for the international business literature as it is a clear demonstration of the process that a small economy has to follow in order to become a regional player and an outward investor. During the current economic crisis, Greek companies are again, as in the 1990s, under strong pressures which stem from the domestic business environment and one must add into their strategic choices the option of internationalizing their business activities in a country like Bulgaria, which is a member of the European Union and where, from the 1990s until today, labor and tax costs have been much lower than Greece. The main focus of this paper is to explore the specific motives of Greek companies in selecting Bulgaria as a host country for their international activities. We analyze push and pull factors such as economic incentives, internationalization business strategy, and access to resources and infrastructure, general business opportunities and finally openness of the market and the overcoming of existing tariff barriers. Based on our survey we propose certain policy recommendations intended both for the Greek Government in order to improve the internal environment and for Greek multinationals to achieve greater efficiency.

Keywords

Internationalization, competitiveness, motives, incentives, governmental policy

1. Introduction

This article focuses on studying the behavior of Greek multinational companies specifically in relation to the factors at play in selecting Bulgaria to host their international business activities that enhance their competitiveness.

During the1990s, reacting to globalization challenges, Greek firms decided to internationalize all or part of their production activities. In the case of Greek firms, the large wave of

internationalization of production activities came from the re-location primarily of labor intensive enterprises (e.g. clothing and footwear companies) as well as from enterprises aiming to exploit available resources locally in order to serve either the local market or the Greek market (e.g. food and beverages, tobacco, wood-related companies etc.) [1]. This drive towards internationalization by Greek companies was primarily directed toward neighboring Balkan countries in which Greek firms invested quite important levels of funds, taking advantage of the local government's efforts to work to help the transition of these countries to the market economy. In this way Greek firms became key foreign investors in a series of Balkan countries [2].

The behavioral features of Greek multinational companies as regards the process of selection of a host country for their international activities has not been studied in depth so far either by Greek or by foreign researchers, while only a few attempts have been made in this research direction [2]. At present, the internationalization of Greek companies is very slow or non-existent. This is so due to the fact that the current crisis has expanded throughout the world and therefore also to the Balkan region, investment risks have grown considerably, and global uncertainty regarding future economic growth has substantially increased.

2. Internationalization and relocation

Most of the theories on the internationalization of business activities that attempt to describe the internationalization process have their roots in the theory of industrial organization. Moreover, most of them were developed in the 1970s and 1980s [3], [4], [5], and [6]. These theories describe the internationalization process quite adequately, but they also have some weak points. For quite a number of years researchers have been testing and questioning these models, especially the Uppsala model of internationalization proposed by Johanson and Vahlne, but rarely have they demonstrated the ability to replace such models with better models. Often research [7], [8], [9], [10] contributed to new ideas for improvement as well as proposing further refinements and developments of existing models.

The origins of internationalization process theory can be traced back to Vernon's "Theory of the Product Life Cycle" [11]. Given the post-war rise of foreign direct investment by the US, Vernon considered the internationalization process as an expanding process based on the advantages of the host country as well as advantages to the company accruing along the product lifecycle. Regardless of criticism of this approach (i.e. see [12]), it nevertheless provides for a historical perspective on how US companies increased their international presence. Earlier, other scholars [13] focusing on the experience of Swedish companies, created a four-level model, starting from exports through independent dealers and leading to the final stage of international production in the host country. This view was further developed via "the Uppsala model of internationalization» [14]. This model adopts a stages approach: the company initiates its international presence with cautious steps in foreign markets and gradually increases its geographic reach through a process of experiential learning [14], [15]. Similar models featuring a consecutive levels approach have been presented by [16], [17], [18], while other authors have confirmed these models to a lesser or greater extent [19], [20], [21], [22], [23]. Other studies focused on earlier stages of a company's internationalization [24], [25], [26], [27], [28], [29] as well as the determinants of entry choice modes [30], [23], [31], [32], [33], [34], [35] including the specific characteristics of these companies among the determinants .

3. The internationalization of Greek firms

Over the last two decades Greece has emerged as a regional champion and as one of the largest investors in Central and Eastern Europe [36], [37], and [38]. With the opening up of neighboring markets in the early 1990s, Greek companies and Greek entrepreneurs seized the opportunity to

exploit their ownership advantages in order to expand abroad. This expansion has operated in a twofold way: First, foreign affiliates of multinational enterprises which were already established in Greece, upgraded their role as regional headquarters and were utilized by their parent companies as regional centers for their expansion in the Balkans and the countries of Central and Eastern Europe. This strategic change was confirmed by the study carried out by Kyrkilis and Pantelidis [39], who argue that it is probable for foreign subsidiaries to adapt their strategies for the market over time and in association with changes in circumstances. The second expansion mode covers only domestic firms, family businesses, public or private enterprises, which developed international activities, attempting to expand abroad in order to exploit both their advantages in the domestic market, or their close cultural links, especially regarding the countries of Central and Eastern Europe.

In this manner, Greece has changed from a peripheral European country into a regional business centre with a relatively greater degree of importance in neighboring South-eastern European countries. Current developments in the region have altered the role of domestic multinationals [40]. This process was reinforced by Greek state policies which aimed at transforming the country into a “star” country in the region. The "Greek Plan for the Reconstruction of the Balkans", which offered about 500 million euros, is an indicative policy that seeks to achieve this objective.

During the current economic crisis, Greek firms now appear hesitant when it comes to relocating their international activities to neighboring countries, despite an attractive tax regime (a 10% flat income tax rate), lower labor costs, various economic incentive schemes, possible perceived opportunities for access to “resources and infrastructure”, as well as facilities provided regarding operating licenses and land use. In the context of this paper, we investigate whether the key factors for the internationalization and relocation of Greek companies to neighboring Bulgaria are due to: (a) economic incentives afforded, (b) the company internationalization strategy currently being followed, (c) access to resources and infrastructure, (d) opportunities afforded by the local environment for investment implementation, (e) access to foreign markets and (f) the opening up of the market and avoidance of existing or future tariff barriers.

4. Survey: Methodology and sample characteristics

Data was collected using a questionnaire that was addressed to 110 companies already known to have engaged in internationalization activities. 70 questionnaires were filled out by company Presidents, CEOs and other top ranking officers. The survey was conducted in the time period from September 20, 2006 to January 20, 2007. Of the 70 internationally engaged companies that responded, 67% were initially located in Northern Greece and the remaining 33% in Attica. The sectoral distribution of respondents sorted by type of responding firm is shown in Table 1 below.

Table 1: Sectoral distribution of respondents

Sector	Sector code	No. of subsidiaries	No. of export companies	Total No. of companies per sector
Food industries	20	10	7	17
Tobacco industries	22	1	0	1
Textile industries	23	0	3	3
Footwear, apparel and clothing fabric industries	24	6	1	7
Wood and cork industries	25	0	1	1
Furniture and furnishing industries	26	2	1	3

Sector	Sector code	No. of subsidiaries	No. of export companies	Total No. of companies per sector
Paper industries	27	1	2	3
Industrial rubber products and plastics	30	1	1	2
Chemical industries	31	3	2	5
Petroleum derivatives industries	32	1	0	1
Non-metallic minerals industries	33	3	2	5
Industries of finished metal products	35	5	2	7
Construction machinery industries	36	1	1	2
Electrical equipment industries	37	2	4	6
Vehicle construction industries	38	1	0	1
Various industries	39	3	3	6
			SAMPLE TOTAL	**70**

The business executives surveyed were either at top management level (Presidents, CEOs, General Managers) or at middle level (Export Managers, International Business Operations Managers, CFOs, etc). Table 2 below shows the number of persons who took part in the survey per executive category, and as a percentage of all responses. The companies participating in the study were manufacturing companies.

Table 2: Position of Executive Respondents in Company Hierarchy

	No of respondents	% of total
President	10	14,29%
CEO	12	17,14%
General Manager	5	7,14%
Export Manager	14	20,00%
Director of Marketing	5	7,14%
Commercial Manager / Sales Manager	7	10,00%
CFO	7	10,00%
International Business Development Manager	10	14,29%

5. Analysis

This study explores the role of key factors of the internationalization of Greek firms and location / expansion of activities into neighboring regions of Bulgaria, and specifically the contribution of: a) financial incentives, b) internationalization strategy adopted, c) access to "resources and infrastructure", d) opportunities afforded by the domestic environment for investments, e) access to a 'foreign market', and, f) market openness and the avoidance of existing or future tariff barriers. Motivation and incentives for internationalization examined in the context of the present study are presented in the following Table 3.

Table 3: Incentive coding

Code	Incentive
□1	Access / utilization of raw materials in host countries
□2	Exploitation of comparative advantage in the area of raw material costs

Code	Incentive
□3	Better access to technology and know-how
□4	Use of cheap labor
□5	Use of skilled labor
□6	Access to infrastructure
□7	Exploitation of local market size
□8	Market access in specific areas of the host country
□9	Exploitation of a neighboring market
□10	First mover advantage
□11	Avoidance of existing or future tariff barriers
□12	Avoidance of existing or future non-tariff barriers
□13	Need for presence in the local market
□14	Market Development
□15	Privatization opportunities
□16	Acquisition of intangible assets (goodwill)
□17	Acquisition of fixed assets
□18	Subsidies
□19	Grants
□20	Tax Relief
□21	Slower growth of domestic vs. foreign market
□22	Integration / participation of the company in other companies' investment initiatives
□23	Political change and social stability in the host country
□24	Dispersion of investment risk
□25	Economies of scale
□26	Economies of knowledge (experience)
□27	Savings related to synergies and collaborations
□28	Developing sales channels (international clusters)
□29	Developing new products and services
□30	Strengthening sales channels
□31	Development of R & D
□32	Improvement of production processes
□33	Improvement of marketing
□34	Improvement of marketing processes

These research questions were investigated using factor analysis. Specifically, the analysis for Bulgaria using statistical tests of factorial analysis for the best model with 6 factors and a 75.655% explanation of total variance yielded the following results: a) Bartlett's test of sphericity: 359,847 with a significance level of 0.000, so we can reject the hypothesis that the correlation matrix is an Identity Matrix, b) Based on the Anti-image correlation matrix we observe that the percentage of large coefficients is very small and we therefore can accept the model we have chosen, c) The Kaiser-Meyer-Olkin (KMO) test of sampling adequacy is 0.765. This is the index that compares the effect of observed correlation coefficients with those of partial correlation coefficients. In our case the index is characterized as worthy of reference, d) The measurement of sample capacity for each of the 19 variables selected to participate in the model appears on the diagonal of the Anti-image correlation matrix and the prices are large, as is required in order for the model to be successful, e) The communalities of selected variables are quite large and are close to 1. Therefore the model selected provides a good description of the original variables, and, f) Finally, the number of residual values of >0.05 is only 37% and therefore we can assert

with certainty that the selected model for the factor analysis for the case of Bulgaria is a very good reproduction of observed correlations between variables.

Therefore we can proceed with factor analysis. The following tables show detailed information on whether the factors under investigation are valid or not.

Table 4: Descriptive Statistics

	Mean	Std. Deviation	Analysis N
□1	1.39	1.153	36
□4	3.03	1.844	36
□9	3.42	1.663	36
□15	1.67	1.287	36
□17	1.83	1.363	36
□18	1.53	1.055	36
□20	1.58	1.052	36
□21	1.92	1.538	36
□23	1.94	1.330	36
□24	2.33	1.568	36
□25	2.53	1.699	36
□26	2.11	1.469	36
□28	2.56	1.629	36
□10	2.39	1.626	36
□11	1.53	1.207	36
□8	2.22	1.533	36
□13	2.92	1.888	36
□19	1.42	.967	36
□7	3.00	1.673	36

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 8 iterations.

Table 5: Rotated Component Matrix

	Component					
	1	2	3	4	5	6
□18	.850					
□19	.821					
□20	.766					
□23						
□25		.845				
□26		.803				
□21	.510	.643				
□1			.799			
□17			.788			
□4			.699			
□15				.806		
□7				.678		
□24				.573		
□8						
□13					.755	
□28					.730	
□9					.585	
□10						.877
□11						.644

6. Findings

Processing of the research questions resulted in the following factors influencing the internationalization of Greek companies into neighboring Bulgaria being identified:

1. Economic incentives, which consist of a1) tax exemptions, a2) subsidies, a3) subventions and a4) slower growth of the Greek market compared to the Bulgarian market,
2. Company internationalization strategy followed, which consists of the following elements: b1) economies of scale, b2) economies of knowledge – experience and b3) slower growth of the Greek market compared to the Bulgarian market,
3. Access to “resources and infrastructure”, consisting of the following three most important internationalization incentives: c1) raw material exploitation in Bulgaria, c2) fix investment asset acquisition and c3) use of cheap labor
4. Opportunities afforded by the local environment for investment and specifically d1) privatization opportunities, d2) local market size exploitation and d3) investment risk spreading,
5. Access to the “foreign market” through e1) necessity to be present in the local market, e2) sales network development in host market and e3) exploitation of a neighboring market, and
6. Opening up of the market and avoidance either of existing of future tariff barriers.

he selection of Bulgaria as a host country for Greek multinational enterprises is driven mainly by the financial incentives offered there. Such incentives include: a) tax exemptions, b) subsidies, c) subsidies and grants, and d) slower growth of the domestic vs. the foreign market. So our hypothesis is acceptable.

Internationalization strategy clearly influences the decision of Greek entrepreneurs who would like to undertake internationalization activities in the neighboring country. The internationalization strategy opted for at any given time is selected for the following reasons: a) to obtain economies of scale, b) to acquire economies of knowledge and experience, and c) because of lower growth of the Greek market vs. its Bulgarian counterpart. Therefore our assumption is valid.

The question of whether the motivation of Greek firms to choose Bulgaria as a host country for developing their international business activities is associated with the openness of the specific market or with business access to specific resources and/or infrastructure can be answered affirmatively for the second part of the question. For Greek companies, access to "resources and infrastructures” is considered a real incentive, given the fact that through these, Greek enterprises are able to a) exploit raw materials in Bulgaria that may not exist in Greece, b) acquire assets, and c) utilize a cheaper labor workforce. Therefore our assumption is correct.

A fourth driver for the relocation of Greek enterprises to Bulgaria is their intention to exploit opportunities presented in the business environment of that country. The three reasons underlying such a choice by Greek companies relate to: a) the exploitation of opportunities for privatization, b) the exploitation of market size, and c) the implementation of specific investment projects aiming at spreading related investment risk. Therefore our assumption is correct.

Greek companies wish to have access to the Bulgarian market, something that forms an incentive for them to take internationalization-related action. Selecting the particular market is a result of incentives such as: a) a need for the localized presence of a company in the specific market, b) the fact that Greek multinational companies wish to develop sales networks in Bulgaria, and c) an intention to use this market to host part of their international activities. Therefore our assumption is accepted.

A final incentive for Greek companies to develop business activities in Bulgaria has been their concrete intention to acquire a presence in this specific market. The desire of Greek companies to establish themselves in the Bulgarian market is thus also grounded in the fact that the said

companies wish to avoid either existing or future tariff barriers. Therefore our assumption is accepted.

7. Conclusions: Challenges and future policies

In the context of future challenges for the adaptation of policies to strengthen the competitiveness of Greek multinational enterprises in the new international business environment, we can distinguish two groups of policies: a) those which deal with the internationalization of enterprises themselves, and b) those which deal with a set of policies targeting the improvement of the competitiveness of the Greek economy and its adaptation to new international business conditions [41], [42]. As far as the improvement of Greece's competitiveness is concerned, we would emphasize the following challenging areas over the next 3 to 5 years. Challenges related to the strengthening of the competitiveness of the Greek economy are grouped into three groups, as follows [2], [43], [44]:

A] Challenges for improving the domestic business environment

1. Instituting an intelligent and flexible regulatory business environment.

2. Improving the business environment by simplifying administrative procedures for entrepreneurship.

3. Consolidating such a socio-political culture so as to promote the development and internationalization of small and medium-sized Greek enterprises.

4. Encouraging entrepreneurial innovation to develop new business and technological processes in Greek industries. Designing and implementing specific policy measures to enhance cooperation between domestic enterprises and universities.

5. Affording better access by small and medium-sized companies to financing instruments, especially for newly established businesses. - Improving business access to venture capital.

6. Encouraging more Greek SMEs to export their products and services.

7. Reforming policies to attract Foreign Direct Investments (FDI)

B] Challenges for improving the functionality of public entities and their relations with domestic enterprises

1. Remodeling regulations and laws affecting businesses in order to make their operation more competitive

2. Introducing a more effective and less costly public administration

3. Improving the business-related legal framework.

4. Improving the process of formulating state policies and laws, with the aim of reducing bureaucracy and increasing transparency.

C] Challenges for enhancing business capacity to conduct research, development and innovation activities

1. Increases in business expenditure for research and development.

2. Strengthening of human resources to implement research, development and innovation.

3. Reform of the existing legislative framework regarding the exploitation of innovations.

4. Greater openness of the Greek economy to the rest of the world and encouragement of indigenous innovation efforts.

5. Intensifying the commercialization of innovations generated by domestic universities and research facilities.

6. Characterization of research and innovation activities as an area of high priority in formulating the state budget.

7. Institutionalization of incentives to reduce "brain-drain".

References

1 Georgiou, Ch., Komninos, N., Martinidis, G., Martzopoulou, N., Sefertzi, E., Tramantzas, K. (2009) Hybrid innovation and the future of industry in Thessaloniki, in Greek, Thessaloniki, Giahoudis Press
2 Georgiou, Ch. "Adaptations of Business Policies for Competitiveness Strengthening in SMEs in the New Entrepreneurial Environment", Ph.D. Thesis, Unpublished, University of Patra, 2010
3 Dunning, J.H. (1988 a); "The eclectic paradigm of international production: an update and a reply to its critics", Journal of International Business Studies, Vol.19, N.1, Spring.
4 Dunning, J.H. (1988 b), Explaining international production, London: Unwin Hyman.
5 Dunning, J.H. (1988 c); "The theory of International Production", The International Trade Journal.
6 Feldhusen, F., Schmidt, M., and Strauch, F.,(2006), Internationalization theories and their application to one of Sweden's most successful "Exports – H& M-", Malardalen University.
7 Andersen, Otto (1993), "On the Internationalization Process of Firms: A Critical Analysis", Journal of International Business Studies, Second Quarter, pp.209-231.
8 Axinn, C.N. & Matthyssens, P., (2001), "Limits of internationalization theories in an unlimited word", International Marketing Review, Vol. 19, No. 5, pp 436 – 449
9 Forsgren, M., (2002), "The concept of learning in the Uppsala internationalization process model: a critical review", International Business Review 11, pp. 257-277
10 Hadjikhani, A., (1997), "A note on the criticism against the internationalization process model", International Marketing Review, Vol. 37, No. 2, pp. 43-46
11 Vernon, R. (1966), 'International investment and international trade in the product cycle', Quarterly journal of economics, 80(2), 190-207
12 Cantwell, J. A. (1997), The Globalization of Technology: what remains of the product cycle model?, in Daniele Archibugi and Jonathan Michie, Technology, Globalization and Economic Performance, Cambridge: Cambridge University Press.
13 Johanson, J. Weidersheim-Paul, F., (1975), "The Internationalization of the Firm--Four Swedish Cases", Journal of Management Studies, 12, pp. 305-322.
14 Johanson, J. and Vahlne, J-E (1977), 'The internationalization process of the firm- a model of knowledge development and increasing foreign market commitments', Journal of international business studies, 8(1), 23-32
15 Eriksson, Kent, Johanson, Jan, Majkgard, Anders and Sharma, D. Deo (1997), "Experiential Knowledge and Cost in Internationalization Process", Journal of International Business Studies, Vol.28 no.2, pp.337- 360.
16 Luostarinen, R. (1980), Internationalization of the Firm, Helsinki: Helsinki School of Economics
17 Jarillo, J.C and Martinez, J.I (1990), 'Different roles for subsidiaries: the case of multinational corporations in Spain', Strategic Management Journal, 11(7), 501-12
18 Root, Franklin (1994), Entry Strategies for International Markets, Lexington Books, New York: Lexington.
19 Bilkey, W, J. E Tesar, G. (1977), "The Export Behavior of Smaller-Sized Wisconsin Manufacturing Firms", Journal of International Business Studies, Nº 8, pp. 93-106.
20 Cavusgil, S. T. (1980), "On the Internationalization Process of Firms", European Research, no. 8, Nov., pp. 273-281.
21 Cavusgil, S. T. (1984), "Differences among exporting firms based on their degree of internationalization", Journal of Business Research, 12, 99:195-208.
22 Young, Stephen, Huang, Chun-Hua and McDermott, Michael (1996), "Internationalization and Competitive Cath-p Processes: Case Study Evidence on Chinese Multinational Enterprises", Management International Review, Vol.36 no.4, pp.295-314.
23 Calof, J. L. (1993), "The Mode Chaise and Change Decision Process and Its Impact on International Performance", International Business Review, Vol.2 no.1, pp.97-120.
24 Autio, E., Sapienza, H. J. and Almeida, J. G. (2000), "Effects of age at entry, knowledge intensity and imitability on international growth", Academy of Management Journal, 43, pp. 909-942.
25 Martin, X., Swaminathan, A. and Mitchell, W. (1998), "Organizational evolution in the interorganizational environment: Incentives and constrains on international expansion strategy", Administrative Science Quarterly, Vol. 43, pp. 566-601.
26 Knight, G. (2001), "Entrepreneurship and strategy in the international SME", Journal of International Management, Vol. 7 no 3, pp. 155-171.

27 Donckels, Rike Aerts, Ria (1993), Family-business in the spotlight, in Rik Donckels, ed., (1993), KMOs Ren Voeten Uit, Koning Boudewijnstichting, KMO – Studiecentrum, Brussels: Roularta Books.
28 Leonidou, L. C., and Katsikeas (1996)," The export development process: an interrogative review of empirical models", Journal of International Business Studies, vol.27 no.3, pp.517-552.
29 Katsikeas, C. S. (1994), "Export Competitive Advantages: The relevance of Firm Characteristics", International Marketing Review, Vol.11 no.3, pp.33-53.
30 Kwon, Y. C. and Hu, M. Y. (1995), "Comparative Analysis of Export-Oriented and Foreign Product Oriented Firm's Market Entry Decisions", Management International Review, Vol.35 no.4, pp. 325-336.
31 Barkema, H. G., Shenkar, O., Vermeulen F. and Bell, J. H. (1997), "Working abroad, working with others: How firms learn to operate international joint ventures", Academy of Management Journal, 40, pp. 426-442.
32 Madhok, A. (1997), 'Cost, value and foreign market entry mode: the transaction and the firm', Strategic Management Journal, 18(1), 39-62
33 Pan, Yigang and Tse, David S. (2000), "The Hierarchical Model of Market Entry Modes", Journal of International Business Studies, Vol.31 no.4, Fourth Quarter.
34 Davis, P. S., Desai, A. B., Calantone, R. J. and Francis, J. D. (2000), "Mode of international entry: An isomorphism perspective", Journal of International Business Studies, Vol.31, 239-258
35 Arora, Ashish and Fosfuri, Andrea. (2000), "Wholly Owned Subsidiary Versus Technology Licensing in the Worldwide Chemical Industry", Journal of International Business Studies, Vol.31 no.4, Fourth Quarter, 555-572.
36 Bastian, J., (2004): "Knowing your way in the Balkans: Greek Foreign Direct Investment in Southeast Europe", Journal of Southeast European and Black Sea Studies, Vol. 4, No. 3, pp. 458-490
37 Demos, A., Filippaios, F., Papanastassiou, M., (2004), "An event study analysis of outward foreign direct investment: the case of Greece," International Journal of the Economics of Business, Taylor and Francis Journals, vol. 11(3), pages 329-348, November.
38 Kekic, L., (2005): "Foreign direct investment in the Balkans: recent trends and prospects", Southeast European and Black Sea Studies, Vol. 5., No. 2, May 2005, pp. 171 – 190
39 Kyrkilis D., and P. Pantelidis, (□ay - August 1994)," Market □rientation of Foreign Direct Investment in Greek Manufacturing", Economia Internazionale, Vol.XLVII, No.2-3,.
40 Manolopoulos, D., Papanastassiou, M., Pearce, R. (2005), "Sources of technology for foreign operations: an empirical examination", International Business Review, Vol. 14 No.3, pp.249-67.
41 Komninos N. (2008) Intelligent Cities and Globalization of Innovation Networks, London, Routledge.
42 Komninos, N., Sefertzi E. (2008) Selectivity as the future of Greek technology development and innovation policy in Giannitsis, T. (ed) Greek Economy: Critical issues in economic policy, in Greek Athens, Alpha Bank, pp. 453-479.
43 Komninos, N, and Tsamis, A. (2007) 'The System of Innovation in Greece: Structural asymmetries and policy failure' International Journal of Innovation and Regional Development, No 1, pp. 1-23.
44 Georgiou, Ch., Komninos, N., Sefertzi, E., Styliaras, K., Zaharis, N. (2012), Development of an Innovation Strategy for the Thessaloniki Metropolitan region, Proceedings of the 5th International Conference for Entrepreneurship, Innovation and Regional Development ICEIRD 2012, Sofia, pp. 298-307.

SME – A CHANCE TO RAISE EMPLOYMENT AND SPEED UP RECOVERY IN SERBIA

Prof. Dr. Miroljub Hadžić[1], Petar Pavlović[2]

[1] *Professor, Singidunum University, Belgrade, Serbia, Faculty of Business, mhadzic@singidunum.ac.rs*

[2] *Senior Advisor, Ministry of Regional Development and Local Self-Government of the Republic of Serbia, petarpavlebgd@gmail.com*

During the transition period in Serbia, which started in 2000, SME have strengthened and become important economic subjects. Due to the global economic crisis the business climate deteriorated and economic dynamism lost its momentum, which resulted in fewer chances for potential entrepreneurs to establish and start a business. Entrepreneurs are faced with a stronger fear of business failure. Support for entrepreneurs is now weaker. Small companies started their recovery in 2011 by transferring their business to less risky segments. Micro companies and shops suffered most. Dynamic SME are successful in safeguarding their vitality and perform well even in times of crisis.

GEDI is a composite indicator which keeps track of the attained level of national entrepreneurship and provides useful information for policy makers. It verifies the claim that SME development is stagnant because of a market reform slowdown and the global crisis. It also shows that a shift with respect to support measures for SME development is needed, and that: measures that prop up overall SMEE development and aim to neutralize effects of the crisis and increase employment need to be combined with additional measures of specific support for dynamic SME.

The aim of the paper is twofold: to cast light on the current level of SME development in Serbia and propose an efficient mix of measures that endorse SME development.

Keywords: crisis, entrepreneurship, SMEE, transition

1. Introduction

Over the last decade Serbia has finally started to make a shift towards becoming a market economy. It had completed the first stage of transition prior to the crisis. SME development had been encouraging and SME became important economic agents owing to their shares in total employment and the total number of economic agents, as well as to their GDP contribution. Due to the global economic crisis the business climate deteriorated and economic dynamism lost its momentum.

The business climate essential for SMEE development worsened, which resulted in fewer chances for potential entrepreneurs to establish and start a business. Entrepreneurs are now faced with a stronger fear of business failure. Social and government support for SME is weaker.

There is evidence that small companies, being flexible enough, started to recover in 2011 largely by transferring their business to less risky areas. Still, micro companies and shops have suffered most. In 2012 more companies were established than closed but the business

demography relating to shops was still negative. There are some encouraging signs now that dynamic SME have succeeded in safeguarding their vitality and performed well.

GEDI is a composite indicator which keeps track of the attained level of national entrepreneurship and provides useful information for policy makers. The GEDI ratio for Serbia during the crisis verifies that SME development is stagnant because of a market reform slowdown and adverse crisis effects. It also suggests that some changes to support measures are necessary: firstly, general support is vital for neutralizing effects of the crisis and raising overall employment and, secondly, specific support for dynamic SME has to be strengthened.

The aim of the paper is twofold: to cast light on the present level of national SMEE development and to make a case for a changing mix of measures that prop up SMEE development in times of hardship.

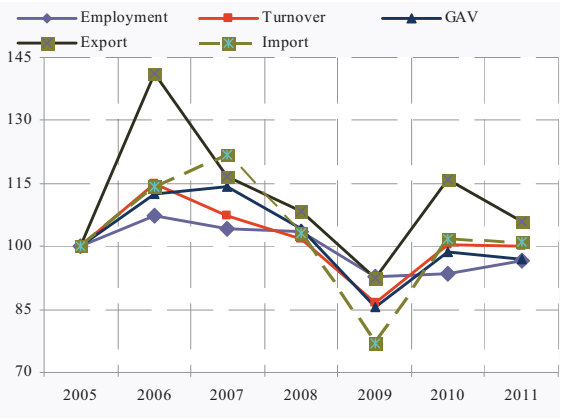
2. Recent trends and business demography

As an integral part of the overall transition process, *development of SME has been fast* over the last decade. *SME have become an important segment of the national economy* taking into account their share in the total number of economic entities, total employment, total turnover of the economy, the total value added, and export and import volumes. Before the outbreak of the economic crisis they had been more dynamic than the average of the non-financial sector. After the economic downturn of 2009 the recovery of SME has been weak due to the global economic recession and worsened economic circumstances that adversely affected the entrepreneurial attitude.

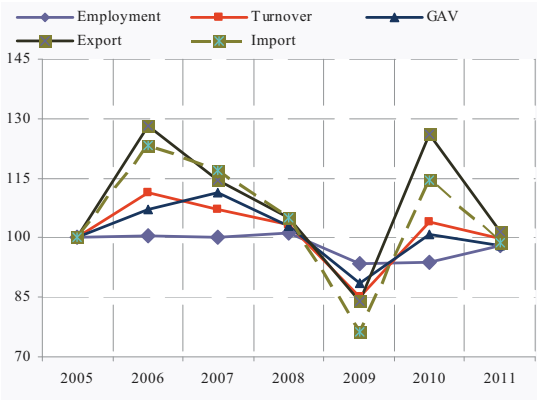
The entrepreneurial sector, still underdeveloped, has no strength to mobilize internal resources and achieve more dynamic growth. Therefore the SMEE sector has not become a leading segment of the national economy. Figure 1 shows that if one compares SMEE performance in 2011 with that of 2005, several results will stand out, such as: double the import volume (while the non-financial sector raised its import volume by 65.8%), investments (17.2% and 0.4%, respectively), and a below average decrease in the import volume (of 13.9% and 30.7%, respectively) [1].

Figure 1 SMEE indices 2005-2011 (growth % p.a.)

SMEE sector



Non-financial sector



Source: Statistical Office of the RS

By 2009 the rise in employment in the SMEE sector had been rapid enough to offset the rise in unemployment induced by restructuring of large social-owned companies. In crisis years employment decreased in the SMEE sector as well. Compared with 2005, in 2011 the number of the employed was down by 3% or 23,989 workers (14.2% of the total job cuts in the non-financial sector).

In 2011 the share of the SMEE sector in total employment was at 45.1%; it was at 51.7% in total investments, 46.5% in the total export volume, 52.7% in the import volume, while the sector contributed with 33% to GDP formation. It also generated 65.5% of total turnover of the national economy and 55.2% of the total value added.

If one tried to summarize recent trends in SMEE development in 2011, positive facts will be as follows: a slight increase in the number of entities, a humble increase in turnover (0.2% real growth), a productivity increase of 0.2% (in medium high-tech of 8.3% and in high-tech of 2.6%), an increase in export (2.9%) and import volumes (6%), the coverage of the import value by the export value of 52.3%, and a higher competitiveness (a real export growth of 9.6%, an export per employee growth of 10.7%, and an increase in the share of export in total turnover of 1 percentage point, to 12.1%) [1]. However, there were negative signals as well, such as: a decelerating trend of establishment of economic entities while their closing got momentum, decreasing employment (3.5%), a fall in gross value added (3.2%) while there were no industrial or regional changes (as for industry, the concentration is still greatest in trade, while regional concentration is still the largest in a few urban centers).

Business demography provides useful information on tendencies in the opening and closing of businesses and shops. These data are used for assessing the national SMEE development, the dynamism of new economic agents, and growth of small and medium-sized enterprises.

As a result of the economic crisis and worsened economic climate, since 2008 the number of newly established shops and businesses has been decreasing, while the number of closed ones has been increasing. Before the crisis the number of opened and closed shops had been higher than number of opened and closed businesses. Being a seasonal characteristic, shops and companies used to be established mainly at the beginning of the year, while the closing would take place at the end of the year. However, this seasonal characteristic disappeared after the crisis outbreak.

Table 1 Serbia – the number of newly established and closed SME

	No of companies		No of shops		Net effect	
	Established	**Closed**	**Established**	**Closed**	**Companies**	**Shops**
2007	11,902	2,027	47,951	31,619	5.9	1.5
2008	11,248	3,068	43,375	34,572	3.7	1.3
2009	10,014	3,597	39,365	36,441	2.8	1.1
2010	9,470	9,389	36,337	37,162	1.0	0.9
2011	8,471	13,593	33,070	35,285	0.6	0.9
2012	8,648	7,355	3,200	32,853	1.2	0.9

Source: Business Register of the RS

In 2010 and 2011 the tendencies of an increasing number of closed entities and a decreasing number of established shops and enterprises got momentum. As can be seen in Table 1, there are some encouraging signs that in 2012 the trend of a decreasing total number of shops and businesses slowed down. In 2012 compared to the year before the number of newly established companies was up by 2.1%, while the number of closed business was down by as much as 45.8%. At the same time, figures relating to newly established and closed shops were falling (-6.3% and -6.9%, respectively). Consequently, the total number of active entities in 2012 was down by 888 than the year before or by 12.5%, with different tendencies registered with companies and shops (the number of companies was up by 1,293, while the total number of shops was down by 2,653). At the end of 2012 there was 323,232 active entities, of which 105,105 companies and 218,127 shops.

Another encouraging fact is that the ratio of the number of established and the number of closed enterprises (net effect) in 2012 was much better than in 2011 (1.2 vs. 0.6). At the same time the net effect for shops remained unchanged (at 0.9). This again serves to show that shops still suffer most.

3. Implementation of legal reforms and the business climate

In October 2008 the Government of the Republic of Serbia adopted the Strategy for Regulatory Reform as a part of the transition process and the process of legal harmonization with legislation of the EU. The main objective of this move was to cut down on administrative costs and improve the legal environment for doing business.

Table 2 Serbia – status of recommendations for overall legal reforms

Status of recommendation	Number	Estimated cost cut in million □
Implemented	212	128.5
In the process	27	18.4
Not implemented	65	36.2
Canceled	36	
Total	**340**	**183.1**

Source: Office for Legal Reform and Analysis of Effects of the RS

In December 2009 the Government developed 340 proposals for amendments to regulations marked as the ones that complicate the business environment. Made on the basis of the Report released by the Office for Legal Reform and Analysis of Effects for the first three quarters of 2012, Table 2 shows that 212 recommendations were implemented and 27 are in the process of implementation [2]. In addition, all these changes to the regulatory system could mean annual savings of 183 million euros for the Serbian economy.

In order to establish an analytical basis for defining support measures for SMEE development, around mid-2012 TNS Media Gallup conducted *a survey* funded by the National Agency for Regional Development with a stratus of more than 3,000 entrepreneurs

[3]. *The survey was focused on business problems, technical and technological as well as financial and market aspects of doing business, the need for non-financial services, the use of innovations and information technologies, and human resources*. The results say a lot about the worsening of business environment and pessimistic expectations of entrepreneurs.

As for market-related aspects, entrepreneurs are mainly national market oriented, which comes as no surprise given that 11% of them are exporters/importers. The target of exporters is the market of former Yugoslav republics, while importers target markets of Italy and Germany. When it comes to the access to the global market, what matters is the size of a company – exporters/importers are mainly medium-sized companies (25% of importers and 26% of exporters), small companies (15% and 16%, respectively), while shops and micro enterprises are oriented predominantly to the national market. When asked about factors of competitiveness on external markets, entrepreneurs ranked them as follows: price and quality (rank 1.9), while least important ones are the brand (rank 4.1) and product design (rank 3.9).

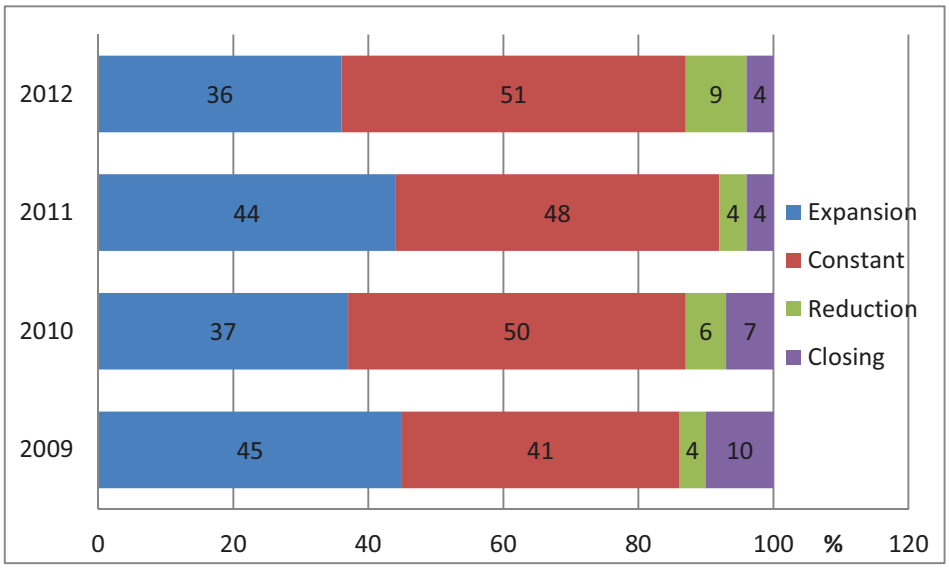
As for the technical and technological aspects of doing business, a half of entrepreneurs operate with equipment that is 5-10 years old. Almost a quarter of surveyed entrepreneurs possess equipment that is more than 10 years old, while a fifth of them possess adequate equipment. Outdated equipment is found mainly in medium-sized companies involved in construction, manufacturing industry, and graphic and medical services, while modern equipment can be found in cosmetic and recreation services, and intellectual services. Despite the difficult circumstances and expensive borrowing, 42% of surveyed entrepreneurs have invested in equipment build-up over the last three years. In the next three years 48% of them plan to invest in business, whereby more funds will go into equipment (56%) and less into real estate (36%). It is important to note that results in general are less optimistic than the year before (48% vs. 63%, respectively).

Innovations and the use of IT technologies are two very important factors for enhancing competitiveness on the global market, but they are not widely present. Only 1/5 of surveyed entrepreneurs placed a new product/service or applied an innovative process. Approximately 1/7 of these have some sort of inter-company cooperation in the field of innovations. What encourages, though, is the fact that the majority of these entrepreneurs use PCs, less than 1/2 use PCs for bookkeeping, and around 40% have Internet presentations.

Human resources are essential for the success of SMEE. On average, surveyed companies and shops have 8 employees who possess a secondary school degree and are 38 years old.

Business problems and limits to growth are multiplying. Major problems are related to the lack of financial support (rank 2.5), legal environment (rank 2.5), standardization (3.7), and a lack of market information (3.8). The least worrisome are a dearth of human resources (4) and IT (4.5). Entrepreneurs are dissatisfied mainly with their tax obligations and procedures, and the work of different inspectorates.

Figure 2 Business plans of entrepreneurs



Source: [2]

As for the impact of the global economic crisis, results look better now. In general, one can conclude that entrepreneurs perceive their problems and limits to growth in rather general terms, linked to exacerbating business climate and weaker SMEE support, and not directly to the crisis. From Figure 2 it is clear that business pessimism has prevailed: 51% of entrepreneurs do not plan on business expansion, 36% of them do, 9% of them have negative plans (reduction), and 4% of them plan to close their business. There is less optimism and more realism regarding business plans. Entrepreneurs are afraid of a lingering impact of the crisis combined with a deteriorating business climate. Shops and micro enterprises are encountered with the most problems.

4. Global Entrepreneurship Development Index

GEDI (Global Entrepreneurship Development Index) [4], [5], [6] is an indicator of quality of the entrepreneurship system, especially with regards to effects of entrepreneurship and innovation that depend on individual and institutional factors. It consists of three entrepreneurship dimensions:

- *entrepreneurship attitude (ATT)* is related to the citizens' attitude to entrepreneurship – business chances in the surroundings in the next six months, possession of skills necessary to start a business, opportunities for beginners to liaise, an absence of fear of failure, and social support;

- *entrepreneurship activity (ACT)* measures entrepreneurial activity with a potential for rapid development - chances for starting business, the quality of technology and human resources, and the level of competition;

- *entrepreneurial intentions (ASP)* is related to a complex, qualitative, and strategic

In Table 3 one can see that the GEDI value (V) for Serbia is 0.18, the rank (R) being 63; such a value is three times lower than that of the USA (0.60) that boasts the highest GEDI, and at the same time pretty lower than an average value of all the measured economies (0.29) [7]. Among countries belonging to 'the group of economies with efficiency-led development' Serbia is close to the foot. Columbia is the first in the group (0.27) and Ecuador the last (0.15). Within the region only Bosnia and Herzegovina (0.16) is behind Serbia. By the level of development combined with the GEDI value, Serbia is not very attractive by any of the three indicators (ATT, ACT and ASP) since the points are below the trend line (-0.08), as can be seen in Figure 3.

Compared to countries on a similar level of overall development and transition economies in the EU, as can be seen in Figure 4*, Serbia has comparative advantages in skills which beginners possess. Its disadvantages lie in a dearth of chances for start-ups, human resources quality, new products and technology implementation, and internationalization of SME.*

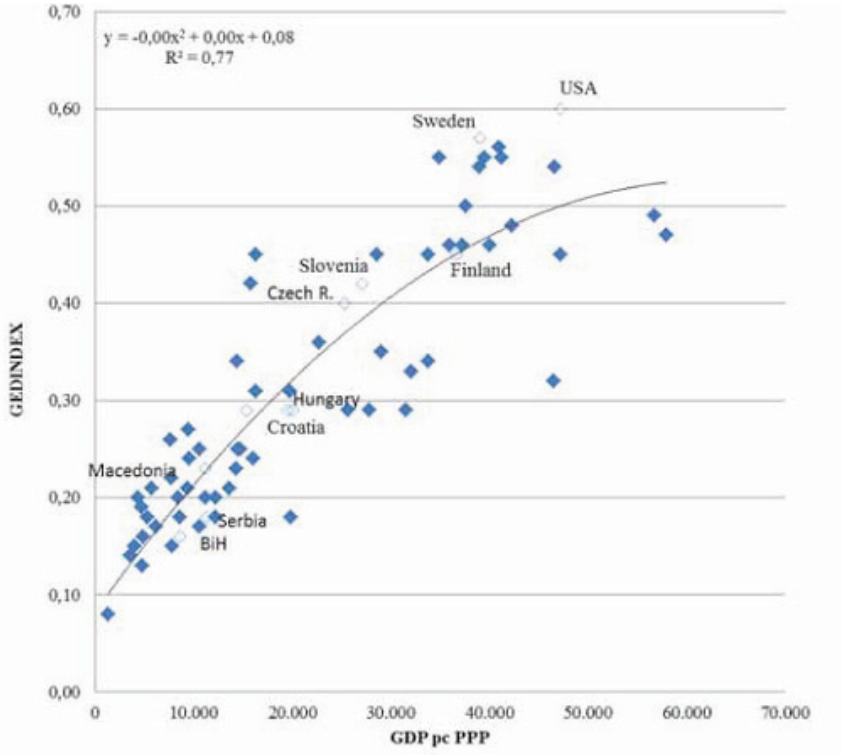
Table 3 Global Entrepreneurship and Development Index (GEDI)

	Serbia		B&H		FYROM		Croatia		Romania		Hungary	
	V	R	V	R	V	R	V	R	V	R	V	R
GEDI	0.18	63	0.16	70	0.23	49	0.29	37	0.23	48	0.29	34
A. Entrepreneurial attitudes ATT	0.28	54	0.21	67	0.26	55	0.31	44	0.22	64	0.32	41
1. Opportunity perception	0.13		0.12		0.16		0.16		0.06		0.12	
2. Start-up skills	0.71		0.42		0.46		0.53		0.41		0.53	
3. Non-fear of failure	0.13		0.09		0.09		0.32		0.22		0.31	
4. Networking	0.45		0.37		0.50		0.44		0.28		0.54	
5. Cultural Support	0.20		0.19		0.31		0.24		0.23		0.32	
B. Entrepreneurial activity ACT	0.14	70	0.14	72	0.20	57	0.30	38	0.25	45	0.35	28
6. Start-up opportunity	0.09		0.16		0.00		0.19		0.31		0.52	
7. Tech sector	0.05		0.07		0.16		0.34		0.05		0.33	
8. HR quality	0.19		0.09		0.33		0.28		0.41		0.41	
9. Competition	0.25		0.27		0.44		0.45		0.36		0.28	
C. Entrepreneurial aspiration ASP	0.12	60	0.12	62	0.23	38	0.27	31	0.21	39	0.21	41
10. New products	0.30		0.13		0.27		0.13		0.22		0.23	
11. New technology	0.08		0.00		0.05		0.22		0.08		0.09	

12. High growth	0.12	0.14	0.30	0.29	0.22	0.24
13. Internationalization	0.10	0.34	0.50	0.65	0.60	0.46
14. Risk Capital	**0.04**	**0.05**	**0.20**	**0.15**	**0.09**	**0.10**

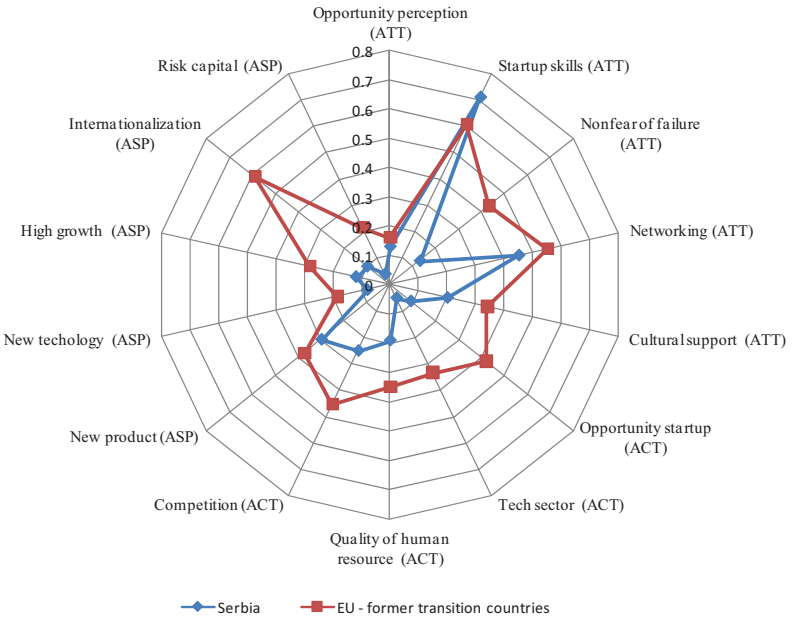
Note: V – value, R – rank, Source: Global Entrepreneurship and Development Index 2012

Figure 3 GEDI index and GDP pc



If we compare GEDI data for Serbia before and after crisis (2008 and 2012), there will be no difference in general (0.18). However, numerous factors that affect entrepreneurial activity have worsened in the meantime, and so have various indices related to different dimensions. ATT (0.29 and 0.28, respectively) - worsening business climate over the last several years has produced fewer business chances, while the fear of failure has increased and social support for SMEE weakened. ACT (0.13 and 0.14, respectively) – the level of education of entrepreneurs and readiness of employees are both rising. At the same time the competition has become stronger. The ability of entrepreneurs to invest in high-tech processes and products is now weaker. ASP (0.12 and 0.12, respectively) – implementation of IT and innovation is in decline, and so is the ambition to become a global market player. All in all, *SMEE development has been stagnant over the last several years due to a slowdown of market reforms and the global crisis*.

Figure 4 GEDI - Serbia and EU former transition countries



Source: Global Entrepreneurship and Development Index 2012

6. Conclusion

Recent developments in the Serbian SMEE sector show that small and medium-sized enterprises seem to have succeeded in adjusting to adverse business conditions, although micro enterprises and shops still suffer a lot. As for the crisis, entrepreneurs see fewer chances for starting a business and have a stronger fear of failure, which results in more pessimistic business plans. Government support for the SMEE sector has become weaker because of multiplying public consumption problems (budget deficit). More importantly, the overall business climate has deteriorated and entrepreneurs have become highly dissatisfied with expensive crediting, heavy tax duties and procedures, and the conduct of different inspectorates.

Based on these findings several important recommendations for policy makers can be made. Firstly, although Serbia has seen the start of the second stage of SMEE development in which it is more appropriate to introduce specific support measures, *in order to raise overall employment and neutralize the impact of the global crisis a general SMEE support has to be reintroduced*. In other words, before the crisis the SMEE sector with rising employment had been an important factor in neutralizing increasing unemployment induced by restructuring of large companies. However, during the crisis unemployment has become extremely high and even SMEE reduced their employment. Given that the investment volume per employee in the SMEE sector is lower than in large companies, with general support for SMEE development in place one can expect beneficial effects on employment growth. It is also important to note that the SMEE sector is still underdeveloped and has not become a leading economic agent. In other words, it has no strength to mobilize resources on its own, without any support.

Secondly, it is equally important to *continue providing specific support for most dynamic companies* (this being an appropriate policy for the second stage of SMEE development) because these companies have demonstrated an ability to grow fast even in crisis circumstances. Fast growing companies and gazelles have not suffered like other SMEE – they have preserved high rates of growth and improved their business indicators, including the access to the global market. These companies and their contribution are critically important for improving overall competitiveness of the national economy.

The third line of activities is more general and relates to *the new development model*. Namely, over the transition period Serbia has practiced 'growth without development' as growth, although fast, has been based on the increase in personal and public consumption, and this is unsustainable in the medium run. A new development model has to rest on: export demand, an increase in employment and investments, a decrease in public consumption, and strengthening of industry.

References

1 Ministry of Finance and Economy, Ministry of Regional Development and Local Self – Government, National Agency for Regional Development – Report on Small and Medium-sized Enterprises and Entrepreneurship, 2011, Belgrade, October 2012

2 Office for Legal Reform and Analysis of Effects of the RS - Report of the Office for Legal Reform and Analysis of Effects for the first three quarters of 2012, Belgrade, 2012

3 National Agency for Regional Development, TNS Media Gallup – Conditions, needs and problems of small and medium-sized enterprises and entrepreneurship, Belgrade, May 2012

4 Zoltan A.J., Autio E, Szerb L. – National System of Entrepreneurship: Measurement Issues and Policy Implications, February 2012

5 Szerb A.M. - Measuring the entrepreneurial behavior of the established business: an individual and a country–level investigation, 4th GEM Research Conference, London Imperial College, 2010

6 Szerb L., Zoltan A.J. – The Global Entrepreneurship and Development Index Methodology, 2011

7 The George Mason School of Public Policy's Center for Entrepreneurship and Public Policy (CEPP) – Global Entrepreneurship and Development Index 2012, 2012

MICROINSURANCE DEVELOPMENT PROSPECT THE CASE OF ROMANIA

Vintileanu Cristina Monica[1], *Stylianos Kechagias*[2]

City College, 13 Tsimiski Str, Thessaloniki, Greece, cristina.vidis@yahoo.com; Kehaghias@city.academic.gr

Abstract

This research explores the Microinsurance concept by reviewing the main aspects related to it, from its connotations and its development framework up to the evaluation of the development prospects in Romania.

The main objective is to identify the perception of insurance companies' representatives of the development prospects of microinsurance - insurance addressed to poor people - in Romania where microinsurance represents an opportunity for both business and social organizations. The secondary purpose is to identify and analyse the business determinants in developing the microinsurance market as well as the key success factors for implementing such an initiative in the Romanian market.

This exploratory research uses a qualitative survey method for obtaining an in-depth understanding of insurance business decision makers' opinion towards the microinsurance development prospects in Romania. Considering the segment concentration, the research is based on semi-structured interviews. Linking the existing available literature with the research findings, this study addresses the complexity of the microinsurance development framework, highlighting a range of aspects from the organizational mindset shift required up to practical implications to be considered in developing this new market.

Introduction

Microinsurance is primarily a phenomenon encountered in developing countries in the light of a low insurance penetration and ineffective social government protection schemes, where the main actors are the low-asset individuals ignored by commercial and/or social protection insurance schemes, especially those persons working in the informal economy.

Schuck (2005), McCord et al. (2006) and Heydel et al. (2009) support that microinsurance emerged to fill the gap between the protection need of the low-asset individuals excluded from commercial and social insurance schemes, the inefficient social protection systems in developing countries and the new market opportunity for insurers.

Review of the literature

The microfinance movement has been constructed on a three pillar foundation of developmental financial services, *microcredit*, *microsavings* and *microinsurance*. The greatest contribution of microinsurance is its dual role in alleviating poverty and vulnerability, one of extending social protection for the low-asset individuals in the absence of appropriate government programs and

one of developing a new market perspective (Prahalad, 2004) with appropriate business models that will enable the low-asset people to become a sustainable market segment for insurance companies.

Poverty alleviation is the cornerstone of many microfinance initiatives (Khandker, 1998, 2005). Microfinance is an emerging phenomenon that addresses the individuals previously excluded from formal means of borrowing, savings and insurance and their immediate community, developing a new way for financial services (credit, savings, insurance, mortgages and retirement plans) to potentially stimulate economic growth in developing countries through market-driven business initiatives.

Since the turn of the Millennium, microfinance has widely broadened in scope. Armendariz and Morduch (2005) and Leeuw (2009) support that the microfinance concept refers to a wide range of financial services with a major focus on microcredit, microsavings and microinsurance.

Churchill (2006, p. 12) defined the concept of microinsurance as, “the protection of low-income people against specific perils in exchange for regular premium payments proportionate to the likelihood and cost of the risk involved”. Hinz (2009) replaces “low-income people” expression with “low-asset people” considering that the people’s assets dimension distinguishes between microinsurance and conventional insurance.

Siegel et al. (2001) and Mosley (2009) consider microinsurance a social risk management tool taking into consideration (a) the risk transfer mechanism as the foundation of insurance, (b) the provision of private protection services in an environment characterized by imperfect information and high transaction costs and (c) the opportunity created by microinsurance to empower low-asset family groups to access better insurance and finance services and to socially include other individuals outside the group in question.

The development of microinsurance is still in a relatively early stage, supported in large part by donor initiatives and the corporate social responsibility programs of large insurance companies. Donor funding was important from the outset with the involvement of GTZ, DFID, the World Bank, and others. Several authors raised the concern that donor funding may distort the inputs and outputs of microinsurance enterprises (McCord, 2002; McCord, Isern, & Hashemi, 2001; Herndorf, 2010) although “there is cautious optimism that donors can play a valuable role in developing the still nascent microinsurance market” (Koven and Zimmerman, 2011, p. 9)

Although the concept received increasing attention relatively recently, microinsurance may be considered already well disseminated around the world. A number of 77 countries of 100 poorest countries in the world, according to Roth et al. (2007) have microinsurance programs and in many countries, “microinsurance models are already an integral part of the implementation process of a comprehensive social protection system” (Silva, and Afonso, 2011, p.4).

In Central and South America, 7.8 million people (about 10% of the entire population) are covered by microinsurance; the majority of these, 6.7 million people, are from Colombia and Peru (Roth et al., 2007). In Africa, microinsurance is quite limited, corresponding to a mere 4% (3.5 million) of all lives insured of the 100 poorest countries in the world. Moreover, approximately 1.6 million of those insured are living on less than US$2 per day (Roth et al., 2007). Most of the lives insured by microinsurance in the 100 poorest countries come from Asia, which includes more than 67 million people (Roth et al., 2007). The majority (more than 58 million) is concentrated in India (more than 30 million) and China (more than 28 million). Nevertheless, more than 97% of poor people in Asia do not have any kind of microinsurance coverage.

All evidence so far (Churcill, 2002; Cohen and Sebstad, 2005; Churchill, 2006, Hinz 2009) indicate that the low-asset people are in demand for formal insurance as a risk coping mechanism depending on background, gender, ethnicity, cultural beliefs and, wealth levels, demand that exists together with a wide array of informal individual or group mechanisms to manage risks before happening (ex ante) and to cope with shocks after they occur (ex post).

Microinsurance supply chain

The microinsurance supply chain is made up of five components: *Reinsurer* – provides insurance to insurers for catastrophic risks, *Insurer* – carries the insurance risk, *Delivery channel* – sells the insurance policy and provides basic customer servicing, *Policy holder* – buys the product (can be individuals or groups) and *Covered lives* – those who benefit from the cover (normally family members, or group members for group policies).

Key issues for microinsurance suppliers

The key issues for microinsurance suppliers according to Huber et al (2003) are the development of products in the context of lacking accurate profile information, a sound delivery channel, market barriers, and the insurance regulatory system

Key Success Factors
Dawar and Chattopadhyay (2002), Chesbrough et al. (2006), London and Hart (2004), Hart (2005), Seelos and Mair (2007) concluded that a successful operation in low-asset markets would necessitate a business model innovation as a key success factor while Letelier et al. (2003) recommended the business model should bridge the tensions between modern and traditional values, enabling the “Bottom of the Pyramid” to enjoy modern values without giving up on their traditional values

In this respect, Klein (2008) built a framework of business model qualities which include the *firm’s value proposition*, *local capacity building* through the company’s business model, the *embeddedness of the organization within local communities*, *inclusion of learning* in the business model, and *scalability* of the business model

One of the most successful examples of microinsurance development is the Pep-Hollard[1] model in South Africa. As identified by Smith and Smit (2010), the key success factors that contributed to its success are: low distribution costs due to available infrastructure, low costs by provision of limited information and no advice (less training and accreditation costs and increase use of call center services), commitment to success by the parties involved in the joint venture, extensive experience in product packaging, pricing and design allowing the operation to handle unexplored markets, thus resulting in a product offering that is not only financially sound, but offers clients value and addresses the needs of the insurance underwriter as well as of the distribution partner.

The Brazilian microinsurance models analyzed by Bester et al. (2010) have been successful because of a variety of distribution channels, special emphasis on quick and efficient client service and active and incentives based sales model.

Romanian insurance industry context

The insurance industry is operating in unstable economic conditions (with decreasing purchasing power increasing unemployment) and undergoing financial services reforms with no specific microinsurance legislation (although microfinance is well developed and regulated since 2007, which is often a pre-requisite for the successful launch of microinsurance into a new market). Population demographics show an unbalanced split between rural/urban populations (76%/24%) which, along with a slow but continuous insurance penetration rate and density, invites to consideration for microinsurance introduction.

Romania presents attractive development prospects – large underinsured market, new international players in a context of constantly developing market regulatory requirements for service quality standards and an increasing customer awareness and sophistication.

This research focuses only on the life insurance segment (including credit life, disability, savings and health products) since most of the successful microinsurance projects (AIG Uganda; CARD MBA, the Philippines; Delta Life, Bangladesh; MUSCCO, Malawi Union of Savings and Credit Cooperatives; Spandana, India; TATA-AIG Life Insurance Company Ltd., India; Madison Insurance, Zambia) started with one of the most affordable products, which is credit life or loan protection or with at least one life protection product, and subsequently built a substantial client capital base expanding life insurance benefits followed by non-life (property) benefits.

Research methodology

This exploratory research used a case study qualitative analysis based on a multiple case method. It focuses on the insurance industry as the main player in the development of a microinsurance scheme in Romania.

Research Questions

1. What are the perceived internal and external determinants that might motivate insurance companies to develop the microinsurance market in Romania?
2. What are the perceived key success factors for successfully implementing a microinsurance initiative in the Romanian market

Interviews

Fourteen interviews were administered in 2011 with interviewees in nine large insurance companies in Romania. The research instrument was piloted before the interviews took place.

The interviewees consisted of chief executive officers and directors (marketing, financial, sales and operationa), over 40% of respondents hold at least one academic degree while all respondents have more than 5 years experience in the specific industry.

Research Findings

At organizational level, a detailed overview regarding the potential development of microinsurance in Romania was provided by respondents, which is summarized in the following table

Opportunities and Threats for microinsurance development in Romania

Opportunities	Threats
Growth of the microcredit business (bundling of loans with insurance in order to protect the debtor) Mutual or cooperative schemes built on formal or informal risk-sharing groups (as opposite to individual risks). Innovation in product development and distribution, targeting simplicity. Enabling technology (point-of-sale terminals, mobile devices, smart cards, etc). Support and involvement of insurance supervisory and fiscal authorities.	Low-asset people cannot afford to pay for anything more than their daily needs. Many of the potential clients do not understand the concept of insurance (that of "paying money in exchange of a promise") or are illiterate (unable to read, understand and sign a contract). Inability to build credible products and pricing due to lack of information Due to small sums involved, the acquisition and administrative expenses would be a multiple of the premium. Unreasonable cost of selling (including communication and educational campaigns). Individual risk underwriting and as well as the individual claim control would not be economically viable.

55% of interviewees declared they are reluctant to enter a risky new market (that of microinsurance) in the absence of a guarantee that the external environment (including specific market regulations, fiscal incentives, subsidies, etc.) is prepared to host such an initiative. At the same time, over 85% of all respondents agreed that the timing for approaching a risky new market is currently not appropriate provided the existing economic circumstances. Three organizations declared no interest for the time being in focusing on new market segments.

Research Question 1 - What are the internal and external determinants that might motivate insurance companies to develop the microinsurance market in Romania?

In the context of uncertain economic and regulatory conditions, most of interviewees(over 70%) identified a minimum *four major challenges for the current period*, in the following order: *capital requirements under new regulations* which can reconfigure their activity in terms of products and distribution channels, *flexibility requirements of the distribution and support systems*, which can increase the variety and sophistication of distribution platforms, *improvement of process efficiency* and increase of customer service level and *development of new business opportunities*, with direct positive effects on the costs structure and business volumes.

The first three challenges require internal skills and resources to be focused on the organizations' activity alignment with regulatory constraints and customer service standards, whereas the last challenge requires organizations to identify those business opportunities that best match their level of development in terms of capabilities and risk appetite. Only two large companies from the

participating organizations confirmed that expanding into new market segments is on their priority list in a short – medium term.

The main internal business determinants agreed by the interviewees if they were to consider the microinsurance market are:
(1) Potential additional business revenues generated by the market volume and the under-insurance degree (unanimously confirmed by respondents).
(2) Opportunity of business diversification with impact over the product and distribution portfolio and processes innovation was mentioned by the majority of respondents (86%).
(3) Reputation advantages factor was proposed as a business determinant by only two large companies.
(4) Timing of microinsurance business initiative**.** Since Romania is an emerging market that still experiences the effects of the economic crisis, it is understandable why all interviewees, with the exception of representatives of the two companies considered that the best timing for such an initiative is not the current period.

Having in mind the shrinking profit margins within a growing competitive market*, the main external business determinants* that have been identified are the following:

(1) Potential strategic distribution alliances/partnerships. Most respondents (86%) considered that this will constitute a competitive advantage in approaching the microinsurance market. A large potential microinsurance sales force through a banking correspondent network as well as a retailer network with their corresponding sales force can be translated into a significant microinsurance sales force.
(2) Relatively easy-to-access population. According to over 70% of respondents, most of the Romanian population who live in rural areas are served by utilities (so included into a database) and use a mobile phone and only a minority benefit of credit or payment cards or a bank account.
*(3) An engaging target market***.** Based on market intelligence, the general view of top management respondents is that the low-asset market is an engaging target market aspiring for a better life style, but not prioritizing insurance*,* with a relatively well defined sense of "consumerism", although the current economic circumstances are creating a savings rather than a spending culture.
*(4) Increasingly sophisticated insurance industry, that does not provide microinsurance products***.** The majority of respondents agreed that the Romanian insurance industry has relatively recently developed to European standards, is well-organized, comprises of multiple players operating through multiple channels and uses a diversity of products for mass market insurance. However no company addresses insurance needs of low-asset individuals, which may represent an opportunity for an innovator in the microinsurance area.
(5) Regulatory incentives and labor legislation. The general opinion reflects the idea that the ideal regulatory environment is the one that neither over-promotes the market thus distorting it, nor creates barriers by rigidly imposing traditional guidelines, but ensures a business development environment adapted to the "Bottom of the Pyramid" context.

Research Question 2 - What are the perceived key success factors for effectively implementing a microinsurance initiative in the Romanian market?

Respondents recognized a major benefit in developing the microinsurance market through establishing *a valuable partnership with entities* already active in their target market environment (banks, donor funding/non-Governmental organizations) making reference to their existing infrastructure within the low-asset communities, their extensive understanding of the low-asset people profile (in terms of risk perception and limited education), habits and cultural beliefs and to

their already to built trust and credibility as a partner institution interacting with the community. *The local capacity building*, should not be implemented through the traditional expensive cash-based distribution channels, but via an existing collection system, specifically by partnerships with large retailers in all business areas (banks, cell phones, clothing, food, etc).

Product value proposition is considered by Klein (2008) a business model quality. Respondents' contrary opinions existed regarding whether microinsurance products should be supply (71%) or demand driven (29%).

Technology – ranging from customer interface and transaction processing to data analysis. The aspect that all respondents raised was the reduction of transaction costs (the cost of company – client interaction) since they will reduce administrative overheads with direct impact on customers' insurance premiums and the improvement of routine production processes, thus releasing resources from administrative activities and redirecting them into product innovation and marketing. Most respondents (86%) assumed that organizations with high technical abilities would timely identify how profitable the activity is and whether, and to what extent, this activity achieved its social purposes as well, with positive impact on the overall growth of the industry.

The microinsurance provider's capacity refers to aspects with direct impact over the efficiency of the operation, such as:
(a) Sound company Management and Governance;
(b) Microinsurance product development capacity in terms of pricing them on a sound technical/actuarial basis that will ensure adequate premium rates and claims reserves and an accurate estimation of future losses and will also establish guidelines for selecting risks and determining the profitability of the company's products;
(c) Risk underwriting (process through which the insurance company accepts or rejects the risk of insuring) capacity in the sense of building capabilities of checking and confirming the accuracy of client information, of formulating underwriting guidelines, of monitoring changes in the market characteristics and their portfolio while preserving the simplicity and efficiency of the process;
(d) Marketing as a critical ingredient for operation success enclosing product education, training, materials, knowledge and time required to educate and sell to clients and to build their loyalty;
(e) Claims management as to develop processes to verify that only valid claims are paid out and to be conducted by specialized personnel who have the knowledge and experience to assess the validity with accuracy and consistency in a timely manner
(f) Investment management referring to sound investment strategies focusing on the liquidity and regulatory impacts and particularly on the inflationary risks that the Romanian market environment exhibits
(g) Adequate reinsurance whereby insurance companies transfer portions of their risk portfolio to reinsurers in order to spread the risks across alternative institutions. The adequacy of reinsurance resides in sticking the balance between the risks transferred and those retained by the company with impact on profitability.

Conclusions

From a medium to long-term perspective, Romania, as a European Union member state, will continue the catching-up process, which means that insurance players can expect a growth of the local insurance market for the next 5-10 years, at a moderate level considering that currently Romania has a high inflation rate and its population has among the lowest income levels on an average, which limits the speed of insurance development.

As for insurance companies, the market corrections registered in the last couple of years improved the level of market maturity by forcing shareholders to review business models and implement more sustainable strategies, aligned with the realities of a changing marketplace. The expected growth will be founded on increasing insurance penetration, especially in the area of mainstream commercial insurance.

Microinsurance is an important risk mitigation tool for the low-income market in Romania that may be used as a social protection instrument since growing private risk mitigation reduces the social protection responsibilities of the state and, consequently, there is a sound rationale for the state to provide fiscal incentives for the microinsurance market development.

Specifically in Romania, the main issues to be addressed for a successful microinsurance activity development are:

(1) Given its specific characteristics, microinsurance warrants a separate set of insurance regulations, as regards the typology of providers (specialized microinsurers or traditional insurers or both), the special treatment of microinsurance operations (observing the prudential criteria, governance and compliance proportionally to the operational risks incurred), product types and parameters as to be distinguished from the traditional product lines, distribution channels and financial education that should stimulate awareness and hence microinsurance market development.
(2) There is a need to identify and evaluate tax concessions that should be considered for microinsurance providers for reducing the costs of microinsurance, but expressed as provision of the microinsurance product rather than as a concession or subsidy directly to consumers.
(3) Microinsurance should be distinguished from popular insurance in the sense that it specifically targets the low-asset population and consequently the entire business model should be designed in an innovative and non-conventional way.
(4) Considering the impact of regional differences in the microinsurance business development, the business strategy of microinsurance providers (either exclusively specialized microinsurance providers or large insurance companies providing microinsurance as well) should be adapted accordingly, within an insurance regulatory and fiscal environment that recognizes the impact of this activity in social value creation.

5.1. Limitations and further research

The microinsurance concept is relatively new and rather complex and it is possible that interviewees, for reasons of lack of time, did not have adequate information to fully understand the phenomen0n's characteristics and its interdependencies.

There is obviously a lack of available literature in the area of microinsurance supply in Romania and insufficient literature in respect to market demand. The present research may be considered as a first step in exploring the development premises of the microinsurance phenomenon in Romania that opens up new avenues for future research.

There is a lack of financial metrics and/or peer benchmarking both at organizations' level and for the industry as a whole in order to determine which specific factors drive business success (and which drive both business success and social value creation) and, consequently, which microinsurance operations have been truly profitable, which are on a trend to profitability and which are unlikely to be profitable.

In this respect, further research could focus on the calculation of the impact of various key success factors on both business and social value creation as well as on the identification of the microinsurance business model that best fits the characteristics of the demand profile in the post-crises Romanian environment. Similarly, further research may approach the rest of stakeholders involved in the creation of microinsurance market in Romania, from microfinance organizations, donor and other non-governmental organizations to insurance regulators with the purpose to evaluate their overall appetite and determinants for developing the microinsurance market.

References

1. Bester, H. et al (2010), Case study: Microinsurance in Brazil, The Centre for Financial Regulation and Inclusion.
2. Chesbrough, H. et al (2006), Business models for technology in the developing world: The role of non-governmental organizations. *California Management Review,* 48(3), p. 48–61.
3. Churchill, C. (2002), Trying to understand the demand for microinsurance. *Journal of International Development,* 14 (1), p. 381 - 387
4. Churchill, C. (2006), What is insurance for the poor? in: C. Churchill (ed.), *Protecting the poor: A microinsurance compendium*. International Labour Organization, Geneva, p. 12-22.
5. Cohen, M. and Sebstad, J. (2005), Reducing vulnerability: The demand for microinsurance (draft article). *Journal for International Development,* 17(3), p. 397–474.
6. Heydel, T. et al (2009), *Needs assessment and feasibility study on disaster microinsurance: Empirical findings from four provinces in Indonesia*. GTZ, Eschborn.
7. Herrndorf, M. (2010), The ugly duckling turned rich – LeapFrog's approach to microinsurance. *Next Billion*. June 2010
8. Hintz, M. (2009), Micro-Impact: An impact study on microinsurance in Indonesia, *Prosper* ed. 5. International Cooperative and Mutual Insurance Federation (ICMIF), London, p. 17-19.
9. Huber, G.et al (2003), *Mutual health organizations (MHO) – five years experience in West Africa: Concerns, controversies and proposed solutions.* Eschborn, GTZ, Division 4300, Health, Education, Social Security – Social Health Insurance in Developing Countries.
10. Klein, M.H. (2008). *Poverty Alleviation through Sustainable Strategic Business Models: Essays on Poverty Alleviation as a Business Strategy*. Unpublished M.Ed., dissertation. Erasmus Universiteit Rotterdam
11. Koven, R. and Zimmerman, E., (2011), *Is there a business case for microinsurance? A recent literature review.* Microinsurance Center, April
12. Leeuw, F. (2009), *Impact of microcredit: 3ie Synthetic Reviews SR 003 - Protocol April 2009*. International Initiative for Impact Evaluation, New Delhi.
13. Letelier, M.F. et al (2003), Developing productive customers in emerging markets. *California Management Review*, 45(4): 77–103.
14. London, T., & Hart, S.L. (2004) Reinventing strategies for emerging markets: Beyond the transnational model. *Journal of International Business Studies,* 35(5), p. 350–370.
15. McCord, M.J. (2006), The Partner-Agent Model: Challenges and Opportunities, in C. Churchill (ed.), Protecting the poor, A microinsurance compendium, International Labor Organisation, Geneva.
16. McCord, M. J. (2002). The Lure of MicroInsurance: Why MFIs Should Work with Insurers. The MicroInsurance Centre.
17. McCord, M. J. et al (2001), Microinsurance: A Case Study of an Example of the Full Service Model of Microinsurance Provision Self-Employed Women's Association (SEWA). MicroSave.
18. Morduch, J. (1995), Income smoothing and consumption smoothing, *Journal of Economic Perspectives* 9(3), p. 103-114.

19. Mosley, P. (2009*),* Assessing the success of microinsurance programmes in meeting the insurance needs of the poor. DESA Working Paper No. 84
20. Prahalad, C. K. (2004), *The Fortune at the Bottom of the Pyramid: Eradicating Poverty Through Profits*. Upper Saddle River, NJ: Wharton School Publishing.
21. Roth, J. et al (2007), The landscape of microinsurance in the world's 100 poorest countries Report. The Microinsurance Centre, April.
22. Schuck, C. (2005), Indoneslen: Eine Demokratie ohne soziale Verantwortung, in: R. Jordan (ed.), *Soziale Sicherheit und Demokratisierung in Indonesien*. Asienhaus, Essen, p. 25-36.
23. Seelos, C., & Mair. J. (2007), Profitable business models and market creation in the context of deep poverty: A strategic view. *Academy of Management Perspectives*, 21(4), p. 49–63.
24. Siegel, P. et al (2001), Viewing micro-insurance as a risk management tool. Social Protection Discussion. Paper no. 0115. Washington DC: World Bank.
25. Silva, K.R. and Afonso, L.E., (2011) A study on life microinsurance in Brazil. 11º Congresso USP de Controladoria e Contabilidade, Universidade de São Paulo
26. Smith, A. and Smit, H. (2010) Case study: Hollard Insurance and Pep, The Centre for Financial Regulation and Inclusion.

MODELLING AND METAMODELING OF E-HEALTH SYSTEMS: AN INTRODUCTION

Besim Verdi Abdullai[1]

[1]*Department of Computer Sciences, University of Vienna, a0867903@unet.univie.ac.at*

This paper focuses on a research methodology which puts modelling techniques in focus. Some of the application scenarios presented in this paper should form the basis for further interesting research perspectives of applied modelling and metamodeling in the e-health systems. The main reasons behind introducing this new approach are high demands in integrity, interoperability and security of e-health systems. Through empirical analysis it is shown that metamodeling can resolve many of interoperability issues of different systems, hereof to including e-health systems. The system design process is based on human centred design approach, therefore I consider as very important for the modeling process two components, in one side mental models, and user-centred requirements engineering on the other.

Keywords

Modelling, metamodeling, human-centred design, personal e-health systems, mental models, user-centred requirements engineering

1. Introduction

This paper focuses on a research methodology which puts modelling techniques in focus. In the next chapters I am going to represent a research methodology rather than a practical implementation of metamodels. Some of the application scenarios presented in this paper should form the basis for further interesting research perspectives of applied modelling and metamodeling in the e-health systems. The main reasons behind introducing this new approach are high demands in integrity, interoperability and security of e-health systems. Through empirical analysis it is shown that metamodeling can resolve many of interoperability issues of different systems, in this case to personal e-health systems. Following I am going to represent the human centred design process approach which is a iterative process based on the following methodology: Firstly, I identify the need for human centred design, I commit analysis (understand and specify the context of use), commit requirements engineering for our system (specify the user and organisational requirements), represent the design solution (in our case product re/design, the design of our model for the system and the state of the art ontology re/design). After the design activity the evaluation process takes place, which based on results from analysis and requirements phase should prove if the design solution satisfies the specified requirements. As one can see this approach is different to the “waterfall model” which is broadly used in the software engineering.

At the end of this paper I am going to present few challenges that I face in the research process and open research questions for the future.

2. Models and metamodels in e-health

Metamodeling is a concept derived from the Greek words Meta and model, whereas Meta has the meaning of "after","along with", "beyond","among", etc. For many researchers, a meta-model is seen as a Model of models (Völter, 2012, Strahinger, 1996). Start point for modelling are Domains (our Ontology can be a domain), which contain experiences from a field (in my case personal e-health systems). Domains are elements of the "real world"; they are explained through a given model, whereas elements of the model are explained from Metamodels. As regressive results, one concludes that metamodeling explains metamodels, Domains of which are actually modeling languages.

Before one can speak about metamodels, one should speak about models, as since without models, there are no metamodels. According to (Bézivin, 2003) "the relation between a model and its metamodel is also related to the relation between a program and the programming language in which it is written, defined by its grammar, or between an XML document and the defining XML schema or DTD". He goes further by saying "everything is a model", which became a principle in the modeling world.

Many researchers have introduced the hierarchy of four-level architecture of metamodeling, which incorporates new modeling standards (Völter, 2012). Some of them explained the lack of this infrastructure with the possibility to improve it (Atkinson & Kühne, 2003), and some of them achieved to go further in developing this architecture up to the n-layer (Strahinger, 1996, Karagiannis & Höfferer, 2003).

The lowest in the hierarchy of metamodeling is the layer 0; the "real world" instance. This layer contains objects and facts to be modelled or with other words, it contains concrete information of an object from the "real world", for example, *user data*: the type Person, with ID, name, surname, etc. The second layer is the layer Model. This layer explains the Instance through a Class, thus the Model is of type Class, which contains an ID, name i.e. Person, attributes i.e. name, surname, etc., operations, associations, etc. The third layer is the Metamodel, which contains the Type i.e. the Classifier, with its ID, Name i.e. Class, features i.e. attributes, operations, associations, etc.

The third layer is the Meta-Metamodel and it holds a model depicting information of layer 2, which is of type Classifier, with its ID and Name, i.e. Classifier. This layer is also referred as the MOF (Meta Object Facility).

The last layer in the hierarchy is the modeling language layer. Metamodeling languages in the Computer sciences appeared in recent years, enforced from UML of OMG and other metamodeling languages as a mean to build or implement metamodels such as Adonis (Adoxx) (Karagiannis & Kühn, 2002), M-Telos (Nissen& Jarke,1999), i* (Mylopoulos, 1992, 1999, Yu, 1999), etc.

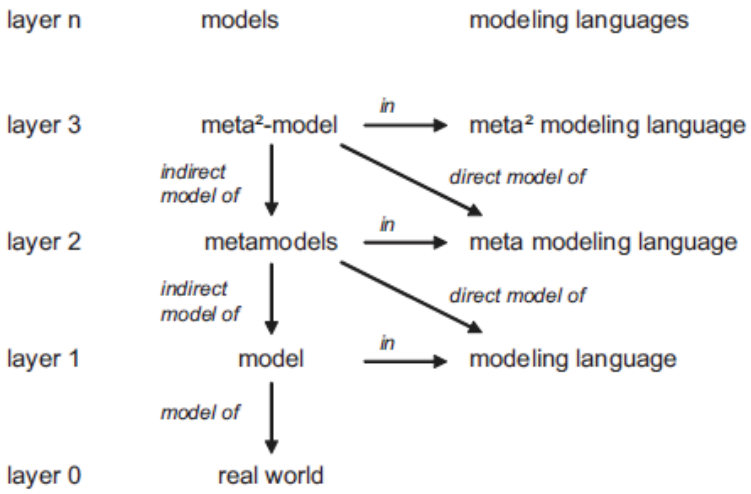


Figure 1 Metamodeling layers (after (Strahinger, 1996, Karagiannis & Höfferer, 2006))

The idea behind this chapter is to gain a general perception of what I am going to implement in the future steps of our research, while not reinventing the wheel. I am not reinventing the way metamodels are made, but I am going to present how one can use the actual knowledge from implemented metamodels to resolve actual issues in our field of interest.

In the reviewed literature one can find very useful approaches about how one can define (Kühn, 2004) or use metamodels (Karagiannis, Höfferer, 2006). The later identified two main usages of the metamodeling concept: in the first hand, for *design* purposes and in the other hand to resolve *integration* problems. The same authors concluded after an empirical analysis that there are three different aspects for research work on metamodeling*: design, use* and *implementation* of metamodels. *Design* is about how metamodels are actually represented, *use* is about how metamodels are applied, and *implementation* is about how applications of metamodels are implemented.

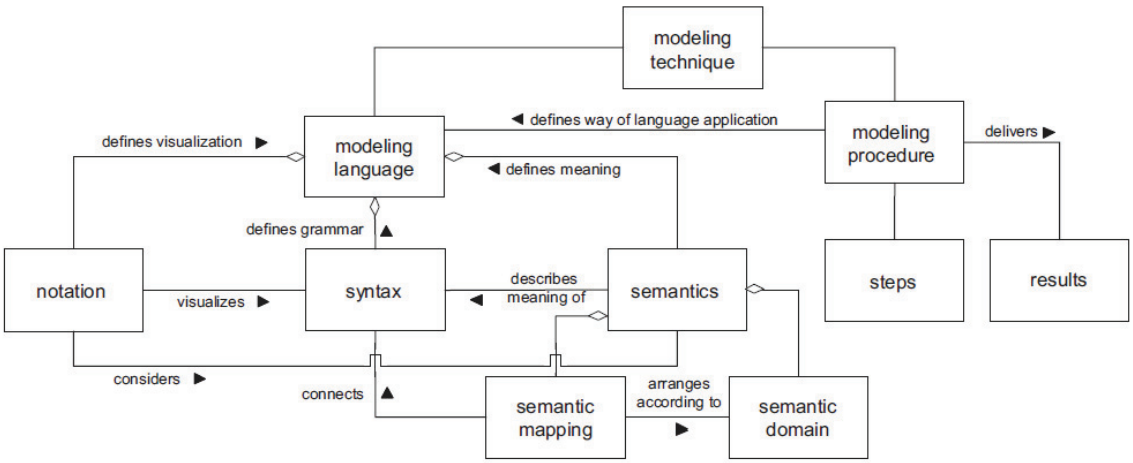


Figure 2 Elements of modeling technique (Kühn, 2004)

One should agree also with their conclusions that in the "domain" of requirements engineering on the macro or micro level design, there are no papers or research articles presented in one of ten most renowned research databases. Therefore, I will be introducing the idea of design of personal e-health systems through metamodels in the design perspective, taking into account *requirements engineering* and *mental models*.

Beside this, I am going to stress the concept of ontological metamodeling by (Atkinson, C. and Kühne, T. 2003), as an approach toward implementing a metamodel that will satisfy all mentioned requirements from the above mentioned authors. Ontological metamodeling after (Karagiannis & Höfferer, 2006) and (Kapel et all, 2006) is called *"lifting",* or from some others as *ontology anchoring* (Brinkkepper et all., 1999), which represents the linkage of model elements with concepts of ontologies.

The idea behind introducing ontologies is to map different models that are modelled for the same purpose, but, in different circumstances and from different metamodels. Here linguistic modelling and also ontological modeling is taken into account. (Karagiannis & Höfferer, 2006) argued that reduction of mapping complexity is achieved using the semantics of an ontology. Ontological metamodeling ("lifting") allows implementation of inherent semantics "as it describes a kind of "inner meaning" of modelled resources that is exceeding the type semantics that is being inherited by elements of the metamodel layer" or according to (Atkinson & Kühne, 2003), the ontological instance of relationships relate user concepts to their domain types and relate entities within a given level i.e. what concept exist in a certain domain and what properties they have.

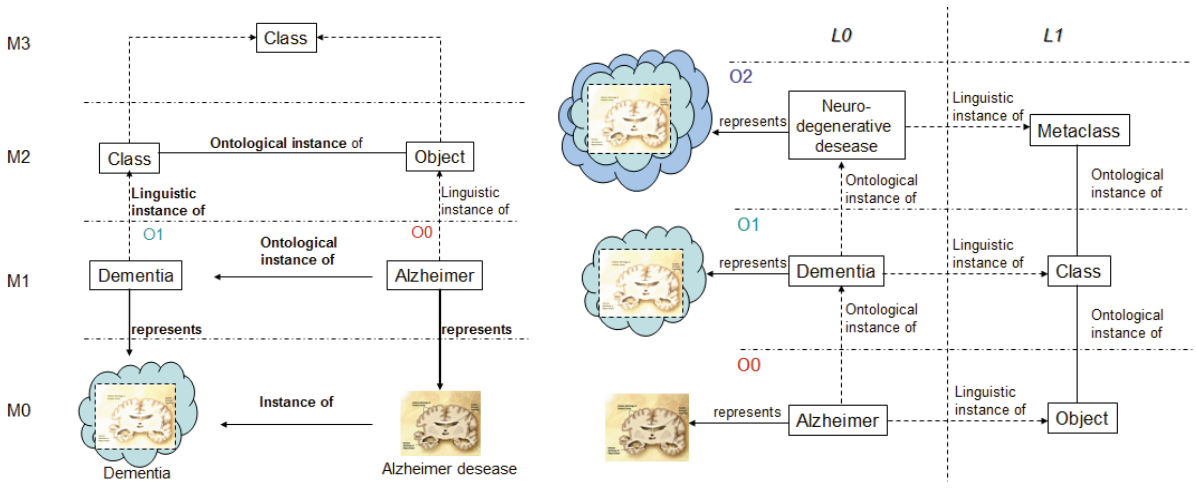


Figure 3 a) Linguistical metamodeling, b) Ontological metamodeling

Finally, according to both groups of researchers, the first place takes the linguistic modeling rather than ontological modeling, but, they agree that both of these dimensions are crucial to "precisely locate a model element in the language ontology space" (Atkinson & Kühne, 2003).

From this extensive knowledge, I learned what to take into consideration while modeling the e-health system, how to integrate different existing models using metamodels, how to map models using the most usual ontology in the field, taking into account semantic integration, type semantics, inherent semantics, ontological metamodeling, and linguistic metamodeling.

Models used as reference for our further analysis are mentioned in the (Besim, 2012), containing a state of the art ontology for a personal e-health system that will be used as a "Domain".

Beside models and metamodels, there are other issues that I would rise in my research, like human-centred design of personal e-health systems, where I will combine the knowledge of mental models to affect the design of metamodels. The next part of this paper will be dealing with this interesting and novel approach.

3. Human-centred design for personal e-health systems

Most of the implemented personal e-health systems reviewed in the literature, partly addresses the human-centred approach in the design of such systems. The biggest part tends to make patients´ lives easier. In fact, they design the system asking physicians what should be implemented, thus a complete approach toward all end-user needs is missing. In the first phase of implementation of such information systems, the importance and focus is set to the digitalisation of the documentation in the care giving industry. In this way one of the most important factors, the end-user as a part of design process, is neglected. During design processes, there are many aspects considered. In a design of such a system, the intention is to help patients, but actually, at mostly the design is focused to the caregiver, and not to all end-users i.e. patient, family members, caregiver, case-manager, the physician, etc.

In the article (Besim, 2012), are mentioned a few state of the art personal e-health projects, in one of them, I was directly engaged in design processes and modeling. Even though the technology implemented, and the use of mobile devices, in combination with web semantics, delivered very high quality product, still there is a lot to be desired. Since there are many personal e-health systems implemented, it is the right time to go to the next stage and try to reengineer these systems, commit requirements engineering, build metamodels, take into consideration mental models or in general human-centred design processes, etc.

3.1. Human-centred paradigm

This paradigm was introduced and developed from Dr. Carl Rogers (1902-1987), a psychologist who wrote the famous book "On becoming a person" and many other articles to be found in (Rogers, 1999), who opposed Freud's theory with four core arguments about human potentials: sociability, being trusty, being curious, and being creative and compassionate. If one takes into account the empathy, unconditional positive regard and congruence of Rogers, one can find enough arguments about my critical approach toward e-health systems mentioned before.

The modeling of e-health systems, without taking into account the human-centred approach of Rogers, is incomplete and destined to fail. Since different humans have different expectations, one should reconsider the actual product design. Change is one of the human potentials that Rogers mentions, and we need to be open to changes, to commit research for a better system, taking into account system reengineering, usability engineering and user-centred requirements engineering.

3.2. Mental models

My task is to enhance my e-health system. Enhancing the system is a goal of modeling, so are mental models. Reasoning with mental models is important, therefore, I will briefly explain what they really represent.

Many researchers wrote different definitions about mental models, but to date there is no generally accepted definition of mental models. For example (Rickheit & Sichelschmidt, 1999, p.10) defined mental models as: "…the way which people understand external objects, states, or events…the internal representation of the working of some external device in terms of its inherent structure and processes", whereas (Galitz, 2002, p.82) says that mental models are "…simply an internal representation of a person's current understanding of something". Galitz says also that the product will be more intuitive for the human that uses a given product, if the product was designed taking into account his mental model.

To design an information system or a product is followed with different challenges, since different humans have different mental models, i.e. different people have different understanding of something in a given moment. Also, some users are not interested in the device they are using, but rather the information that device brought to them. Here comes in question the paradigm *conceptual modeling* (Norman, 2002 p.16). Conceptual modeling should not be confused with data modeling or logical modeling, since a conceptual modeling is a situation where different domain experts discus a given problem, and find relationships between different concepts. In computer science, a conceptual model is actually known as a domain model. A conceptual model is derived from the user's mental model; therefore it is of crucial importance that "the designer of the system should facilitate for the user the development of useful mental model of the system. This is accomplished by presenting to the user a meaningful conceptual model of the system" (Galitz, 2002, p.99). A good system is the one where the user's mental model will match the system's conceptual model. On the other hand, the system or the product will be difficult to use for the user, and thereby users will tend to avoid using that system or product (Jin & Fine, 1996), and thereby "it is more costly in the long run to have programmers write the wrong thing than to write nothing at all" (Cooper, 2004, p.53). Thus, it is important for the system designers to know that the consideration of human mental models is very important, as well as visual abilities and requirements.

3.3. Human centred design (HCD) process

Human centred design (HCD) or user centred design (UCD) is an approach with focus on the user of the product in each of the stages of the design process. Furthermore, the human centred design process helps to optimize the usability[1] aspects (Kriglstein, 2011, p.41).

The ISONORM 13407:1999 (International Organisation for Standardization, 1999) defines the four main steps of the human centred design process (Stone et al., 2005, p.15):

[1] Usability = "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use"(International Organization for Standardization, 1998, p. 6).

- ***Analysis***: to understand and specify the context of use (e.g., to specify who will use the product, what are their expectations, their experiences and their tasks with this product),
- ***Requirements:*** to specify the requirements (e.g., user requirements, usability requirements, product requirements),
- ***Design solution/Prototype:*** to produce design solutions/prototypes (e.g., from rough concept (paper prototype) to complete concept (functional prototype)),
- ***Evaluation:*** to test the design solution with users to find out if it meets the requirements (e.g., usability testing, surveys or interviews to gain feedback).

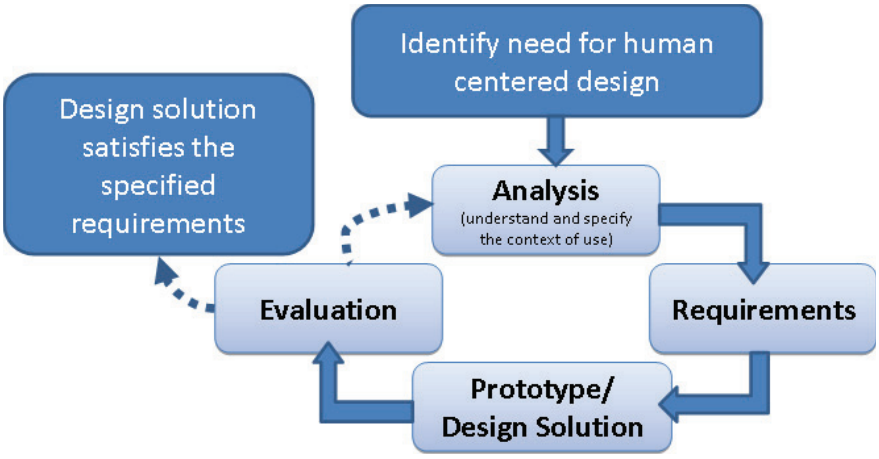


Figure 4 Human-centred design process (Kriglstein, 2011, p.41, after ISO 13407:1999)

The human centred design, as one can see, is very different to the waterfall model (software engineering life cycle), where each phase of the life cycle is represented as a separated part, and should be finished before the new one starts. In this model, the evaluation of the solution takes place at the very end of the process.

In the human centred design, in contrary, is an iterative design process where the users are involved throughout the whole design process. If there are any changes necessary, the next iteration will start and will be repeated until the result of the evaluation satisfies the requirements (Figure 4).

Following I am going to explain in detail all steps of human centred design process, which in my point of view is actually a metamodel of human centred design process.

3.3.1. Analysis

Since I am dealing with two perspectives or system solutions, modeling of the system, and prototype design of the product interface, a parallel and complicated analysis will take place. “Analysis and modelling are frequently interleaved…modelling consumes the output from analysis, structures facts, and represents them in a notation” (Sutcliffe, 2002, p.51) i.e. the Analysis from the human design process, one affects also the modelling and metamodeling phase of the system, thus, achieving at the end an e-health system metamodel that actually implements the human centred design paradigm.

In the Analysis perspective of the product interface, the starting point of human centred design is to understand the context and use. For the further design process, here one should specify which information has to be presented, and how? Therefore one should analyse:

- ***Users:*** User analysis actually means answers to the questions related to the user understanding. In e-health systems, users of the system as mentioned before are not just physicians, caregivers, case managers, etc., but also patients. The more users the system has, the more variability of user needs one will have. Also, one should answer the questions such as: Who are the users? What do they need? What do they actually expect from the system? What requirements and questions do they have? How they resolve actually their problems? (Kriglstein, 2011, p.42). On the other side (Galitz, 2002, p.85) goes further and addresses the need to visit users location, observe users while working, videotape users while working, even to try the users job by your self etc.
- ***Tasks:*** The designer should identify which tasks are relevant and not relevant for the design process (Stone et al., 2005, p.57). As I mentioned in the previous point, there are different users, different needs, different ages, which means they have different background and computer literacy Therefore, the identification of user profiles is needed. Scenario design (use case) will resolve many issues from the analysis phase of users, and specifies the most important tasks important for the design (Kriglstein, 2011, p.42 and 58)
- ***Domain:*** In my case the domain is the ontology of my e-health system, and it contains a specific knowledge with its own concepts. Since my system has two perspectives, in other aspects, it is also necessary to collect information about the domain for which the product is designed. Furthermore, the specifications of tasks, user goals and requirements depend also on the domain. The activity to collect information about the domain is also called domain analysis and involves methods, such as surveys, interviews and observations or the analysis of relevant documentations and similar products (Stone et al., 2005, p.52, Kriglstein, 2011, p.42)
- ***Design constraints:*** Are also known sometimes as challenges in the design process, since they influence and challenge the design process. They may be, e.g., technical limitations, budget, availability of participants for surveys and tests, project deadlines, readiness of human to support the design or the research phase, etc.

User requirements analysis is the next human centred design activity. This activity comprises activities that will lead to information collection by contacting directly the users of the system. Techniques that can be used for “requirements elicitation” are borrowed from systems analysis, for example, interviews, focus groups, observation, participation, questionnaires and surveys, and documentation analysis (Sutcliffe, 2002, p.45-47).

3.3.2. Requirements

The next step of the human centred design process is to identify user and organisation requirements based on the analysis activity. “Requirements engineering can be seen as a collection of techniques that are recruited to a more general process according to the users` and designers´ needs” (Sutcliffe, 2002, p.6). As Sutcliffe mentioned, there are different requirements which influence the development and design of a given product or system, for example, technical requirements (functional and data requirements), user requirements and usability engineering requirements. Integration of requirements and usability engineering is mentioned from (Lindgaard et al., 2006), where the same authors deliver a solution for the main problem of user needs analysis, i.e. where to begin and where to end the analysis.

Modeling requirements that a MDD should satisfy (Atkinson & Kühne, 2003)	**User centred requirements** defined as critical from (Sutcliffe, 2002)
The concepts available for creating models and the rules governing their use The notation to use in depicting models How the model's elements represent real world elements, including software artefacts Concepts to facilitate dynamic user extensions to model concepts, model notation, and the models created from them Concepts to facilitate the interchange of model concepts and notation, and the models created from them Concepts to facilitate user-defined mappings from models to other artefacts, including code	To capture a complete set of requirements from users To analyze the users´ requirements accurately and understand all the implications inherent in those requirements, To specify how those requirements should be met in a design, To complete requirements analysis within acceptable constraints of time and cost.

Table 1 Modeling requirements and user centred requirements

Requirements analysis follows two general approaches: top-down decomposition (related to structured system analysis), and bottom-up or event driven analysis, "which creates a behaviour/structural model favoured in object-oriented methods, such as use cases" (Jacobson et all, 1992).

In the sense of combining requirements engineering and modelling, one can mention here the i* modelling language. The i* model family (Mylopoulos et al., 1992, 1999, Yu, 2009) is a modeling language that extends information system models with more general phenomena like: Tasks, Goals, Resources, and Agents. On the other hand, UML-object oriented models integrate three common views: process/information flows, data flow diagrams, and event sequences. UML is used to deliver object class diagrams (with activity sequence and state transition diagrams for detail of procedures) (Sutcliffe, 2002, p.51). In direction to more general conceptual modelling, the work of (Motschnig & Mylopoulos, 1992) has valuable conclusions that can be useful to us, especially (Motschnig, 1993), where she represents an approach toward knowledge modeling and modeling parts of relations of real world objects.

3.3.3. Design

This human centred design process activity starts right after requirements engineering has finished and the designers and developers understood the same. In this phase, the production can start.

While in our case, I am speaking for already implemented prototype that was presented in (Besim, 2012), I am not going to get focused in the design of the GUI, but rather to the domain, i.e. ontology, which should be redesigned according to the human centred design

paradigm, and according to the results of the user-centred requirements engineering. The personal e-health system that was implemented in (Besim, 2012) will be mentioned here as CR project[2].

There is a prototype implemented and used from final users, thus, I have the opportunity to investigate them and understand from them how this product suits their needs. If from surveys, interviews, focus groups, etc., I find requirements that are not fulfilled, or difficulties in use of the product, a redesign of the GUI will be considered.

The focus of this paper is not to commit redesign of the GUI, therefore in this section I am going to focus more in design of the model, and redesign of the ontology (since CR project is a semantical product that is driven from a huge e-health ontology). Based on the first steps, analysis and the step requirements I am going to change or redesign the ontology.

As one can see here, until now I am dealing with three perspectives of HC process design activity: design/redesign of GUI, design/redesign of the Ontology and design of models/metamodels. Two of the sub-activities of the design process are ongoing to the moment I am writing this paper, these are: *user training* and *user support*.

3.3.4. Evaluation (evaluate design against requirements)

The fourth activity of the human centred design process is the evaluation activity. In this stage I am going to find out which are user experiences with the final product. One should find out whether our design meets user requirements, and whether difficulties have been detected. In this phase users have the opportunity to work with the prototype, to get real tasks that should be implemented (Kriglstein, 2011, p.48). Previously, in the section of mental models I mentioned that the mental model of the user should meet the conceptual model implemented in the system. This is the moment of the reality (see the citation of Sutcliffe), in which the developer's ideas, user expectations and requirements should mesh with technical possibilities of the delivered product.

After testing, collected data are analysed and interpreted to identify problems and their causes, finding possible solutions in order to improve the system or the product (Stone et al., 2005, p.432).

The evaluation phase, according to many authors, is based on time and budget, which also represents a challenge for every human centred product or system. This can be a reason why in many projects, the product is tested only once at the end of the design process, which often is not enough. Therefore, one should consider constraints for the evaluation planning (Kriglstein, 2012, p.48). For example, "if the budget is small, it is better to plan smaller-scale studies instead just one big study" (Stone et al., 2005, p.446, Kriglstein, 2012, p.48). To resolve these issues many authors mention prioritizing the identified improvements from the "requirements" and "design" phase,, (like low, medium, high), which will aid developers to better structure their work.

One can mention the following types of evaluations (Stone et al., 2005, p.23):

[2] This is a personal e-health system implemented in the android platform, optimized for Galaxy Tab 10.1.

- ***Evaluation in the early stage of the design process:*** analytic evaluation or explanatory evaluation, at the beginning of the design process, and aim to check if the concept meets the requirements (Galitz, 2002)
- ***Evaluation in the middle stage of the design process:*** detection of usability problems (Galitz, 2002)
- ***Evaluation in the later stage of the design process:*** This evaluation is focused in the verification of how well the user interface design meets users´ needs, or if the usability requirements are met. Findings from this evaluation are used to commit changes in the later releases of the product (Stone et al., 2005, p.23).
- ***Comparison evaluation:*** Here one compares the product in the every stage of the design process, but mostly the intention is to compare the actual product with other similar products with the competition. If no competitor product exists, than e.g., different graphical layout styles of the interface are compared to each other to find out which one of these styles is preferred by the target users. As concerning models and ontologies we can define for example expert of related fields to commit evaluation of the solution i.e. model or ontology.

4. Challenges and further research

Few of the issues that I identified, even in this phase of the project, are of the practical nature and also of the subjective nature. The first challenge is the metamodeling process. As one knows, metamodeling is a very complicated process especially in this case where one needs to combine many approaches, to adapt other metamodels, and to take into account human centred design processes. For the future there is a lot to be done in direction of metamodeling language analysis and comparison, since I need the most compatible language for the modelling process in the next research phase.

The next challenge is the *domain implementation*, or ontology adjustment. One should take into account that not just the expert point of view and opinion is enough to say that the e-health ontology that I used is the best and the state of the art, but, also normal users´ views should be taken into account as well. As one knows, normal users also represent older people, who often don't want to take part in testing of the system. Therefore, a separate challenge is to find appropriate and competent users for the evaluation of the system.

Other challenges are *security and privacy issues*. In such a system, personal health records of real patients will be stored; therefore a real challenge is to convince patients that the data collected will be in secure.

The human centred design process approach presented within this paper should help us in the future to gain an overview of these methods and strategies that are relevant for the modeling and metamodeling of e-health systems. In this way my intention is to build a framework for the development of future e-health projects based on metamodels that are compatible with the human centred design process approach.

References

1 D. Karagiannis, H. Kühn, (2002), "Metamodelling Platforms", Springer-Verlag, p.182

2 M. Völter, (2012), "Metamodellierung", www.voelter.de/data/presentations/ metamodelling-paper.pdf, accessed 08.02.2013

3 S. Strahinger, (1996), „Metamodellierung als Instrument des Methodenvergleichs : eine Evaluierung am Beispiel objektorientierter Analysemethoden", ISBN: 3-8265-5435-3

4 D.Karagiannis, P. Höfferer, (2006), "Metamodels in action: An overview". In: Filipe. J., Shishkov, B., Helfert, M. (eds.) ICSOFT 2006-1st ICSDT: IS27:36, Insticc Press, Setúbal
5 Atkinson, C. and Kühne, T. (2003). "Model-Driven Development: A Metamodeling Foundation". IEEE Software, 20(5):36–41.
6 Kappel, G., Kapsammer, E., Kargl, H., Kramler, G., Reiter,T., Retschitzegger, W., Schwinger, W., and Wimmer, M. (2006). On Models and Ontologies - A Layered Approach for Model-based Tool Integration. In Mayr, H. C. and Breu, R., editors, Modellierung, 2006, p.11–27.
7 Brinkkemper, S., Saeki, M., and Harmsen, F. (1999). "Meta-Modelling Based Assembly Techniques for Situational Method Engineering". Information Systems, 24(3):209–228.
8 Motschnig, Renate P., Myopoulos J., (1992), „"Classes and Instances"; Int. Journal on Intelligent and Cooperative Information Systems, Vol.1, No.1, 1992
9 Motschnig, Renate P., (1993), "The semantics of Parts versus aggregates in Data/Knowledge Modelling", Department of Information Systems, University of Vienna
10 Besim V. A., (2012), "Automation of e-health systems through ontologies and semantics", In: ICEIRD 2012, Sofia, Bulgaria; Proceedings of the 5th International Conference for Entrepreneurship, Innovation and Regional Development, 1-2 June 2012, Vol. 1, p. 16-26, ISBN 978-954-07-3346-3
11 Jean Bézivin, (2003), "On the unification power of models", UML´2003 conference, San Francisco
12 Nissen H. W., M. Jarke (1999), "Repository support for multi-perspective requirements", Information Systems, 24(2), p.131-158
13 H. Kühn, (2004), "Methodenintegration in Business Engineering", PhD Thesis, University of Vienna
14 Galitz, W. O. (2002). *Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques* (2nd ed.): Wiley.
15 Carl Rogers, (1990), "The Carl Rogers Reader", Editors: Kirschenbaum, Henderson, Constable, UK.
16 Carl Rogers, (1957), "The Necessary and Sufficient Conditions for Therapeutic Personality Change", Constable, UK
17 G. Rickheit, L. Sichelschmidt, (1999), "Mental models: Some answers, some questions, some suggestions", in Mental Models in Discourse Processing and Reasoning, Rickheit and Habel (Editors), Elsevier Science B.V.
18 Norman, D., (2002), "The Design of Everyday Things", Perseus Books
19 Alistair Sutcliffe, (2002), "User-centred requirements engineering", Springer
20 Cooper, A. ,(2004), The Inmates Are Running the Asylum: Why High-tech Products Drive Us Crazy and How to Restore the Sanity (2nd ed.), Sams
21 Jin, Z., & Fine, S. (1996). The Effect of Human Behavior on the Design of an Information Retrieval System Interface The International Information and Library Review, 28(3), p. 249 - 260
22 International Organization for Standardization. (1999). ISO 13407: 1999 Human-centred design processes for interactive systems
23 International Organization for Standardization. (1998). ISO 9241-11: 1998 Ergonomic requirements for office work with visual display terminals (VDTs) - Part 11: Guidance on usability.
24 S. Kriglstein, (2011), "Human centred visualization of Ontologies", PhD thesis, University of Vienna
25 Stone, D., Jarrett, C., Woodroffe, M., & Minocha, S. (2005), "User Interface Design and Evaluation", Morgan Kaufman
26 Jacobson, I, Christerson, M, Jonsson, P and Overgaard,G (1992), "Object-oriented software engineering: A use case driven approach", Addison Wesley
27 Mylopoulos, J., Chung, L., Yu, E.: "From Object-Oriented to Goal-Oriented Requirements Analysis", Communications of the ACM, Vol. 42, No. 1, January 1999.

28 Mylopoulos, J., Chung, L., Nixon, B., (1992), „Representing and using nonfunctional requirements: A process-oriented approach", IEEE transactions on Software Engineering, Vol. 18, no.6

29 Lindgaard G., Dillon R., Trbovich P., White R., Fernandes G., Lundahl S., Pinnamaneni A., (2006), "User needs analysis and requirements engineering: Theory and practice", Elsevier, Interacting with computers 18 (2006) 47-70

30 Yu Eric S., (2009), "Social Modeling and i*", Faculty of Information, University of Toronto, Canada, online access: http://www.cs.toronto.edu/pub/eric/JMfest09-EY.pdf, last visited 10.02.2013

SMART INNOVATION FOR HEALTHY AGEING: A MODEL FOR PHYSICAL ACTIVITY ADHERENCE THROUGHOUT THE LIFECYCLE

Vassilis Barkoukis[1], Garifallia Daroglou[2], Athanasios Geligiannis[3]

[1]*South East European Research Centre (SEERC), Thessaloniki, Greece, vabarkoukis@seerc.org*
[2]*Aristotle University of Thessaloniki, Thessaloniki, Greece, filio@phed.auth.gr*

[3]*Greek Free / Open Source Software Society (GFOSS), Athens, Greece adeligia@gmail.com*

Despite the well-established benefits of physical activity on the physical and mental wellbeing there is a declining trend in physical activity participation and associated psychological responses during adolescence that continue through adulthood. Thus, promotion of physical activity is of major importance for healthy ageing. So far, past interventions have shown a moderate effect, at best, on exercise continuation and adherence throughout the lifecycle. Several technological innovations have been developed to resolve this issue, such Fitbit trackers, Nike+ Fuelband, and the Pebble smartwatch, which assist people in actively monitoring their physical activity patterns. However, these devices merely focus on providing information on the activity performed and do not ensure lifelong physical activity adherence. The present paper discusses the Quantified Self Movement as a new approach towards promoting technological innovation for healthy ageing. Quantified Self Movement aims, firstly, to develop tools providing personalized feedback (i.e., training tips and logs based on the activity performed, nutritional guidelines) and offering the opportunity for a more systematic and thorough goal monitoring, and self-preparation of physical activity participation. Secondly, the Quantified Self Movement aims to develop a social network with people sharing common interests in healthy lifestyles allowing exchange of ideas, and the development of forum and online communities. Overall, the Quantified Self Movement comprises a modern healthy ageing innovation promoting the development of easily accessed and individualized tools that can be used by anyone without any technological skills and knowledge requirements in order to support physical activity participation and exercise adherence.

Keywords

Exercise, Health promotion, Web-based application, Quantified Self

1. Introduction

1.1 Physical activity

According to World Health Organization [1] physical activity is defined as any bodily movement, produced by skeletal muscles, that requires energy expenditure, while physical inactivity has been identified as the fourth leading risk factor for global mortality causing an estimated 3.2 million deaths globally. Two types of physical activities can be categorized, organized and unorganized [2]. Organized physical activity includes participation in planned activities clubs, associations or municipal programs for improving physical fitness and learning skills, while unorganized activity includes daily activities that involve movement, such as walking, cycling, climbing stairs, playing, etc. Both types of physical activity are beneficial for the health. USA Department of Health and Human Services' generally refers to physical activity as the movement that enhances health. More specifically, physical activity lengthens the average life span, helps control weight, reduces the likelihood of cardiovascular disease, diabetes and certain cancers, strengthens the musculoskeletal system and helps improve mental health [3].

Although the beneficial effects of physical activity are commonly known, Barnett et al. [4] found a reduction in physical activity of children from age 9 until age 12. Important role in this decrease plays the increased time devoted by children on sedentary lifestyle habits such as television viewing and the decline in physical education activities participation. According to Driskell and his associates [5], obesity prevention behaviors decline with age, while in adolescence increases the probability that childhood obesity will persist into adulthood [6]. Also, Ntoumanis et al. [7] and Barkoukis et al. [8] reported a decline in the adaptive motivation for participation in physical education during adolescence. This evidence implies a downward trend of healthy habits such as exercise and a healthy diet from childhood to adolescence. Taking into consideration that habits during adolescence are closely associated with habits in adulthood and the important health hazards resulting from adopting a sedentary and unhealthy lifestyle it seems urgent to develop practices tackling the adoption of sedentary and unhealthy lifestyles and promoting physical activity and healthy habits.

The study of the quality and intensity of physical activity, its relationship with illness and chronic disease and its effect on longevity has been conducted by many universities, as Harvard, Pennsylvania etc., since 1962 [9]. The most recent studies of physical activity log amplified using pedometer (machinery recording of steps made by people per day) in order to improve health through the promotion of simple forms of exercise, such as walking [10].

1.2 Self-monitoring of physical activity

Such self-reported measurement of physical activity has given rise to the Quantified Self Movement. It is a collaboration of users and tool makers who share an interest in self-tracking. The movements' members are driven by the idea that collecting detailed data can help them make better choices about their health and behavior. Tools used include a combination of traditional spreadsheets, an expanding selection of smart-phone apps, and various consumer and custom-built devices to monitor parameters such as food intake, sleep, fatigue, mood, and heart rate generating data flows that can be scrutinized for patterns. The new devices, along with the increasing ease of sharing data with other users through social-networking sites, mean that more people are finding it useful to quantify their lives and share the underlying data.

Examples of such commercial grade devices include the Fitbit range of trackers (Figure 1), Nike+ Fuelband, the Pebble smartwatch and others. One of the companies, Zamzee, which

offers a tracker aimed at young children, has attempted to "gamify" the available data and use them as a motivational online service. HopeLab and the Robert Wood Johnson Foundation released new research from a six-month scientific study of Zamzee amongst middle school students across America in which Zamzee use increased physical activity in kids by 59% and reduced biological risk factors associated with heart disease and diabetes.

HopeLab gave Zamzee activity meters to 448 middle school kids enrolled in the study from urban, suburban and rural schools across the U.S. Half of the study participants (the control group) just had a Zamzee meter to track their physical activity, but they didn't have access to the motivational website. The other half of the study participants had a Zamzee meter AND access to the motivational website. After six months of kids moving around with Zamzee, the final Point was earned, the last upload was completed, and HopeLab crunched the numbers. The group that had access to the Zamzee website moved a whopping 59% more than the control group – which is approximately an extra 45 minutes of moderate to vigorous physical activity per week. Kids who were really at risk for sedentary behavior got moving, too. Overweight participants (BMI >25) increased their activity by 27%, and girls increased their activity by 103%.

More recently, Google, through its Google Now android mobile phone app, is offering a monthly overview on the distances walked or cycled by users, without the need of any additional sensor hardware.

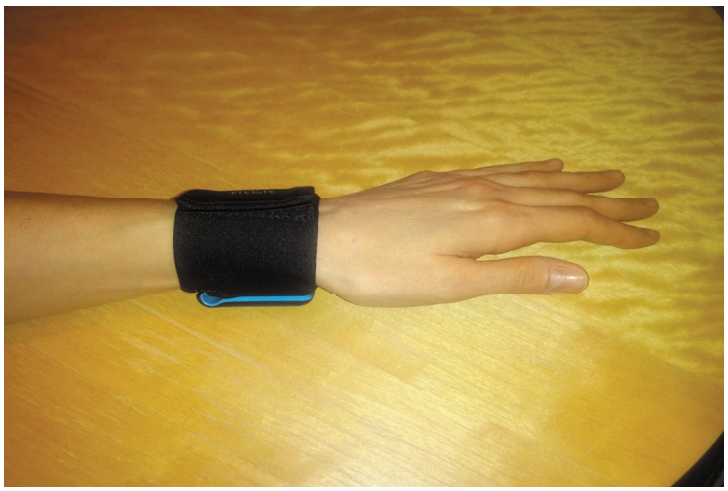


Figure 1 Fitbit tracker

1.3 The Quantified Self Movement

It seems that only limited studies have investigated the positive reinforcement of healthy behaviors by recording and processing of the results of daily physical activity in adults through social networking. For this reason the Quantified Self Movement was designed in order to test the efficacy of a technology-based intervention in promoting children and adults' physical activity. The central goal of the Quantified Self Movement is to provide a full set of methodology, device and application on self-quantification that will support participants and researchers to collect data, visualize their evolution, and cross reference them with similar efforts. The target group of the Quantified Self Movement can be children and adults of all ages because a) in any age a person can establish healthy lifestyle habits, b) as the person ages there is a decline in actual PA participation and related adaptive psychological responses, c) persisting habits can lead to less exercise and sedentary habits and d) both

children and adults are adapting rapidly to the use of new technologies in everyday life activities, especially through gaming experience and social networking.

More specifically, the aims of the Quantified Self Movement involve:

- Allowing participants to create an adaptive psychological mentality concerning physical activity with the ultimate goal of creating and maintaining life-long healthy habits. This is attempted through the aggregation of data acquired by the use of triaxial accelerometers. These data will be in turn visualized, shared on a specialized web based social network in manners enabling game based learning and habit formation,
- Providing devices and applications on self-quantification as well as the relevant methodology that will support participants and researchers in collecting data, visualizing their evolution and cross referencing them with similar efforts. The Quantified Self movement harnesses technology to acquire data flows of a person's daily life in terms of inputs, states and performance,
- Developing the appropriate psychological background that will result in exercise adherence. Satisfaction of basic psychological needs, intrinsic motivation, self-efficacy to overcome barriers are among the psychological constructs that can be influenced by the application of the Quantified Self Movement and result in higher exercise adherence and lower drop out rates.

1.4 Interventions to promote physical activity participation

According to Lubans, Morgan and Tudor-Locke [11] review, pedometers have been used successfully in a variety of ways to promote activity among youth. In the study of Hackmann and Mintah [12] in a sample of college participants, results showed significant differences in steps from baseline to conclusion. Significant differences were detected in participant estimation of activity level and in the activity indicators from pre- to post- test. Pedometers increased awareness of physical activity among college students and would be a useful intervention strategy in the college and university setting. The results suggest that the use of a pedometer is associated with significant increases in physical activity and significant decreases in body mass index and blood pressure.

Respectively, in the review of Bravata and his associates [13], the association of pedometer use with physical activity and health outcomes it was evaluated among outpatient adults. The results suggested that the use of a pedometer is related to significant increases in physical activity and significant decreases in body mass index and blood pressure. More specifically, Chan, Ryan and Tudor-Loche [14] examined the effects of a pedometer-based physical activity intervention (Prince Edward Island-First Step Program) on activity and specific health indices in 106 sedentary workers. Using subjects as their own control, physical activity (pedometer-determined steps per day) was compared before and after a 12-week intervention. The Prince Edward Island-First Step Program increased physical activity in a sedentary population. Importantly, those with a higher BMI at baseline achieved relatively similar increases in their physical activity as participants with a lower BMI. Similar results was found in the study of Thomas and Williams [15] on a pedometer-based workplace physical activity (PA) promotion program conducted with volunteer staff from the former Department of Human Services in South Australia. Staff were supported to increase activity through wearing a pedometer and encouraged to aim for 10,000 steps per day to achieve the National Physical Activity Guidelines of 30 minutes of moderate intensity activity on most (preferably all) days. Greatest increases were observed in those people who started at the lowest daily step counts. Follow-up evaluation showed that those people who had increased their walking through the program were more likely to maintain that level of walking over the following months. The majority of participants included other family members in their walking.

Positive results on the use of a pedometer-based intervention to promote physical activity were also found among elderly population. In the study of Sugden and her colleagues [16] on female over the age of 70, the participants were recruited from primary care and randomized to receive a) pedometer plus a theory-based intervention or b) a theory-based intervention alone. The theory-based intervention consisted of motivational techniques, goal-setting, barrier identification and self-monitoring with pedometers and daily diaries. All participants in the pedometer group found the pedometers easy to use and there was good compliance with diary keeping (96% in the pedometer group and 83% in the theory-based intervention alone group). There was a strong correlation (0.78) between accelerometry and pedometer step counts i.e. indicating that walking was the main physical activity amongst participants. There was a greater increase in activity (accelerometry) amongst those in the 20% target pedometer group compared to the other groups, although not reaching statistical significance ($p = 0.192$).

Based on the above mentioned literature is apparent that existing interventions have moderate efficacy in promoting PA, however there are elements in each one proven effective. Thus, the Quantified Self Movement intends to synthesize prior research in promoting PA, utilize the strong elements of prior interventions and go beyond by addressing their limitations. More specifically, the Quantified Self Movement is expected to further our understanding and promote PA participation by:

- Employing an integrated social cognitive model. So far research has used separately the social cognitive approaches. Fishbein [17] argued that integration of approaches incorporating dispositional and situational determinants of behavior is expected to result in better understanding of behavior. Hence, the synthesis of these approaches into an integrated model is expected to provide more thorough and comprehensive information on the mechanisms leading children and adults to physical activity or physical inactivity. The Quantified Self Movement intends to integrate dispositional variables (i.e., Self-Determination Theory) with decisional making processes (i.e., Planned Behavior Theory) and take into account a number of meaningful situational parameters (i.e., physical activity constraints, normative processes as discussed in the extended Planned Behavior Theory). Prior research has supported the possible link between these theoretical approaches [18], yet sparingly investigated the inclusion of these situational parameters.
- Using an objective measure of physical activity behavior. There is a growing trend in using objective measures of physical activity behavior [19]. Yet, there is only limited evidence in associating this type of measurement with the psychological mechanisms associated with physical activity participation. The Quantified Self Movement will use prior evidence which is about to be produced by the members of consortium to cover this gap in the literature. The results of this test are expected to produce valuable information that will be used during the intervention.
- Conveying the intervention material through an online tool specifically designed for this purpose. So far, interventions have used standard procedures (i.e., hard copies, phones, mails etc) to convey their messages. Still, both children and adults are familiar with new technologies and use them in many occasions in their everyday life. Also, there is a growing trend in replacing traditional forms of getting information (i.e., books, TV, newspapers etc.) with the use of internet. Hence, the use of an online tool conveying the interventions messages has been used very limited and only partially in the past and is expected to attract children and adults interest on more actively participating in the intervention activities. Besides the mean, the interactive nature of the intervention, as it can be allowed with the use of this online tool, is another innovative aspect of the Quantified Self Movement that is expected to increase the interest, the commitment and overall the adherence of the participants to the scheduled activities.

- Taking into account other health related behaviors associated with physical activity participation. Measurements of nutritional habits, sedentary lifestyle habits (i.e., physical inactivity) and physical abilities will take place and act as covariates in the effect of the intervention on physical activity participation. So far, interventions promoting physical activity were largely focused merely on physical activity participation. However, physical activity is a part of a more general lifestyle that influences physical activity as well. For instance, is not effective practicing a sport for 2 hours three days a week but in the remaining time adopting a sedentary lifestyle accompanied with bad nutritional habits. Also, the level of physical abilities can influence, through the satisfaction of basic psychological needs [20], motivation and subsequently behavior. However, both in basic research and intervention development the effect of these variables has been largely neglected. Thus, an innovative aspect of the Quantified Self Movement lies in taking into account the effect of these variables and providing a more complete index of physical activity -related lifestyle.

1.5 Implications of the Quantified Self Movement

Nowadays, there is a rise of self-quantification, and of self-experimentation, especially with respect to health. The reason for this is mainly that the new technologies can measure and analyze many data and provide health knowledge [21]. More specifically, the increase of self-quantification is driven by the access to information and ideas about health, both through the Internet and increasingly diverse local environments. According to Mehta [21], Quantified Self participants may be a forerunner of the future.

The Quantified Self Movement is expected to have important implications in promoting healthy lifestyle across the lifespan. More specifically, it can be used by:

- Children and adolescents. Due to the expected decline in physical activity participation during adolescence, it is expected that the Quantified Self Movement could assist children and adolescents maintain their physical activity levels by a) providing a modern tool to monitor their activity levels, b) offering incentives for physical activity participation, c) providing opportunities for a holistic approach on healthy lifestyles, d) supporting an adaptive mentality towards physical activity participation and e) tackling the negative influence of several factor associated with sedentary lifestyles.
- Young and middle-aged adults. The increased obligations with adulthood are often related with a further decline in physical activity participation. The Quantified Self Movement is expected to provide a tool increasing leisure-time physical activity by a) offering incentives for physical activity participation, b) providing opportunities for a holistic approach on healthy lifestyles including both nutrition and physical activity guidelines, c) maintaining a positive attitude towards physical activity participation, d) offering a social network supporting physical activity participation, e) providing opportunities for alternative types of physical activity and f) promoting physical activity adherence.
- Elderly. Physical activity has been proposed as an effective prevention and rehabilitation tool for several diseases occurring during this age. The Quantified Self Movement is expected to assist in the healthy ageing process by a) offering incentives for physical activity participation, b) providing opportunities for a holistic approach on healthy lifestyles including both nutrition and physical activity guidelines, c) promoting physical activity adherence, d) offering a social network supporting physical activity participation, e) providing accurate estimations of physical activity levels enabling proper preparation of the rehabilitation exercise programs, f) offering

self-monitoring of activity levels enabling self-evaluation of performance, and g) increasing self-esteem and quality of life.

2. Conclusions

In recent years there has seen an increasing trend of obesity from childhood to adulthood, and comorbidity of other conditions that leads to the need to the implementation of measures to prevent and deal with this phenomenon. Most of the people today are accustomed to carry portable devices which are quite strong (phones, tablets) in order to communicate better and work more effectively from a distance. The same technology allows the presentation or the recording of data from sensors associated with fitness, health data, etc. The aim of this project is to create organized interventions which, based on these possibilities, will provide the opportunity to leverage and support the participants. Thereby, in the near future, people may be engaged in managing their own health and will be exposed to a wide variety of health related knowledge.

References

1 WHO. Promoting health through school. Geneva:WHO; 1996.
2 Alexopoulos P. Correlation of sedentary activities and physical activity to body composition on elementary children. Master thesis. Harokopio University, Department of Dietetics and Nutritional Science, 2011.
3 Colditz, G.A. Dart, H. Ryan C.T. Physical Activity and Health. International Encyclopedia of Public Health, 2008, pp. 102-110.
4 Barnett T, O'Loughlin J, Paradis G. One- and two-year predictors of decline in physical activity among inner-city schoolchildren. American Journal of Preventive Medicine 2002; 23: 121-28.
5 Driskell M M, Dyment S D, Mauriello L M, Castle P H, Sherman K J, Prochaska J M. Relationships among multiple behaviors for childhood and adolescent obesity prevention. Prev.Med. 2008; 46: 209-15.
6 Kvaavik E, Tell G S, Klepp K. Predictors and tracking of body mass index from adolescence into adulthood: follow-up of 18 to 20 years in the Oslo Youth Study. Arch.Pediatr.Adolesc.Med. 2003; 157: 1212-18.
7 Ntoumanis N, Barkoukis V, Thøgersen-Ntoumani C. Developmental trajectories of motivation in physical education: Course, demographic differences, and antecedents. JEdPs. 2009; 101(3): 717-28.
8 Barkoukis V Ntoumanis N, Thøgersen-Ntoumani C. Developmental changes in achievement motivation and affect in physical education: Growth trajectories and demographic differences. PsSpEx. 2010; 11(2): 83–90.
9 Lee I, Hsieh C, Paffenbarger R S. Exercise Intensity and Longevity in Men: The Harvard Alumni Health Study. JAMA. 1995; 273(15):1179-1184.
10 Haines D J, Davis L, Rancour P, Robinson M, Neel-Wilson T, Wagner S. A pilot intervention to promote walking and wellness and to improve the health of college faculty and staff. JACH. 2007; 55: 219-25.
11 Lubans D R, Morgan P J, Tudor-Locke C. A systematic review of studies using pedometers to promote physical activity among youth. Prev Med. 2009; 48(4):307-15.
12 Hackmann D J, Mintah J K. Pedometers: a strategy to promote increased physical activity among college students. JInstructPedagogies. 2010; 4: 1-28.
13 Bravata D M, Smith-Spangler C, Sundaram V, Gienger A L, Lin N, Lewis R, Stave C D, Olkin I, Sirard J R. Using Pedometers to Increase Physical Activity and Improve Health: A Systematic Review. JAMA. 2007; 298(19): 2296-304.
14 Chan C B, Ryan D A J, Tudor-Locke C. Health benefits of a pedometer-based physical activity intervention in sedentary workers. Prev Med. 2004; 39(6): 1215-22.

15 Thomas L, Williams M. Promoting physical activity in the workplace: using pedometers to increase daily activity levels. Health Promot J Aust. 2006; 17(2):97-102.
16 Sugden J A, Sniehotta F F, Donnan P T, Boyle P, Johnston D W, McMurdo M E T. The feasibility of using pedometers and brief advice to increase activity in sedentary older women – a pilot study. BMC Health Serv Res. 2008; 8: 169.
17 Fishbein M. An integrative model for behavioral prediction and its application to health promotion. In R. J. DiClemente, R. A. Crosby, & M. C. Kegler (Eds.), Emerging theories in health promotion practice and research. New York: John Wiley & Sons: 2009; 215-34.
18 Hagger M S, Biddle S J H, Chow E W, Stambulova N, Kavussanu M. Physical Self-Perceptions in Adolescence: Generalizability of a Hierarchical Multidimensional Model Across Three Cultures. JCross-Cultural Psychology. 2003; 36: 689-716.
19 Simmons R K, van Sluijs E M F, Hardeman W, Sutton S, Griffin S J. Who will increase their physical activity? Predictors of change in objectively measured physical activity over 12 months in the ProActive cohort. BMC Public Health 2010; 10: 226.
20 Deci E L, Ryan R M. Handbook of self-determination research. 2002. Rochester, NY: University of Rochester Press.
21 Mehta R. The Self-Quantification Movement - Implications for Health Care Professionals. SelfCare 2011; 2(3): 87-92.

PUBLIC RELATIONS & COMMUNICATION FOR INNOVATION & REGIONAL DEVELOPMENT

Radu Jecu

INCDMRR, Technological Information Centre for Mineral Resources 70, Carol I Blvd. 020917 Bucharest, Romania, radu.jecu@gmail.com

The paper aims to highlight the role of public relations and communication in order to increase the capability of innovation & regional development in the Balkan region. The crisis revealed that communication between research, development and/or innovation organizations and business world, between scientists and society is very important in the promotion of results of research, development and innovation activities as well as their consequences in the community and private life. There is emphasised the science communicators' role and their relation with the innovation and technological transfer entities. The concept of "Development communication" is presented and its specific adaptation in the Balkan context too. The paper presents the society's benefits provided by public relations & communication and their role played in the improvement of the efficiency of the regional (interregional, cross-border) development & innovation projects, of the technological transfer and innovation activities and of public information as well.

Keywords
Development communication, regional policy, innovation.

1. Introduction

In the Western countries, the late eighteenth century industrial revolution has correlated progress with economic development and the nineteenth century scientism promoted science as the engine of human progress. Accordingly, up to the middle of the past century, the scientism empowered all the scientific explanations, solutions and accomplishments with an absolute authority beyond any doubt or questioning.
Even if some factors have changed, since the Second World War the concept of development has often been conceived in strictly economic terms. It was thought to follow an evolutionary process that commenced from basic commodity suppliers, through capital accumulation to industrialization, in turn leading to urbanization and "modernization". Development paradigms of modernization and industrialization have often resulted in the destruction of indigenous peoples' political, economic, social, cultural, education, health, spiritual and knowledge systems as well as extraction of their natural resources. Specific examples of disconnect between dominant development paradigms and local societies include:

- local societies have often been regarded as "backward, primitive and uncivilized", where their "development" is understood to be their assimilation into the so-called "civilized world."
- local cultures and values are seen to be contradictory to the values of the market economy, such as the accumulation of profit, hyper consumption and competitiveness. Indigenous peoples are seen as "obstacles" to progress because their lands and

territories are rich in resources and indigenous peoples are not willing to freely dispose of them.

The pursuit of economic growth at all costs is destructive for all humanity and the planet. The focus on GDP as a main measure of progress has distorted the true meaning of progress and wellbeing. For example, damage to ecosystems, irreversible loss in biological diversity and the erosion of cultural and linguistic diversity and indigenous traditional knowledge, are not factored into the balance sheet. Such ecological, cultural, social and spiritual indicators, which provide more comprehensive measurements of national and global situations, are seldom used. [1]

These conditions we may recognize in the Balkan region too. After the Second World War, most of the Balkan countries have been integrated within the Communist area. The scientism and positivism have been kept integrated within the totalitarian atheistic regime ideology. The "primitive" societies had to be integrated in the international Communist system officially considered to be the most progressive in the world. Science was used to back up the political directives. The only viable truths and solutions, permanently perfectible, might be obtained using the scientific research. The central leadership considered the economic development as a fundamental imperative, within the industrialization represented an essential objective. Local cultures and values were seen to be contradictory to the values of the planned economy. The engineering sciences development was favoured to the detriment of humanities. The economy and society as assembly took over unconditionally the results delivered by the research-design entities. The communication was unilateral because the totalitarian regime didn't predict any feed-back on the behalf of the economic units (state-owned), local authorities, even less a public reaction. National promotion of the results aimed to present the justification and efficiency of the political decisions that determined them. On international scale the participation at different events and meetings was extremely limited, being parts of propagandistic efforts of the political system, sustaining the Communist vision superiority against the Capitalist one.

In the rest of the world, the changes of the world political configuration and soon, the mass-media diversification have generated a communicational explosion. Concurrently, some undesired effects of the technical-scientific revolution such as the problems in nuclear energy use, pollution etc., besides the increase of funds allocated to the research activity, had forced the scientific community to present its achievements, opinions, demands and options more frequent *ad extra*. The communication and its means had to diversify depending on the message, aims and addressees, first the population and local authorities.

The globalizing process in progress and the requirements of the sustainable development have attracted more and more interest for the scientific knowledge and for the innovation from the economic and business environment. Innovations can be in the form of new products or services, or cost-reducing process improvements, or innovative business models and methods. The benefits of innovation occur in all aspects of the profit/loss statement: innovators drive additional sales volume, achieve price premiums and reduce costs through process improvements. In addition to the financial benefits, innovation goes hand-in-hand with sustainable development initiatives, as both require progressive leadership and an appetite for change, combined with a tolerance of experimentation and some risk.

These evolutions have also featured the necessity of communication fluidization, on one hand, between specialists with different professional background and on the other hand, between those first ones and unqualified people, encouraging the appearance of a new interdisciplinary specialization generically denominated science communicators.

2. The Romanian Situation

2.1 Recent Historical Context

The events occurred in the late 80s of the last century have caused radical transformations in Communist Balkan states as well. The transition towards the market economy, the economic situation and the political options imprinted the development coordination and funding. The new context dictated to science community the communication necessity on both of national and international plan because:

- people without scientific knowledge have nowadays the possibility of influencing the research & development activities. The offer/results as well as the demand/requirements must be presented, sustained and argued in front of politicians, economic agents and business investors, central and local authorities, mass-media and – sometimes - the local communities or the entire population. Therefore, it became necessary for them to get easily and correctly the messages of the scientific community.
- world-wide, scientists communicate between them more fluently, within the same field of activity as well as between the different research areas, due to the continuous evolution of interdisciplinary researches, being obliged to get up to date permanently with the development of communication means.

The lack of ability to present the results and the own problems of the research & development organizations damaged their public image as well as their field of activity, hindering the communication efficiency and thus, favouring under-funding tendencies and minimizing the role played by sciences in Romanian society and economy.
Moreover the Romanian mass-media (with very few exceptions) don't have qualified science journalists in order to present professional inquiries, reports and interviews in the field.
The latest developments showed off implicitly or explicitly necessity of the science communicators' presence in the area of research services in Romania, in mass-media respectively

2.2 Regional Policy. National Romanian Aspects

Once the introduction of communism, in 1950, the territory of Romania was reorganized from the administrative point of view. The 58 counties have been replaced with 28 regions. In 1968 it was returned to traditional form of organization, this time comprising 39 counties and, separately, municipality Bucharest. At the same time, totalitarian regime has imposed "democratic centralism" principle according to which local institutions are located (in any problem) under central institutions and working after their orders. Therefore, regional development was directed by the central authorities, the local ones being only performers.
The issue came into focus after 1989. In 1995, the strategy for Romania's accession to the European Union highlighted the importance of the regional policies The *Green Paper. Regional Development Policy in Romania,* Government of Romania and the European Commission was elaborated in 1997 and *The Law 151 on regional development in Romania* was adopted in 1998. So there were established the 8 development regions. The most competitive regions are in central and western country, with higher development level even between the two world wars. They are also physically closer to the markets in Western Europe, quickly assimilating European spirit (tolerance, decentralization, competition, etc against a more expressive ethnic diversity compared to other regions).
Regional development is a new concept (1999) that aims at stimulating and diversifying economic activities, stimulating investments in the private sector, contributing to decreasing unemployment and, last but not least, a concept that would lead to an improvement in the

living standards. In order to apply the regional development strategy, eight development regions were set up, spreading throughout the whole territory of Romania. Each development region comprises several counties. Development regions are not territorial-administrative entities, do not have legal personality, being the result of an agreement between the county and the local boards.

Regional development policy is an ensemble of measures planned and promoted by the local and central public administration authorities, having as partners different actors (private, public, volunteers) in order to ensure a dynamic and lasting economic growth, through the effective use of the local and regional potential, in order to improve living conditions. The main areas regarded by the regional policies are: development of enterprises, the labour market, attracting investments, development of the SMEs sector, improvement of infrastructure, the quality of the environment, rural development, health, education, culture.

The main objectives of the regional development policies are as follows:

- to reduce the existing regional disparities, especially by stimulating the well-balanced development and the revitalization of the disadvantaged areas (lagging behind in development) and by preventing the emergence of new imbalances;
- to prepare the institutional framework in order to comply with the integration criteria into the EU structures and to ensure access to the financial assistance instruments (the Structural Funds and the Cohesion Fund of the EU);
- to correlate the governmental sector development policies and activities at the level of regions by stimulating the inter-regional, internal and international, cross-border cooperation which contributes to the economic development and is in accordance with the legal provisions and with the international agreements to which Romania is a party;

The principles that the elaboration and the application of the *development policies* are based on**:**

- decentralization of the decision making process, from the central/governmental level to the level of regional communities;
- partnership among all those involved in the area of regional development;
- planning – utilization process of resources (through programs and projects) in view of attaining the established objectives;
- co-financing – the financial contribution of the different actors involved in the accomplishment of the regional development programs and projects [2]

2.3 Regional Policy. Trans-national Aspects

As a result of enlargement of the European Union, there has been a substantial widening of regional disparities within the Union. The Cohesion policy therefore focuses on promoting a balanced and sustainable development of the territory of the Union, by involving regional and local actors as well as social partners particularly, in areas where greater proximity is essential: investment in innovation, the knowledge economy, the new information and communication technologies, employment, human capital, entrepreneurship, support for Small to Medium Enterprises and access to risk capital financing.

The following countries stated Cohesion Policy as one of their priorities for 2014-2020 (50% are Balkan countries) [3]:

- *Croatia*
- Czech Republic
- Estonia
- ithuania
- *Romania*
- *Slovenia*

In Romania, The Ministry of Regional Development and Public Administration (MRDPA) provides financial and technical management of regional development programs and projects, cross-border and transnational cooperation, administrative capacity development, urban rehabilitation, including urban transport, European spatial planning, of those financed by the European Regional Development Fund, under the Regional Operational Program, by the European Social Fund, under the Operational Program Administrative Capacity Development, of programs and projects financed under the European Territorial Cooperation objective, by the ERDF, of the European Neighborhood and Partnership Instrument – the cross-border cooperation component, as well as other European financing instruments specific to its areas of activity, in accordance with the legislation in force, financed by PHARE funds, in the extended decentralized system.

The important place of innovation in the regional development (Figure 1) led to the situation that many cross-border cooperation development projects are run by innovation entities – members of The National Technology Transfer & Innovation Network or RDI organizations.

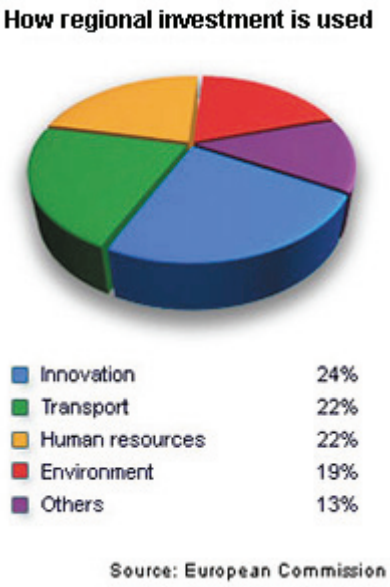


Figure 1 [4]

2.4 Innovation in the Romanian context

In the Romanian economic context and under the actual global conditions but also on perspective, the getting out of crisis demands a more fluent and accessible communication between the scientific community, the economic and business environments and the society. In full accordance with the current orientations of world and European research, development & innovation policies, Romania's Government recognizes the strategic importance of the scientific research and technological development domains for obtaining and maintaining a sustainable competitive advantage for our country, at both european and global level. In this respect, one of the strategic objectives for the policies in the field of research, technological development and innovation is a more close correlation of research & development activities with the industrial policy of Romania and the reinforcement of long term connections between the research & development sector and the economic environment, achieved by the

development of mechanisms that ensure technology transfer to economy and encouraging the participation of the private sector in research, development and innovation activities.
The National Authority for Scientific Research promoted the infrastructure development at national scale in the fields of services for innovation and technology transfer by implementing the program „INFRATECH" (2004 – 2008), launched and coordinated by the Direction for Innovation & Infrastructures of the National Authority for Scientific Research, approved by the Government Decision 128 / 2004. The projects were aiming to settle technology and business incubators, technology transfer centres, technology information centres, science & technology parks, technology & business incubators as well as offices matching the industry demand with the technological research supply. While the Government Decision 406 / 2003 provides the legal basis for methodology that enforces the assessment, evaluation and operation of the innovation and technology transfer institutions, the Government Ordinance 14 / 2002 (approved by the Law 50 / 2003) enforces the existence of science & technology parks.
The National Technology Transfer & Innovation Network is an initiative of Ministry of Education, Research, Youth and Sports – The National Authority for Scientific Research as a result of the application of the program „INFRATECH". The providers of services in the area of innovation and technology transfer are grouped in the specialized network containing 54 accredited entities: 14 technology transfer centres, 20 technology information centres, 16 technology & business incubators and 4 science & technology parks. All these 54 entities are operating under the Government Decision 406 / 2003. Besides, there are more science & technology parks under development, set-up on the basis of Government Ordinance 14 / 2002 approved by Law 50 / 2003. The National Technology Transfer & Innovation Network is evenly covering the national area with important nodes in Bucharest, Craiova, Arad, Cluj-Napoca, Deva, Iaşi, Râmnicu-Vâlcea, Timisoara, Tulcea, Brasov and Sf. Gheorghe.

The National Technology Transfer & Innovation Network is a national reference point for the principal stakeholders in the transfer of knowledge and technology in order to:

- support the socioeconomic development, stimulating the innovation and the technological transfer, attracting investments in order to turn to advantage the research, development & innovation activities and the human resources in the field;
- increase the visibility of the research, development & innovation units and the exploitation of the research, development & innovation results;
- improve the competitiveness of the small & medium enterprises and their innovation processes through the development of supply services for transfer of knowledge and technology;
- promote a market for the research, development & innovation results in all sectors of the Romanian economy;
- promote the national exchange of information, expertise, methodologies and best practice;
- stimulate partnerships and networking.

The beneficiaries of The National Technology Transfer & Innovation Network are economic agents, research, development & innovation units and innovative small & medium enterprises.
The entities of the National Technology Transfer & Innovation Network Romanian also are members of the Romanian Association for Technology Transfer and Innovation – ARoTT – a professional, non-governmental and non-profit organization of the technological transfer and innovation profile units. Its first purpose is promoting and protecting business environment of the technological transfer entities and innovative business from Romania in order to improve the activity of the members.
Besides the activities concerning scientific research and technological development, international research, development & innovation collaboration and development of institutions, human resources and infrastructures, the area of responsibilities of the former

National Authority for Scientific Research included several activities that are further achieved by the entities of The National Technology Transfer & Innovation Network: innovation and technology transfer; diffusion and dissemination of research, development & innovation results; public promotion and awareness of research, development & innovation activities.
As far as you can notice, among these objectives there are science communication activities which can help to:

- increase the visibility of the research, development & innovation units;
- increase the capitalization of the research, development & innovation results;
- improve the relationships between the research, development & innovation organizations, economic agents and society,

in correlation with the attendance and/or organizing of exhibitions and dissemination actions, both internally and internationally.
In our country, the National Authority for Scientific Research has initiated different events on national and regional scale in order to improve visibility of the results of the Romanian research, to multiply the contacts between the entities involved in the technological transfer and innovation activities - Romanian and foreign organizations.
Yearly, during the International Technical Fair from Bucharest, The Romanian Research Salon and The International Salon of Inventions, Research and New Technologies INVENTIKA have been organized ever since 2007.
The National Technology Transfer & Innovation Network entities attend to these events by:

- specific presentations;
- presentations concerning the organizations that include them;
- accomplishment of: technological brokerage events, symposia, round tables, workshops, partnerships enhancing etc.

The technological brokerage events organized by IPA CIFATT Craiova and the workshops titled „Social-economical interferences on the edge of innovation" accomplished by CIT IRECSON Bucharest have become known and awaited. For some years, technological brokerage sessions became trans-national due to the organizers' efforts to promote the trans-boundary, inter-regional and European collaborations. The seminaries became turning points for the debating of problems of the entities involved in technological transfer and innovation on national scale, for their professional development.
On national regional scale, yearly, the Regional Research Salons are held in order to promote the local specific connections and they are included by wider actions favoring the meeting between the technological transfer and innovation entities, the stakeholders of the regional economic & business media, the local authorities and the scientific community.
Another event (since 2003) – with international attendance - is the annual Open Forum for Innovation and Technological Transfer, as an instrument meant to link the actors on the research, development & innovation scene, the offer and the demand, the strategies and the ministerial policy to the concrete needs of the small & medium enterprises, meanwhile trying to facilitate contacts to foreign partners, of the European Union in particular. The Open Forum combines both a virtual internet platform and a real space for communication and interaction (conferences and events).
Also the National Authority for Scientific Research organized Romanian research, development & innovation results promotion activities especially in the European Union. Every time, in the last few years, Romania was one of the first three countries rewarded as far as the receiving prizes were concerned. Romania has also been internationally appreciated and the participants' number and their consistency has constantly been increasing.
The contribution of the science communicators to the success of these events may consist in:

- the appropriate promotion of the image of the research, development & innovation organizations and their activities to the interested parts' demands;

- the improvement of the presentation means of the research, development & innovation activities results in order to enhance partnerships and new connections;
- the communication, knowledge and technologies transfer enhancement in order to inform the economic agents and society on the research, development & innovation activities.

Also science communicators' activity feedback may be an extremely important source of information for both research, development & innovation units and the technological transfer and innovation entities aiming for a more consistent, accurate and rapid correlation of their activities with the immediate and actual problems of the economy and society. Therefore the entities of The National Technology Transfer & Innovation Network provide the optimal conditions for science communicators activity in the benefit of the scientific community, economy and society.

2.5 Development Communication

Communication sciences were firmly imposed in the area of humanities, providing a field of research whose reserves seem inexhaustible. Evidence is, in this respect, the impressive number of subordinate works in this field and hence the growing number of researchers who approach it from different perspectives. The emergence and expansion of this autonomous field merely followed the trends of modern society, where communication has become one of the key concepts. Besides this and in immediate connection with the same weight may be included concepts like: identity, image, relationship, mediation or significance.

Mentioned trends have generated interest not only to scientists on the area in question. Another consequence, equally important, is the profession of communicator (PR specialist, PR manager, science communicator or image counselor). Today, in the developed countries, it is well understood that creation and promotion of the own identity, interest, both to promote the own performances critical conditions the professional success of an individual or the economic success of an organization.

In recent decades, a new communication branch has emerged: development communication. Development communication has been defined in several ways by economic development experts, sociologists and communication experts. The terminology development communication originated in Asia, the definitions given by the communication experts of this region gained currency. Definitions differ depending on the definers view of development. Nora Quebral (1975) defined development communication as the art and science of human communication applied to the speedy transformation of a country from poverty to a dynamic state of economic growth and makes possible greater economic and social equality and the larger fulfilment of human potential. Quebral describes the genesis of the term Development Communication and its parameters which grew out of the field of agricultural communication. The term was coined to include under it apart from agricultural development, areas of national development such as population, nutrition, health education housing and employment etc. Development communication was considered an appropriate term to describe the scope, direction and structure of the discipline. [5]

Three main ideas which define the philosophy of development communication and make it different from general communication are: Development communication is purposive communication, it is value-laden; and it is pragmatic. In the development context, a tacit positive value is attached to what one communicates about, which shall motivate the people for social change. Development communication is goal-oriented. The ultimate goal of development communication is a higher quality of life for the people of a society by social and political change. We should not view the goal of development communication purely in economic terms, but also in terms of social, political, cultural, and moral values that make a person's life whole, and that enable a person to attain his or her full potential. The goal of

development communication in a specific society will be influenced by the ends and values of that society.

In the development context, a tacit positive value is attached to what one communicates about, which shall motivate the people for social change. Development communication is goal-oriented. The ultimate goal of development communication is a higher quality of life for the people of a society by social and political change. We should not view the goal of development communication purely in economic terms, but also in terms of social, political, cultural, and moral values that make a person's life whole, and that enable a person to attain his or her full potential. The goal of development communication in a specific society will be influenced by the ends and values of that society.

Development communication has to deal with two types of audience: i) the communicators comprising development bureaucracy, media practitioners and professionals, and ii) the people i.e. the audience who can be informed or uninformed; educated or semi-literate or literate.

Wilbur Schramm (1964) was the first to recognize that communication could play an important role in the national development of the third world counties. He believed that mass media could better the lives of people by supplementing the information resources and exposing people for learning opportunities. Schramm's conceptualization of the interaction between mass communication and development became the focus of many development programs. He was occupied with the practical problems of using mass communication to promote economic growth and social development in third world countries. He conceptualized a relationship between development communication and economic growth, which has been the main guiding paradigm for development programs. He suggested that as economic activity spreads, knowledge must be gathered more broadly, information shared widely and transferred swiftly. For this the developing nations must be prepared to support enormous increase in the day-to-day communication within the system.

The specific concept of development communication identifies information, education and communication (identified by the acronym IEC) about development plans. Development theorists and practitioners realized that merely disseminating information about development plans would not result in development as UNESCO termed it, nations needed communication (IEC) for development within the cultural matrix. Later it was realized that the original formula of information, education and communication for development programs was itself insufficient to achieve the desired results. In addition, people need motivation to accept development. Development motivation and Development Awareness are essential aspects of development communication (Narula Uma, 1994).

The aims of the EU *regional policy*:

- help each region achieve its full potential
- improve competitiveness and employment by investing at regional level in areas of high growth potential, with an added value for the EU as a whole
- bring living standards in the countries that have joined the EU since 2004 up to the EU average as quickly as possible.

Regional inequalities can be due to many factors, including:

- longstanding handicaps imposed by *geographic remoteness or sparse population*
- more recent *social and economic change*
- the *legacy* of formerly centrally-planned economic systems
- combinations of these and other things.

The impact of these disadvantages is frequently evident in:

- social deprivation
- poor-quality schools
- higher levels of unemployment
- inadequate infrastructure.

Relating to these considerations, we can see the similarity with the Asian situation that determined the apparition of development communication.
Regional policy is about investing in people. The idea is for regional policy to dovetail with the EU's agenda to promote growth and jobs by:

- *making countries and regions more attractive for investments* by improving accessibility, providing quality services (such as high-speed internet) and preserving environmental potential
- encouraging innovation, entrepreneurship and the knowledge economy, pushing regions to capitalize on their strengths and make a more effective and better combined use of European national and regional public funds, developing 'smart specialisation' strategies for growth
- *creating more and better jobs* by attracting more people into employment, reversing the 'brain-drain', improving workers' adaptability and increasing investment in human capital.

3. Conclusions

Even if the terminology & study of development communication were originated in Asia, these can be extended and customized for the Balkan region in European Union today. The EU may be one of the richest parts of the world, but there are large differences both between countries and inside individual countries. However, the dynamic effects of EU membership, coupled with a vigorous and targeted investment policy, can bring results.

References

1 http://www.un.org/en/events/indigenousday/pdf/Development%20with%20Culture%20and%20Identity%20formattedenglish.pdf 2013 february
2 http://www.mdrt.ro/en/dezvoltare-regionala/politica-de-dezvoltare-regionala 2013 february
3 http://www.ecdpm.org/Web_ECDPM/Web/Content/Download.nsf/0/B25963797017D49CC12579E40062AC52/$FILE/BN%2037%20.pdf pag 7, 2013 february
4 http://europa.eu/pol/reg/index_en.htm 2013 february
5 Rajesh Kumar, Development Communication: A Purposive Communication with Social Conscience - An Indian Perspective http://www.caluniv.ac.in/Global%20mdia%20journal/Winter%20Issue%20December%20%202011%20Articles/AR-3%20Kumar.pdf 2013 february

CHANGING THE RULES OF THE GAME: WHAT IS YOURS IS MINE!
Social Aspects of Sharing and Servicizing Practices in the Mobility Sector

Nihan Akyelken[1] *and Karen Anderton*

School of Geography and Environment, University of Oxford

This paper is concerned with the role of sharing and servicizing practices (SSP) in moving consumption and user patterns towards sustainable and inclusive growth in the transport sector. We aim to conceptualize the social aspects of SSP in transport by problematizing the quotation 'What is mine is yours!' and suggesting embedding consumption and user practices within the culture, making the reverse, 'what is yours is mine!', more appropriate. In doing so, the power relations between economic and political actors which currently prevent the perceptions of sharing as a form of dependency are also considered.

Keywords
Collaborative consumption; funding sustainable transport; sharing economy

1. Introduction

In the midst of increasing recognition of an unstable global economy, the world is searching for innovative ideas aimed at reshaping current forms of liberal market economies. Collaborative consumption, or the notion of a sharing economy, has attracted significant attention over the last few years. The idea has been further popularised by the book *What's Mine is Yours: The Rise of Collaborative Consumption* authored by Rachel Botsman and Roo Rogers in 2011. Collaborative consumption generally refers to sharing products with others and moving away from owning to utilising services and sharing. Sharing and exchanging (used) products is not a new practice, however. In fact, the trend is often identified as 'the reinvention of old market behaviours renting, lending, swapping, bartering, gifting - through technology, taking place on a scale and in ways never possible before' [1]. Clearly, it is the potential of digitization of consumption practices through network technologies, which is further supported by state incentives and awareness campaigns that has made sharing and providing services increasingly popular amongst consumers and businesses in the recent years. Coupled with increasing social and environmental concerns and the lack of resources, the rise of 'collaborative consumption' or 'the sharing/service economy' has started to change ideas about big businesses. This tendency is manifest in the increased popularity of incentives provided for start-ups using micro-level technologies, communication technologies in particular and the efforts aimed at bringing together 'angel investors' and innovative ideas about how people consume [2].

The transport sector is no exception to these changing consumption practices. In fact, car-sharing has been recognised as one of the most evident examples of collaborative consumption, and is mostly discussed in sustainable mobility literature [3]. However, the

[1] Please email Nihan.akyelken@ouce.ox.ac.uk for a complete draft of this paper.

conceptualisation of service-/sharing-based economy remained limited to discussion of moving away from high-tech solutions to research niches that require soft policy measures in the context of sociotechnical transitions [4] [5]. In this paper, we seek to initiate a thought-provoking discussion on the social aspects of sharing and servicizing practices (SSP) in the transport and mobility sector. We argue that if a *systemic change* is to occur affecting all levels of governance and production through consumption and user practices, the *systemic risks* should be identified: the use of neoclassical economic thinking, which dominates most of transport policy evaluation literature, should go under drastic changes by exploring the complexities within three pillars of public economics –'demand', 'supply' and 'regulation'. Such thinking requires a shift from 'What is mine is yours!' to 'What is yours is mine!' implying that the changes in consumption practices should be embedded within the system rather than the emphasis on the altruistic nature of sharing, which is perceived as a form of dependency.

Of course, there are crucial questions to explore on the environmental aspects of these emerging consumption practices with possibilities for further questions on the need for institutional frameworks. Rather than identifying such unintended risks of SSP in mobility and assuming that these changing consumption practices are likely to benefit the society and the economy, this paper postulates that whether SSP will operationalize effectively and create inclusive and sustainable growth requires further exploration of the processes involving economic and political actors. In this respect, we aim to conceptualize SSP in transport by problematizing the 'altruistic' stance in the 'What is mine is yours!' and suggesting that such consumption and user practices are embedded within culture, making 'what is yours is mine!' more appropriate. In doing so, the power relations within economic and political actors are also considered insofar as they prevent sharing being perceived as a form of dependency. We will first provide a review of the existing SSP in transport and the key aspects of these systems, including infrastructure, consumer awareness, use of technologies and the complexity issues. By discussing how these key elements are likely to change and the potential bottlenecks, we will use Harvey's (2009) inter-related activity-spheres, which he uses to illustrate the circulation of capital, to understand how consumption practices can be shifted toward sustainable and inclusive transport.

2. Integration of SSP in mobility practices

Understanding the aforementioned consumption practices in the mobility sector comes with several definitional issues even before identifying the social aspects. What does it mean not to own transport and mobility goods? How does 'sharing' work to ensure mobility needs are met? Are there enough 'servicizing' options in the transport sector? Are these options always more desirable in terms of economic, social and environmental sustainability? What incentives are there for human beings, known to be 'unsustainable by nature' (Rees, 2011), not to own goods but share with others? These questions are not only broad in scope and lie beyond the mobility-specific practices, but any answer to them in the context of mobility is likely to remain as a response without directly exploring the dynamics of overconsumption, unsustainable patterns of consumption and associated social and environmental impacts. Still, acknowledging the importance of these questions and the limitations of any attempt to provide answers for them is the starting point to reconceptualising the new consumption patterns for sustainable and inclusive transport. We do not discuss the specification of the existing sharing systems as we are not concerned with the technical details of these different types of systems for sharing and servicizing, but with the overall trend of moving away from

owning with the aim of sustainable development. But it is important to clarify how we identify SSP in the present discussion.

In the industrial ecology literature, servicizing is simply defined as a transaction, where value is provided through services or functions and not just through the selling of products [10]. In other words, the concept changes the basic notion of economic value from 'exchange value' to 'utilisation value' [11], assuming that consumers can derive utility from using the services rather than owning them. In doing so, it is expected that production costs are reduced, more choices and faster responses are made available to consumers and environmental impacts are reduced [11]. The business models for servicizing activities vary depending on different sectors and services provided. Business-to-business and business-to-consumer are the most common forms of servicizing business models, while consumer-to-consumer, which illustrates collaborative consumption, and business-to-government models are newly emerging models [11]. For the purposes of this paper, 'sharing practices' is taken mainly to refer to consumer-to-consumer practices. Therefore, we use SSP when we do not distinguish between consumers and producers. It is important to note that in the transport and mobility context, consumer is considered as a user; therefore these terms may be used interchangeably.

While 'service thinking' in transport and mobility practices has been extensively discussed through the emphasis on altering the consumption patterns in several aspects of sustainable transport, servicizing is not a recognized research theme in transport studies. Servicizing in transport has only been dealt with within business, management and environmental studies. However, sharing in the form of car-sharing, car-pooling and car clubs has been widely studied in transport, but mainly with the aim of discussing access to the car within the context of transport disadvantages and social exclusion rather than resource efficiency [12] [13]. There is no definitive framework for servicizing and sharing in transport, except for policy documents at national and local levels.

In identifying the development areas for innovation towards sustainable mobility, Nykvist and Whitmarsh (2008) [4] points to product-to-service systems in the UK and Sweden specifically aimed at enabling a shift towards to increased use of public transport and alternative forms of access to the car. This is mainly in the context of taking up new technologies within transport services. Although it is not as strong as in the case of electric vehicles, they claim that product-to-service systems are becoming part of the transport innovation studies. In fact, identifying collective ownership as an example of cultural and socio-spatial niche that elucidate the efforts challenging 'automobility', the synthesis provided by Geels, et al. (2012) [5] also integrate SSP in transport into transitions and governance literature [14].

Given the lack of theoretical explorations of SSP in transport, difficulties with categorizing the existing practices in the existing systems are expected. But on a very general level, we can claim that although there are both services and product-service combinations available in the transport and mobility sector, at present the majority of the servicizing developments in transport can be categorized under the 'use-oriented services' of product-service systems: the product continues to be owned by the provider, and is made available in a different form, and sometimes shared by a number of users [15]. Here, we present the most evident five forms of SSP in transport. The table below makes the conception of SSP more concrete by presenting five main categories of existing SSP examples in transport; for these we have identified infrastructure usage, the role of consumers, business models and the use of technologies together with complexity issues. The table below broadly makes the conception of SSP more concrete by presenting five main categories of existing SSP examples in transport; for these we have identified infrastructure usage, the role of consumers, business models and the use of technologies. There are also complexity issues involved with the existing forms of SSP.

Table 1 Five mobility categories of SSP

SSP	Car-sharing /Bike-sharing	Parking space	Wireless charging	Public transport	Freight services
Examples	Zipcar, car2go, getaround, Wecar, or taxis, Barclay bikes in London	Park-at-my-house, your-parking-space	Better Place in Israel, electrical public buses in Milton Keynes	Oyster, TfL mobile applications, public transit	Online routing and scheduling, Easybring, small packages like UBS
Business model	It mainly affects the automotive industry. The traditional mode of selling cars should change to providing services that replace 'buying a car'	It affects the governments and the businesses significantly: for governments, land-use is expected to be more efficient, while businesses can benefit from paying special attention to social networking sites when building their business models	It requires large investment and highly-skilled labour, which would affect local councils' budgets significantly	Space-design becomes an important variable eventually resulting in need for a variety of skills	Networking amongst companies would yield high profits. The reliability of the services depends on the strength and the width of the network
Consumer side	Perception of owning a car, i.e. the car as a status symbol, plays a significant role; campaigning for collaborative consumption is important	Awareness of the significance of collaborative consumption and the role of social networks are of key importance	Not applicable	Easy to influence consumers in the use of ticketing	Needs rapid expansion of the network to ensure efficiency for the companies (as consumers)
ICT	Communication networks are crucial for any sort of sharing e.g. mobile phone applications as a communication platform for sharers and service providers	Communication networks are crucial for any sorts of sharing e.g. mobile phone applications as a communication platform for sharers and service providers	Wireless tracking system for vehicles	Innovative ticketing should include communication aspects, i.e. mobile phone applications and timetable screens	More sophisticated networking sites and applications needed
Infrastructure	Depending on the changes in automobile production, a reduction in infrastructure usage is expected to play a key role, but parking space required is also important in terms of the infrastructure required	Less infrastructure usage	Expected to lead to a significant amount of reduction in infrastructure usage	Space is an important aspect for public transit	Depends on the freight manufacturing sector and how fast they adopt service businesses
Complexity issues	Societal benefits are great, although significantly depending on the forms of car sharing. Consumer-to-consumer services (e.g. Wheelz, Buzzcar, Tamyca) also differ in terms of their impacts	Difficult to disseminate best practice in residential neighbourhoods	Require huge amounts of investment and the users of public transport are not necessarily affected, which may hinder the popularity of best practice	There are various societal impacts that can only identified depending on the context	Freight is a traditional business, meaning that such networking may take time to adjust

First, car-sharing is one of the most popular forms of practice in a service-based economy. It generally involves two or more people sharing a car rather than driving alone. Car-sharing activities in the form of business-to-consumer include private companies offering car-sharing services to consumers. It could also take others forms, like car-clubs and car-pooling, mainly organised by local councils or even between consumers. Business-to-consumer car-sharing

activities have significant implications for business models mainly in terms of goods and services provided; these mainly affect the automobile industry. The practice requires the traditional mode of selling cars to change to providing services that replace 'buying a car'. It is important to note that the societal benefits vary significantly depending on the forms of car sharing, i.e. household ride-share or external ride-share; if socially disadvantaged groups choose to use carpooling over walking and cycling, the results may not be optimal. Finally, car-sharing in the form of a business-to-consumer system also involves insurance companies as one of the main actors due to existing information problems.

Second, the concept of shared parking spaces has recently become popular. The idea illustrates consumer-to-consumer activities and represents a business model which enables home and business owners to rent their parking space for drivers as a means of cost-effective parking and private (individual) revenue generation. It also demonstrates that car companies are thinking strategically about new business models for the longer term. This model can be applied in the absence of a business, using social networks and communication technologies. For governments, land-use is expected to be more efficient, while businesses can benefit from paying special attention to social networking sites when building their business models.

Third, wireless charging for electrical vehicles is quite new and can be recognized as a form of servicizing as it has a role in reducing infrastructure usage. Wireless charging for electrical drivers saves drivers from using physical infrastructure and tools to recharge their batteries, i.e. having to plug the electrical vehicle into the grid, and enables them to charge their cars through a wireless energy transfer. Despite the controversial debates over the use of electrical vehicles, they are still not popular and there are no predictions of the impacts of wireless charging for electrical vehicles. What is known is that it would require significant investment and highly-skilled labour and would be likely to result in reduced infrastructure usage.

Most of public transport can be considered servicizing in general. However, complementary actions that reduce the use of infrastructure/machines, such as the use of mobile phone applications for travel routing and reusable travel cards, would be the main focus of the analysis if considered from a SSP perspective. Most importantly, space-design becomes an important variable, eventually resulting in the need for a variety of skills. Access to public transport is, however, crucial in determining people's social accessibility. Physical inaccessibility is likely to result in inaccessibility of goods, services, decision-making, life chances, social network and social capital, which then leads to social exclusion. However, this could also work in the opposite direction that public transport use can strengthen social capital by providing a safety net of transport options for (economically) disadvantaged groups [16]. Therefore, social equity considerations become particularly important in public transport as a form of SSP [17].

Finally, there are several freight transport activities that can be recognized under SSP due to the increasing role of ICT in scheduling activities and changing production patterns like e-commerce, which in turn results in the need for more space and infrastructure. Lorry sharing is also important in the SSP context. Lorry-sharing is where freight service providers come together to form a collective organization with shared access to orders. Using ICT for online routing and scheduling, together with lorry-sharing, is a strategy to prevent empty running. From a sectoral point of view, route planning has become increasingly important in

transport and storage and wood and furniture sectors, while online retailing is one of the recognized best practices in wholesale and retail [18].

Overall, SSP in transport sector is not clearly defined or well understood. However, the above five categories help us identify the main factors involved and the expected impacts and potential constraints to some extent. Based on the broad overview of the existing practices, the main actors involved are consumer/user, central and local governments, provider, car manufacturer, infrastructure and insurance providers. The main factors that are important in enabling the practices to occur are consumer knowledge, access to mobile technologies, access to skilled labour, social networks, and social equity considerations, access to funding and high-technologies and reliability. Although making such lists might appear unduly simple in structure, they nevertheless help us to elucidate the types of activities that can be thought of in a sharing-/service-based economy and the range of complexity issues together with identification of the main agents.

3. Conceptualisation through inter-related activity-spheres

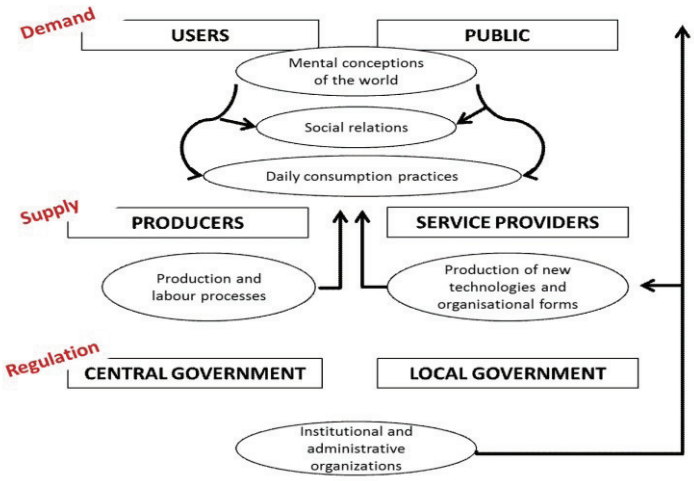
The sociotechnical transitions in transport literature recognize the importance of culture on 'collective ownership' as a developing research area [14]. However, the complexities of the shift from owning to sharing and servicizing are not conceptually defined. If this shift in user practices is to bring economic, environmental and social benefits, it is important to identify the bottlenecks in daily activities that evolve within different political, social and economic spheres. Moreover, in the absence of a holistic conceptual understanding of these complexities within consumption and user practices, these existing SSP are likely to remain piecemeal business models that are forced to exist in the face of increasingly depleted energy and economic resources available for transport. In this section, drawing on Harvey's (2009) [9] *inter-related activity spheres* of capital circulation, we suggest a set of relations between the key actors and factors based on the above review set out in the table. In doing so, the main bottlenecks, where these practices cannot circulate or are not beneficial for sustainability, are identified as well as providing a set of recommendations for encouraging sustainable and inclusive practices [19].

Neoclassical economic thinking is still dominant in transport policy and programme evaluation as evidenced in how transport funding decisions are made [20]. Only a cursory look at the developing indicators of wellbeing and prosperity shows that the determinants of (economic) development include a set of polarized views. These views range from technological determinism, geographical determinism and institutional determinism to the emphasis on different types of identities including class and gender. Harvey (2009) [9] provides a critical overview of these polarized perspectives by pointing out how misleading it would be to focus on a single aspect of a local economy in bringing a structural change. He suggests that the activity spheres of daily consumption practices, mental conceptions of the world, relationships to the natural world, social relations, production and labour processes, institutional and administrative arrangement and technologies and organisational forms are the main activity spheres through which capital circulates. He uses this conception to illustrate what happens if capital becomes stuck in one of the spheres.

Although transport is widely considered as a vertical sector like education and health in the realm of public policy [21], given the increasing role of mobilities as part of the 'society on the move' debate [22], it increasingly acts as a horizontal sector, although more by

stressing the importance of social consequences of mobilities [23]. Accordingly, the focus of our attention in this framework is not the circulation of physical capital, for example say physical infrastructure as part of transport systems, but practices and activities that are relevant to trends helping users move away from owning in the context of transport and mobility needs and wants. As seen in the broad overview of the examples, the most important actors and factors of SSP in transport sector are consumers/users and public, businesses (including producers/manufacturers and service providers) and the regulators. It is important to read the complexities within the aforementioned activity spheres by grouping them into demand (consumers/users and public), supply (producers/manufacturers and service providers) and regulation (central and local governments) aspects in order to emphasis the neoclassical economic thinking prevalent in transport policy evaluation. The below figure outlines the relationships between the activity spheres and the main actors involved in SSP in transport grouped into 'demand', 'supply' and 'regulation'.

Figure 1: Inter-related activity spheres for SSP in transport



Volatility of 'demand'

The role of consumers and the overall societal perception, public opinion on transport usage and consumption in particular, is evident in our initial concern that there should be a shift from 'What is mine is yours!' to 'What is yours is mine!'. Implied in this shift is that SSP should occur as part of the consumption culture, not thanks to 'goodwill' of some. Starting by emphasising the significant part played by the consumers and the public is therefore appropriate. The daily consumption practices are considered the outcome of the demand side, although these practices may well evolve within themselves responding to changing tastes and new technologies. Taking into account the extent to which the 'new mobilities paradigm' has detached transport policy from traditional transport geographies, namely problematizing the very notion of basic travel behaviour [24], which subscribes to the aim of physical movement between two points, the mental conceptions of the world is particularly important for daily consumption patterns in changing towards 'sharing' from 'owning'. How individuals perceive travel and the importance of value derived from travelling itself compared to other preferences is likely to be dominated by their mental conceptions of the world. The notion of motility capital, the capacity or potential to move [25], provides a clear understanding of how this might happen.

According to the 'motility capital' framework, access, competence and appropriation are the key elements of mobilities, which are clearly linked to 'social, cultural, economic and political processes and structures within which mobility is embedded and enacted' [26]. Therefore, if it is not appropriate to share, or if sharing is not consistent with the aspirations of the users, and if the user is not capable of using the services, the potential of SSP is likely to disappear within the demand realm. Implied is the need for a detailed look at the interactions between capacities and aspirations in different contexts that determine the conditions under which travel occurs. Yet, it is already clear that neither daily consumption patterns nor mental conceptions of the world are adequate to determine levels and nature of demand as they are significantly influenced by other activity spheres such as social relations, which clearly have an impact on the mental conceptions of the world.

Social relations is one of the most relevant activity spheres to mobility practices through widening social networks. In fact, Urry's (2007) [23] notion of network capital implies that geographical distance is not as important in determining social relations as it was in the past. Central to Urry's 'network capital' are the social consequences of mobilities, which are influenced by eight factors: physical accessibility (i.e. the ability to move), time, and appropriate requirements including legal procedures, others at a distance (i.e. having someone to communicate with at a distance), location-free information, communication devices, movement and appropriate meeting places (i.e. availability of space to communicate). In essence, network capital is a broader conceptualization of social capital. The relational nature of network capital sheds light on the connection between social relations and mobilities, in this case how social relations are determined by sharing and owning, and vice versa. The main counter-argument is the concern over 'dependency' in sharing practices in transport. In fact, this takes us back to mental conceptions of the world, where the aspirations and behaviour of the individuals might differ depending on the context.

Supply side

Access to technologies may be one of the paths that connect the practices to social relations. The production of new technologies is highly relevant to integrating SSP into the transport sector in order to sustain mobility patterns as well as to maintaining environmental and social sustainability. Specifically, the use of information communication technologies (ICT) is important in determining the options available to transport users as it has been recognized as a major potential contributor to demand management. However, it might well be that new technologies arise accidentally, as in the case of mobile phones, which are not primarily utilized as a communication platform for sharing and enabling servicizing business models, but are now widely employed in SSP. Moreover, the evolution of technologies and the use of these technological services also entail equity issues: not everyone benefits from these developments equally or not necessarily in the direction towards sustainable transport [27]. This is clearly not factored into the most developed individual choice theories in neoclassical economics, which assumes full maximization of net benefits [28].

Of course, the economic thinking is not completely oblivious to such social dilemmas. One could argue that the complexity of social relations and the resulting accessibility issues have been recognized in neoclassical economic thinking as evidenced in the transition from the assumption of perfect information to bounded rationality assumption that states that people are intended to be rational but there are limits to it [29]. However, the multiplicity of actors interact in SSP in transport makes social dilemmas more complex. For instance, the

role of lifestyles and social networks on transport usage is interrelated through several mechanisms. One of the most relevant mechanism in this context is how individuals' participation in, and autonomy regarding, economic, political, social and cultural life and their health may affect the quantitative and qualitative dimensions of their social networks and extent to which they can mobilise the resources contained in those networks, which may in turn impact their levels of transport disadvantage [30]. Overall, daily consumption and user practices, which are in turn determined by mental conceptions of the world and social relations on the demand side, are linked to the supply side through production of technologies and organisational forms.

The nexus of social relations, access to technologies, mental conceptions and the resulting consumption and user practices is not limited to the increased use of ICT in business models and taking up of these technologies by transport users. Being at the heart of servicizing activities, business models have a clear role in altering production patterns and labour processes. Rather than focusing on production, a trend towards SSP requires firms to invest in human capital development, particularly in skilled labour. This trend is likely to be similar to moving from manufacturing sector to traditional services sectors like banking, which led to establishment of strong developmental associations inducing different industry practices [31], which in turn brings further social inequalities. It could also be that depleting energy resources are putting further pressures on production of new technologies and that in turn there are inherent institutional and organizational differences which will need to be addressed [32]. In fact, the required changes in consumption and user patterns can be recognized as a product of the efforts towards environmental sustainability. Therefore, the energy demands of manufacturing and social crises arising from inequalities in labour markets inevitably call for radical transformations in consumption and user patterns that are also linked with social relations; this clearly makes the link back to the demand side.

Moreover, the demographic developments are already evident as a major pressure on the sustainable use of resources. The activity sphere of the relationships to the natural world factors into how individuals perceive the physical environment around them. The level of environmental awareness, utilisation and satisfaction derived from travelling can also be included under this activity sphere. For instance, producers focusing on business models where servicizing and sharing are to be encouraged are likely to improve and maintain relations with insurance providers. These new/niche businesses or those able to change towards services stand to benefit, but there will be traditional and powerful businesses which cannot adapt that stand to lose from a mainstream/large scale switch to servicization. Yet, how this process takes place and how it works in harmony with community interests are also linked to social pressure and government regulation in achieving inclusive growth.

Institutions as 'regulators' and 'resistors'

If taking up of SSP in transport usage is to become a part of the culture towards an inclusive and sustainable economy, in which daily consumption practices are embedded, institutional and administrative arrangements seem to be at the heart of the framework that have a continuously evolving impact on all of its three layers, namely demand, supply and regulation; this impact affects all actors through different activity spheres mentioned above. This argument could be linked with the very basic role of institutions that they act as regulators; the rules of the game. But how these rules are defined is both complicated and of crucial importance as they ensure both equity at societal level and the efficient use of

resources for obvious reasons of sustainability. Thus, a deeper understanding of the role of institutions as the regulator of these activity spheres, not only of free market determinants (demand and supply) is required. One way to do this is to explore their role as a resistor to (i) power dynamics that determine responsibility, which, in this case, can be illustrated with the quote 'What is mine is mine!' and (ii) the path dependency of the existing institutions:

(i) The importance of power dynamics is already outlined in discussing social relations and mental conceptions of the world in determining the feasibility of SSP in transport. Although in a democratic governance system, individuals can organize themselves to induce a change in consumption and travel patterns as in the case of many collaborative consumption activities like starting car clubs, the aforementioned equity considerations should also be dealt with the distributive power of the state, which is generally recognised as the predatory theory of the state [33] that the state is an instrument for transferring resources from one group to another.

(ii) The path-dependency of institutional argument also deserves special attention. Assuming that equilibrium economic institutions are a result of the exercise of *de jure* and *de facto* political power, Robinson and Acemoglu (2006) [34] show that a change in political institutions leads to the distribution of de jure political power, but the elite can intensify their investments in de facto political power, such as lobbying, to compensate for the loss of de jure power. This might lead to a different equilibrium of economic institutions. This shows that there is always a possibility that traces of past institutions might be preserved, and this may affect the way that institutional frameworks are built. The overall argument is that institutions are not exogenous or historically predetermined, but they seem to persist for long periods of time.

Taking into account this complex nature of institutions, two messages arise in the context of SSP in transport. First, it is important to identify the level of governance required for the smooth operations of SSP on both the demand and the supply side. The employment regulations, the relations between employers and local governments, which are in turn affected by central government and also deal with production and labour processes, are all complex relations affecting the healthy circulation of sustainable consumption practices and travel behaviour. For instance, the institutions should be set in a way to provide a set of policy initiatives including publicity campaigns; facilitating technology improvement and fair distribution of access to these technologies as well as to social networks.

Secondly, in order to facilitate an open and democratic environment, information available to businesses, governments and public has a significant role in correcting power imbalances by avoiding the de facto political power, which is not easy to regulate, as much as possible. Specifically, the emphasis on consumption (instead of production) in terms of measuring wellbeing and sustainability should be integrated into governance systems. Efforts towards decreasing the environmental emissions from transport have mainly intensified on the production side. From a production point of view, it is much harder to compromise between nations at different levels of development, as has been evident in international climate change negotiations.

In summation, the inter-related activity spheres outlined above are all equally important in integration of SSP in the transport sector towards inclusive and sustainable growth. Some of them have specific policy implications, while others elucidate the complexities that cannot be handled with the basic economic thinking, which determines, for instance, the role of private and public bodies in transport investment decisions. Although

mental conceptions of the world, daily consumption/user practices and social relationships constitute the demand aspect transitioning into supply through production of technologies and organizational forms, which are in turn entwined with production processes and labour markets and eventually by institutional frameworks as regulators, the division of the activity spheres is not necessarily explicit. Nevertheless, it helps to identify the bottlenecks in integrating SSP in transport.

4. Summing up the bottlenecks

Throughout the paper, we have discussed SSP in transport and how best to identify the main actors and linkages within these actors involved within these practices. First, we have shown that although it is difficult to categorize the existing practices and there are no certain boundaries for defining these patterns in transport sector, infrastructure usage, use of ICT, business models and consumer awareness are the key aspects of identifying these systems. Second, we have discussed the bottlenecks that prevent the dissemination of these practices. The discussion on the linkages within the main actors has pointed out that although the circulation of the practices can be categorized into demand, supply and regulation, how these three groups of activity spheres are connected and what the functions are within them are complex matters. One interesting challenge will be developing methods for data collection in order to understand the patterns. The informal nature of the sharing practices may prove problematic for fully understanding the key trends. This should be dealt with reorganising data collection for national statistics to elucidate the forms of existing SSP.

Overall, there are three key steps that should be taken towards analysing and understanding the mechanisms towards inclusive and sustainable SSP in transport.

First, the policies targeted at promoting SSP in transport should not aim at changing consumer/user behaviour as the trend of moving away from ownership should be embedded within the culture in which individuals should be free to choose whether they are willing to share. Therefore, how best to redefine the culture is what the macro-level strategies should be focusing on at institutional level. The macro-level strategies, the linkages between corporations, central governments and local governments, should be designed in a way that influences the businesses towards more sustainable production through integrating servicizing into their strategies, therefore inducing a trend towards sharing. As is called for in the most recent international discourse, we need to see a 'broad alliance' of actors [35] to deliver against sustainable development goals and in delivering SSP.

Second, if any of the factors and actors identified above do not behave in a way that conforms to sharing and servicizing, these practices are likely to result in less sustainable patterns of growth, both economically and socially. This is evident, for instance, in a situation where businesses promote the use of sharing practices in transport through servicizing activities using ICT and access to ICT entails equity issues. In this context, the relationship between local and central governments becomes crucial. More specifically, the cross-sector impacts of social policy and transport policy should be taken into account for full realization of the benefits of the servicizing activities. This is also important in maintaining equality in starting 'sharing clubs' and encouraging such activities.

Finally, the starting point for constructing a supportive institutional structure for promoting SSP in transport should aim at certain mobility patterns, such as commuting behaviour, where the linkages are made formal through the relationships between employers and governments inducing more sustainable travel behaviour. Focusing on specific forms of

mobility will enable policy makers to disseminate the practices by making it a part of the culture and still giving the public a free choice between owning and sharing. This is mainly due to the multiplicity of life stages that determine social relations and form mental conceptions of the world, which are both identified to be significant in determining the shift from owning to sharing and providing services.

4. References

1. Collaborative Consumption Hub, 2013. Movement: http://www.collaborativeconsumption.com/the-movement/
2. Audretsch, D. B., Bönteb, W. and Mahagaonkar, P., 2012. Financial signaling by innovative nascent ventures: The relevance of patents and prototypes. Research Policy, 41(8), pp. 1407–1421
3. Cairns, S. and Harmer, C., 2011. Accessing Cars: Insights from International Experience. London: RAC Foundation.
4. Nykvist, B. and Whitmarsh, L. 2008. A multi-level analysis of sustainable mobility transitions: Niche development in the UK and Sweden. Technological Forecasting & Social Change, 75, pp. 1373-1387.
5. Geels, F.W., R. Kemp, G. Dudley and G. Lyons (eds) (2012), Automobility in Transition? A Socio-Technical Analysis of Sustainable Transport. New York: Routledge.
6. McQuaid, R.W. and Sherrer, W., 2010. Changing Reasons for Public-Private Partnerships, Public Money & Management, 30 (1), pp. 27-34.
7. Rodrigue, J. P., 2012. The Geography of Transport Systems: http://people.hofstra.edu/geotrans/eng/ch7en/appl7en/actorstransportfinance.html
8. Small, K., 2010. Private provision of highways: Economic issues, Transport Reviews, 30 (1), pp. 11-32.
9. Harvey, D., 2009. TheEnigma of Capital and the Crises of Capitalism. London: Profile Books Ltd.
10. Mont, O., 2004. Reducing life cycle environmental impacts through systems of joint use. Greener Management International, Spring (45), pp. 63-77.
11. Mont, O., 2013. Servicizing Concept. SPREE internal report.
12. Blumenberg, E. and Smart, M., 2010. Getting by with a little help from my friends…and family: immigrants and carpooling. Transportation, 37 (3), 429-446.
13. Lovejoy, K., and Handy, S., 2008. A case for measuring individuals' access to private-vehicle travel as a matter of degrees: lessons from focus groups with Mexican immigrants in California. Transportation, 35 (5), 601-612.
14. Schw anen, T., 2013. Sociotechnical transitions. In: Givoni, M. and Banister, D. (eds), Low Carbon Mobility. Edward Elgar.
15. Tukker, A., 2004. Eight types of product-service system: eight w ays to sustainability? Business Strategy and the Environment, 13(4), pp. 246-260.
16. Currie, G. and Stanley, J., 2008. Investigating links between social capital and public transport, Transport Reviews 28(4), 529-547.
17. Vasconcellos,E. A., 1997. The making of the middle-class city: transportation policy in Sao Paulo. Environment and Planning A, 29(2), pp. 293–310.
18. Bauer, G., et al., 2011.Economic and environmental sustainability of new logistics and manufacturing systems. Deliverable 4 of LogMan. Funded by the European Commission 7th RTD Programme. Vienna, Austria.
19. Turnpenny, J., Radaelli, C., M., Jordan, A., and Jacob, K., 2009. The policy and politics of policy appraisal: emerging trends and new directions. Journal of European Public Policy, 16 (4), pp. 640-653.
20. Akyelken, N., 2013. Finance and Investment in Transport. In: Givoni, M. and Banister, D. (eds), Low Carbon Mobility. Edward Elgar.
21. Mash, D. and McConnell, A., 2010. Towards a framework for establishing policy success. Public Administration, 88 (2), pp. 564-583.
22. Sheller, M. and Urry, J., 2006. The new mobilities paradigm. Environment and Planning A 38 (2), 2007-226.
23. Urry, J., 2007. Mobilities. Polity Press.
24. Shaw, J. and Hesse, M., 2010. Transport, geography and the 'new ' mobilities. Transactions of the Institution of British Geographers, 35, pp. 305-312.
25. Kaufmann, V., Kesselring, S., Manderscheid, K. and Sager, F., 2007. Mobility, Space and Inequalities, Swiss Journal of Sociology, 33(1), pp. 5–6.
26. Kaufmann, V., Bergman, M. M. and Joye, D., 2004. Motility: mobility as capital. International Journal of Urban and Regional Research, 28(4) ,pp. 745–756.
27. Kenyon, S., 2006. Reshaping patterns of mobility and exclusion? The impact of virtual mobility upon accessibility, mobility and social exclusion. In: M. Sheller and J. Urry, eds. Mobile Technologies of the City. London: Routledge, pp. 102-120.
28. Ostrom, E., 2011. Background on the Institutional Analysis and Development Framew ork. The Policy Studies Journal, 39 (1), pp. 7-27.
29. Jones, E. C., 2003. Building on Ostrom's 'The Rudiments of a Theory of the Origins, Survival and Performance of Common-Property Institutions. Journal of Ecological Anthropology, 7 (1), pp. 65-72.
30. Schwanen, T., Lucas, K., Carrasco, J., Neutens, J., Akyelken, N. and Solsona, D. C., 2013. Reconceptualising the links between transport disadvantage and social exclusion. UTSG 2013 Proceedings, Oxford: UK.

31. Berk, G. and Schneiberg, M., 2005. Varieties in Capitalism, Varieties of Association: Collaborative Learning in American Industry, 1900 to 1925. Politics & Society, 33 (1),pp. 46-87.
32. Anderton, K., 2010. The need for integrated institutions and organisations in transport policy -the case of transport and climate change. In, Banister, D. and M. Givoni (eds.) Integrated Transport: From Policy to Practice. Taylor and Francis
33. North, D. C., 1981. Structure and Change in Economic History. New York, Norton.
34. Robinson, J. A., and Acemoglu, D., 2008. Persistence of Power, Elites and Institutions. American Economic Review, 98 (1), pp. 267-293.
35. UNDP, 2012. The future we want. Available online at:
36. http://www.uncsd2012.org/content/documents/727The%20Future%20We%20Want%2019%20June%201230pm.pdf.

REGIONAL SUPPORT FOR INNOVATION IN SMEs IN TRADITIONAL INDUSTRIES

René Wintjes[1]

[1]*UNU-MERIT, Keizer Karelplein 19, Maastricht, The Netherlands,*
r.wintjes@maastrichtuniversity.nl

Innovation support measures in the EU are mostly designed to support SMEs in emerging and R&D intensive sectors. However, in terms of employment, SMEs in traditional manufacturing sectors are still important and innovation support can increase the competitiveness of the participating SMEs and regions. This paper makes use of a survey among over 300 SME in seven regions in the EU, as well as case-studies. Do SMEs in traditional manufacturing sectors have different innovation support needs, and which policy instruments and which modes of implementation are most effective? R&D subsidies focussing merely on product development might not be the most appropriate measures. Also the increasingly competitive nature of the selective application procedures which are in place to select the beneficiaries or project proposals, may not be the most efficient. Marketing, internationalisation and design apprear to be important aspects of innovation.

Keywords
Innovation measures, impact evaluation, SMEs, traditional sectors, behavioural additionality

1. Introduction

This paper focuses on the impact of SME innovation support measures on 7 regions in different countries in Europe: Sachsen-Anhalt in Germany, Noord-Brabant in the Netherlands, West Midlands in the UK, Limousin in France, Emilia-Romagna in Italy, Comunidad Valencia in Spain and Norte and Centro in Portugal.

Traditional industries include the manufacture of food products and beverages, textiles and textile products, leather and leather products, ceramics or other non-metallic mineral products, mechanical/metallurgy or basic metals and fabricated metal products, and automotive or motor vehicles, trailers and semi-trailers.

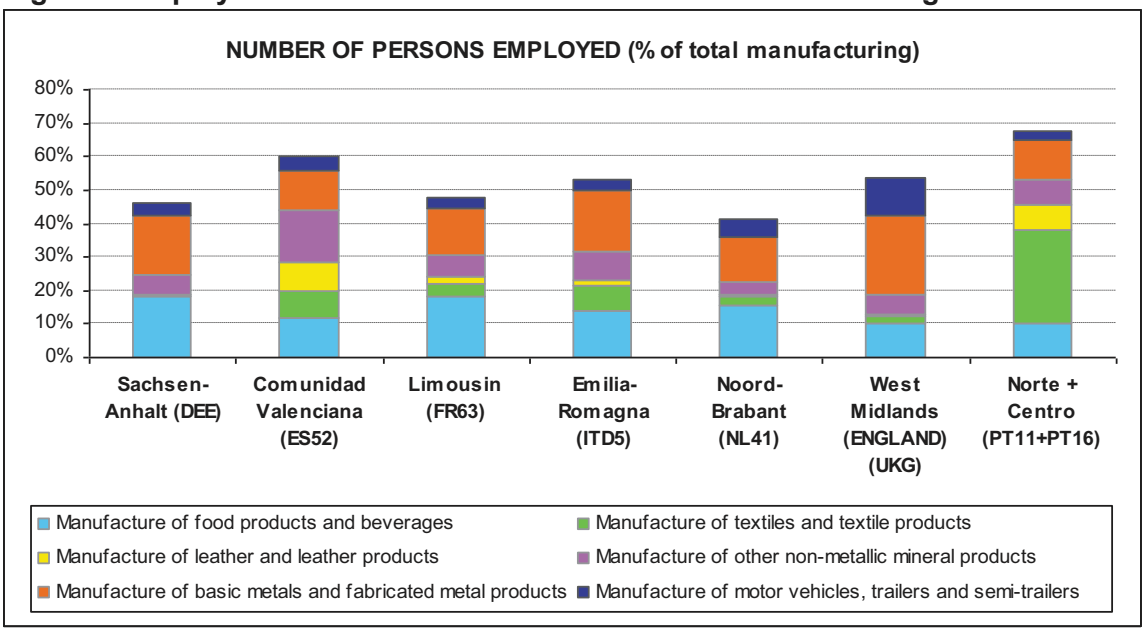
The share of local units in the traditional industries ranges from 43% in Noord-Brabant and West-Midlands to 62% in Norte and Centro. Basic metals and fabricated metal products is, in number of local units, the largest traditional industry in Sachsen-Anhalt, Comunidad Valencia, Emilia-Romagna, Noord-Brabant and West Midlands. Food products and beverages is the largest traditional industry in Limousin and textiles and textile products is the largest traditional industry in Norte and Centro.

For employment we observe similar patterns. The share of persons employed in the traditional industries ranges from 46% in Sachsen-anhalt to 68% in Norte and Centro. Basic metals and fabricated metal products is, in number of persons employed, the largest traditional industry in Sachsen-Anhalt, Emilia-Romagna and West Midlands. Food products and beverages is the largest traditional industry in Sachsen-Anhalt, Limousin and Noord-Brabant. Textiles and textile products is the largest traditional industry in Norte and Centro.

Although not every single traditional sector is important in every region, we can conclude that overall traditional industries still represent quite high shares of activity in the regional

economic structure of the selected regions, even for a 'high-tech' and R&D intensive region such as Noord-Brabant.

Figure 1 Employment in traditional industries in seven selected regions

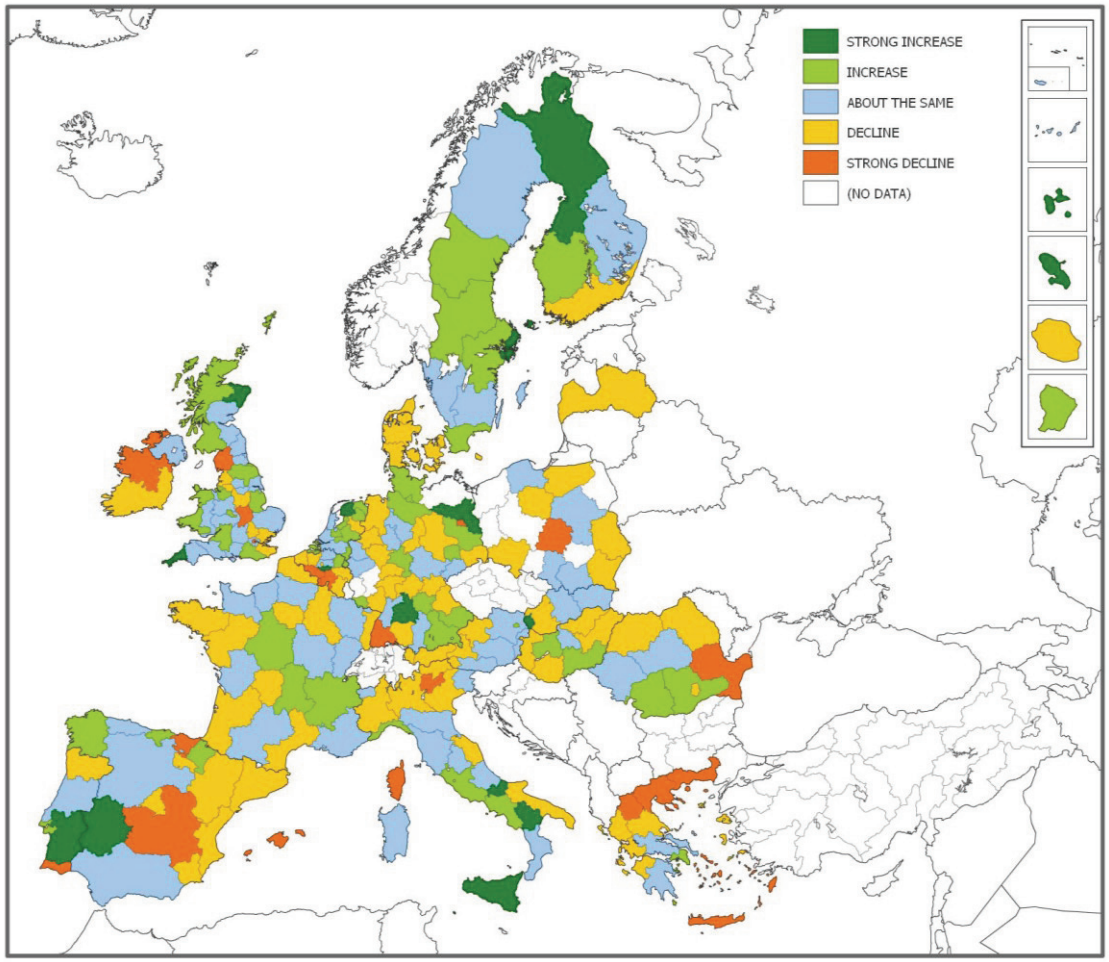


Data source: Eurostat, data for 2007, own calculations.

In about half of all EU regions the share of traditional industries in employment in Manufacturing has increased over the last 15 years and in 78 EU regions this increase was even more than 4.5 percent. Although maps of innovation performance often show patterns of core and periphery at various levels, the geographic pattern of regions with declining or increasing share employment in traditional industries is quite scattered (Figure 2). There are even regions were the traditional sectors seem to be in a state of revival as they have a low but increasing share of employment in traditional industries, and these regions are quite innovative regions located in Germany, the UK, or the innovative Nordic Member States.

The regional economic importance of SMEs in these sectors is often neglected. Most attention goes out to SMEs in research intensive sectors and innovation policy support is focused on supporting the most innovative and R&D intensive firms.

Figure 2 Change in European regions' employment share of traditional industries



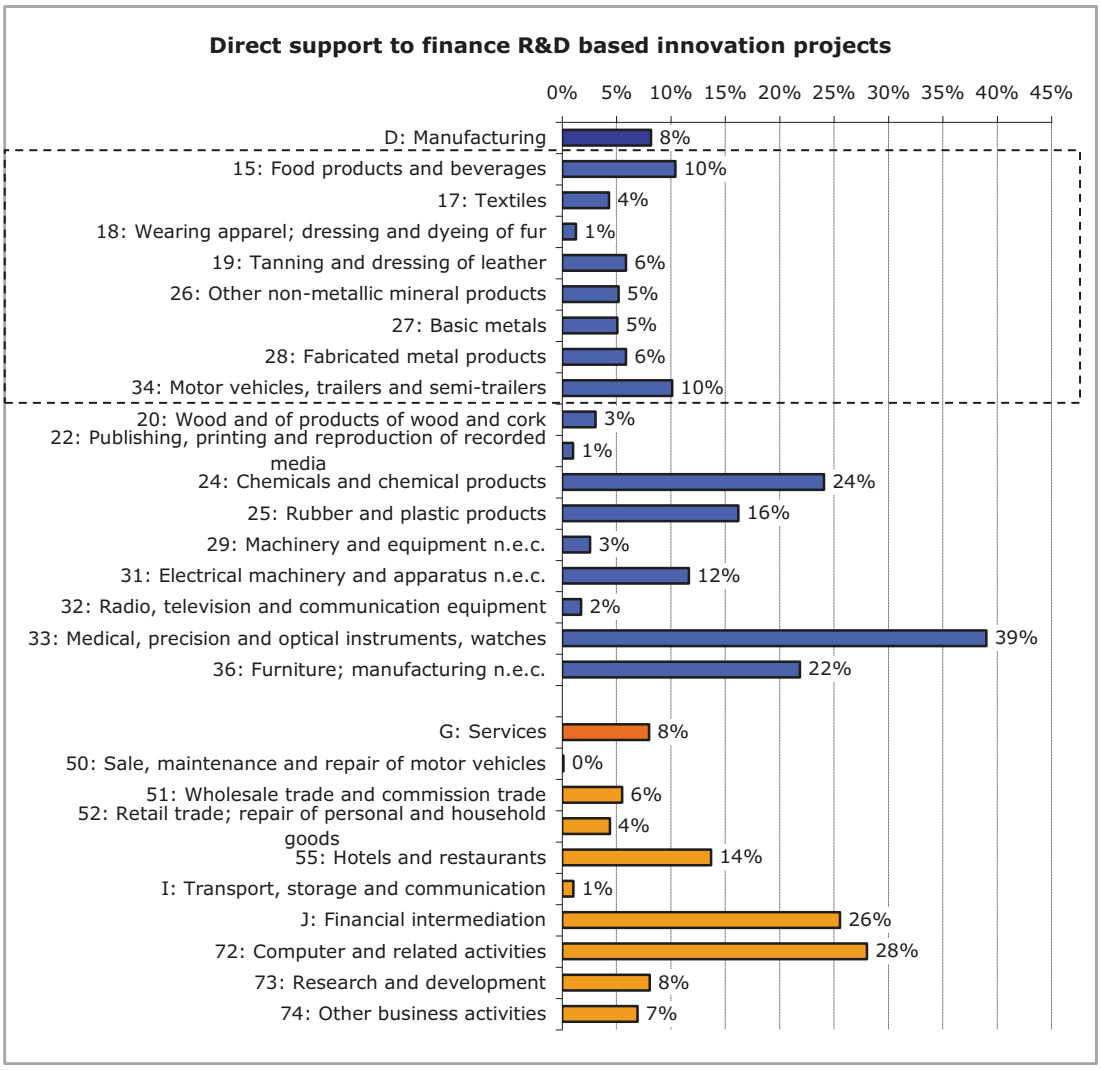
Map created with Region Map Generator. Data source: Eurostat. Data for 2009 and 1995 (or closest years available). The groups were identified using hierarchical clustering and Ward's method. Own calculation.

Fewer firms in traditional industries (6%) receive direct support to finance R&D based innovation projects than firms in other manufacturing industries (10%) or services (8%). In the traditional industries direct support to finance R&D based innovation projects is used most in the food and automotive industries (Figure 3).The analysis of data from the Innobarometer 2007 shows that firms in traditional industries have received less support for R&D activities than firms in other manufacturing sectors. Firms in traditional industries have received more support than firms in other manufacturing sectors from the following measures:

- Subsidies for acquiring machinery, equipment or software;
- Attending or participating in trade fairs or trade missions;
- Networking with companies;
- Information on market needs, market conditions, new regulations, etc.

So, SMEs in traditional sectors might indeed need different kind, less-R&D focussed kind of support. Besides policy-demand, also the supply-side of policy support might be responsible. Many regional agencies have adopted a venture capital approach, selecting innovative project-proposals which are likely to succeed and offer a good 'return on investment'. This regional innovation policy strategy might not work for SMEs in traditional industries.

Figure 3 Direct support to finance R&D based innovation projects



Data source: Innobarometer 2007, own calculations

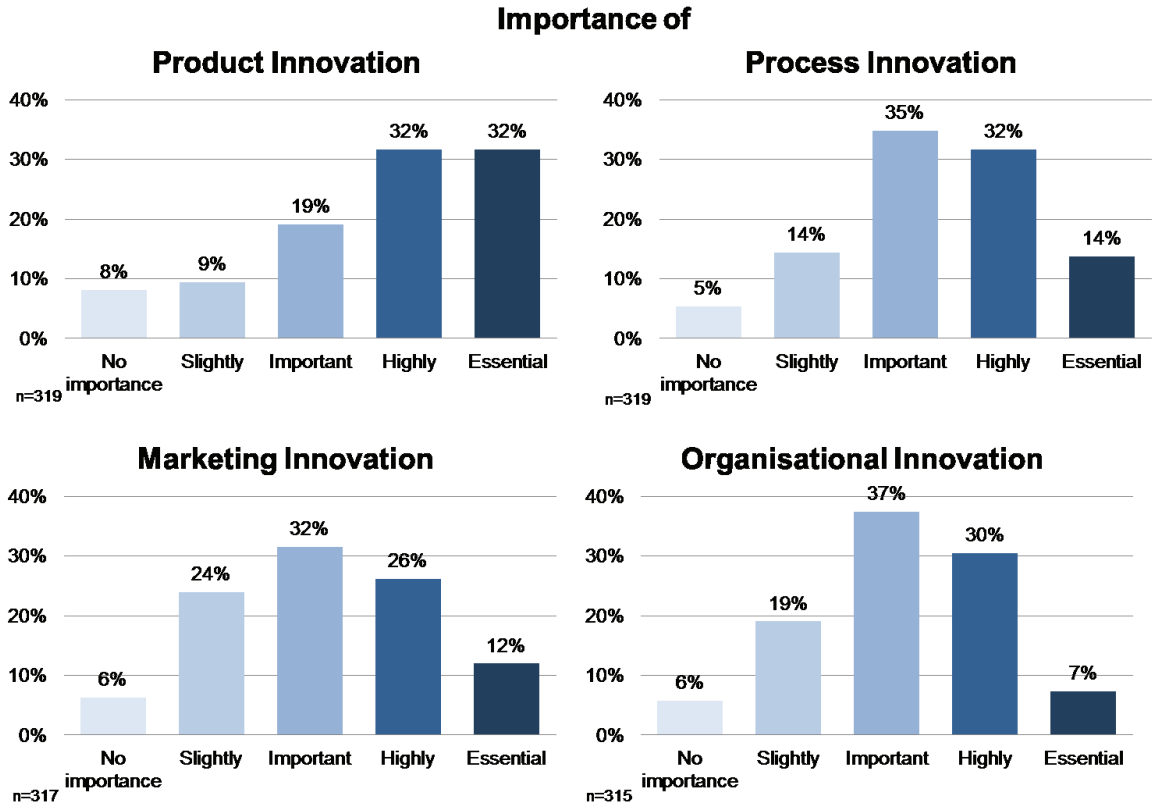
2. Survey results

2.1 Innovative activities, and SME needs

The survey respondents are quite innovative. 37 per cent of the respondents have spend 1-5 per cent of their turnover on innovation activities, which is standard for most sectors. But a quarter of all responding SME spend 6-10 per cent, which is more at the level of research intensive industries. Almost a third spend even more than 10 per cent of their turnover for innovation activities. Nearly 10 per cent do not spend anything for innovation or research, which is an expected value for traditional sectors.

As expected, product innovation is the most important type of innovation, but typical for SMEs in traditional industries is the fact that also the other types of innovation are important. Process innovation is highly important (32 %) and essential (14 %) for 46 per cent of the respondents. Also organizational innovation and marketing innovation are important.

Figure 4 Importance per type of innovation



Since the SMEs are in manufacturing industries it is not surprising that innovation in goods is more important that innovation in services: over 70 per cent of all participants had product innovations in goods between 2005 and 2009. More surprising is that almost 50 per cent of responding firms have innovated in new services. Also in terms of sales from new products as share of turnover, the responding firms are quite innovative. 14 per cent could reach 25-50 per cent of innovation turnover and 17 per cent even realized more than 50 per cent of annual turnover. For comparison: German research-intensive industry companies have reported a share of 32 per cent innovative turnover in 2009 (ZEW, 2011).

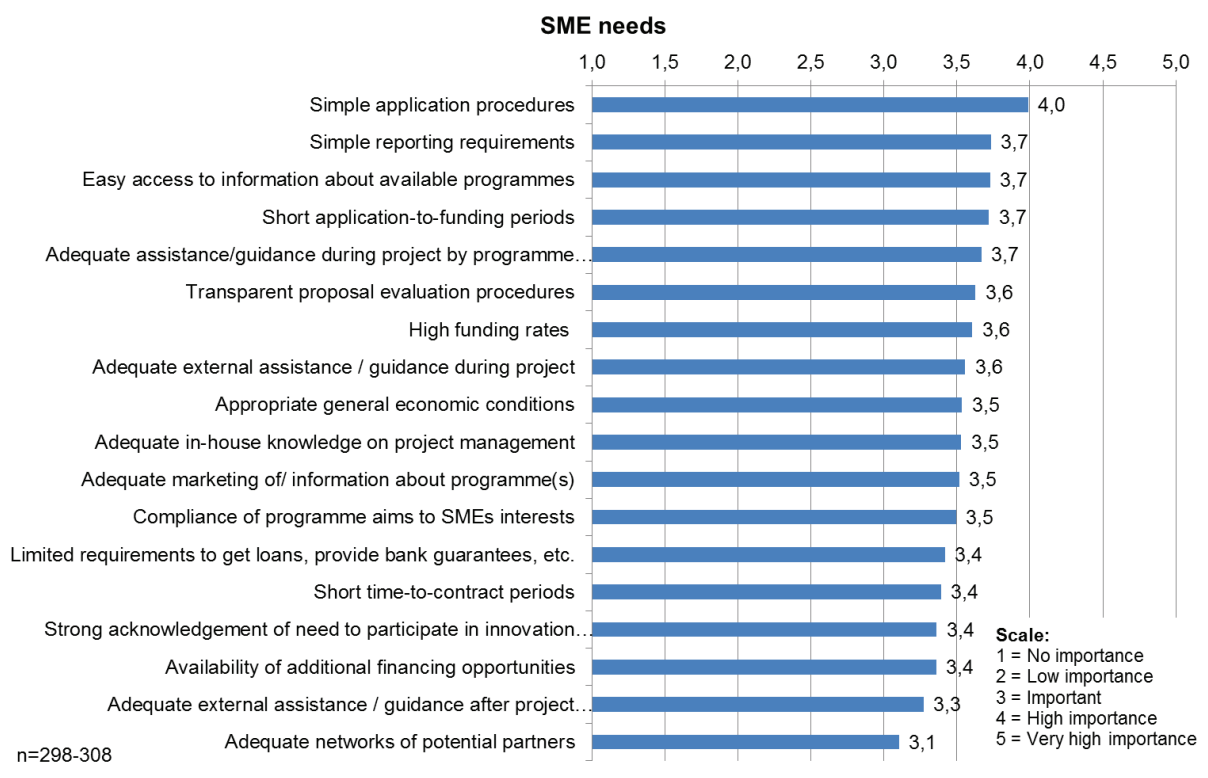
Programme features are of influence on the decision of an SME in traditional sectors to participate in a particular programme (Figure 5). Heavy bureaucratic procedures are a burden to all firms, but this seems especially the case for SME's in traditional sectors.

The survey asked respondents not directly about their own experience of programme participation but for their view on SME needs in general: "What are the specific needs for SMEs to enable them to participate in innovation support programmes?" The main need identified was procedural simplicity and transparency (according to those responding with "High importance" and "Very high importance", which were the extreme categories on a five-point Likert scale). Bureaucratic procedures are a barrier to entry; they impose a fixed cost on programme participation.

Also highly rated was "Short time to contract". Timeliness is hugely important: in case study interviews, SME owners and managers made the point that delay increases the risk that "another firm may get to market first". Moreover, a common theme was that the need for

timeliness can be a source of tension between SMEs and Universities. Other needs noted as important were "Guidance during the project" and "Mentoring/Coaching". Regular contact with programme managers/case officers combined with mentoring/coaching could increase the effectiveness of support measures.

Figure 5 SMEs needs concerning design and implementation of measures



Source: GPrix survey

2.2 Additionality

In order to evaluate the impact of innovation support in terms of additionality, a control group was used, consisting of respondents which had not participated in an innovation support measure. The main finding of the econometric analysis (Forthcoming) is that, in the context of a population of mainly innovating SMEs, support programmes have a zero effect on the innovation of SME participants, but would have had a positive effect on randomly selected SMEs. Moreover, the more likely a firm is to participate in a support programme the less likely that firm is to innovate as a consequence. Conversely, firms that are less likely to participate would be more likely to innovate as a consequence (i.e. were they to participate).

These results are consistent with evidence from interviews with programme managers in all seven EU regions. Namely, the selection procedure adopted by programme managers is typically one of extreme "cream skimming" or "cherry picking"; in other words, firms are selected for programme participation on the basis of observed characteristics that are positively associated with innovation. The firms selected for innovation support are those most likely to innovate irrespective of programme support. Due to the selection procedure of the involved agencies, and the self-selection of the firms (firms that would benefit feel that the support mechanisms do not meet their needs, as in Figure 5).

2.3 Benchmarking type of measures on impact

Based on the survey data we can indicate the extent of impact from participation in various types of schemes. The responding participants gave a score on a wide range of possible impacts for 1 or two of the most important programmes they participated in (See Table 6). Programmes on Human resources are not widely mentioned and the impact scores are on average rather low. The impact from Collaborative programmes and especially the support measures concerning Internationalisation seem to be the ones generating relatively high impacts in certain fields of impact. For the largest group of measures: 'internal innovation' the impact-scores are often close to average, with less outstanding fields of impact. The high impact-fields are often not very surprising. E.g., collaborative schemes generate specifically high impacts on 'Formation of new partnerships and networks', and Internationalisation measures specifically score well on: 'Internationalisation of activities'.

Table 6 Benchmarking types of measures on impact reported by SMEs in traditional industries

	Human resources	External knowledge	Collabo-rative	Internal innovation	Internatio-nalisation	All measures
Number of measures	**6**	**16**	**23**	**95**	**19**	**206**
Improved internal organisation	2.25	2.33	2.48	2.88	2.53	2.54
Improved business or innovation strategy	2.50	2.43	2.67	2.83	2.90	2.71
New quality certifications (iso)	1.57	1.54	1.84	1.93	1.74	2.09
New safety and environmental certification	1.14	1.46	1.58	1.77	1.55	1.84
Improved research competences	2.71	1.79	3.18	2.67	2.10	2.65
Improved marketing competences	2.00	2.23	2.29	2.40	3.45	2.45
Improved design competences	2.75	1.85	3.06	2.71	2.53	2.38
Improved level of skills of personnel	2.29	2.07	3.00	2.77	2.95	3.03
Formation of new partnerships and networks	1.57	2.79	3.59	2.38	3.00	2.82
Improved R&D linkages with universities/research institutes	2.86	2.67	2.91	2.76	1.79	2.61
Improved R&D linkages with other business organisations	2.14	2.36	2.87	2.43	2.11	2.47
Improved commercial linkages with other organisations	1.86	2.27	2.40	2.35	3.26	2.13
Enhanced reputation and image	2.25	3.07	3.43	3.29	3.60	2.52
Facilitated participation in other R&D or innovation programs	1.71	2.64	2.74	2.62	2.26	2.27
Increased turnover	2.57	2.93	2.71	3.32	4.00	3.31
Increased profitability	2.14	2.80	2.57	3.15	3.68	3.12
Enhanced productivity	2.00	2.31	2.45	3.06	3.11	2.72
Access to markets	1.86	2.93	2.91	3.00	3.90	2.97
Internationalisation of activities	1.86	2.50	2.33	2.45	4.16	2.57
Faster 'completion' of innovation project	2.86	3.21	3.25	3.37	2.74	2.94
Average impact scores	**2.15**	**2.42**	**2.73**	**2.71**	**2.87**	**2.69**

Source: GPrix survey
Legend: Cells are highlighted green in case the impact-score is more than 20% higher that the average score as shown in the last column. Orange indicates a score less than 20% below the average (last column).

In the case studies, many firms reported the need for assistance with marketing. Some lacked the resources to employ a marketing specialist and complained that programmes had a blinkered focus on technological innovation. The corollary is that to promote SME

innovation in traditional sectors there should be more emphasis on non-technological innovation, especially marketing.

Around 10 per cent responded with export promotionprogrammes. This was an unexpected result, because export promotion was not mentioned in the questionnaire among the guidance notes on innovation: all the examples for respondents of types of innovation followed the Oslo Manual (2005) and the Community Innovation Survey, in which marketing innovation is restricted to varieties of marketing techniques but excludes entry into new markets. Hence, if anything, there was a bias against responding with these programmes.
The view that exporting may be regarded as a species of innovation goes back at least to Schumpeter (1942):
The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organisation that capitalist enterprise creates ... that incessantly revolutionises the economic structure from within...
This perspective is consistent with both case study interviews and survey data, both of which suggest that SMEs in traditional manufacturing regard exporting as innovatory activity.

3. Conclusions

Actually the results show what is 'bad practice', since the measures have a limited, or not optimal, impact in terms of additionality, which is due to:

- lack of marketing for innovation support measures to attract a wide range of potential beneficiaries;
- above-average representation of research intensive enterprises in innovation support programmes; and
- restricted programme access and "cherry picking" selection procedures.

Concerning the design features of the programmes it is recommended to increase the demand led programmes which are a way to achieve customised projects for SMEs. Demand led programmes are more generic than specific and can be characterized as follows:

1. Covering the overall innovation life cycle from the first idea to market entry;
2. Broad focus on different innovation types (product, process, organisation and marketing – i.e. both technological and non-technological innovation);
3. Wide eligibility of different costs;
4. Flexibility in using the applied budget (internal budget shifts).

Good practice measures in this respect are headed under: cluster policy, coaching schemes, value-chain specific schemes, Innovation Vouchers, tailored schemes including support for demand-oriented activities, and schemes dedicated to develop new export markets.

This principle for policy design is implicit in some of the previous recommendations: in particular, making innovation support consistent with traditional sector innovation models; supporting non-technological innovation, including marketing; and recognising exporting as innovation.

The strategic thinking behind existing innovation programmes often does not match SME needs in traditional sectors. For example, although recent reforms might help, R&D tax credits have not helped traditional-sector SMEs with innovation models based on design and/or marketing and, hence, with broad innovation needs. Conversely, SME respondents

explicitly favour demand-led support programmes, such as Innovation Voucher schemes, which can be used to assess innovation potential and to scope/initiate customised projects. Alternatively, a “one stop shop” can help SMEs to avoid having to navigate the complexity of supply-driven support: SMEs take their needs to a single point of contact and are matched with the most appropriate support programme(s).

There is potential for improving the overall innovation outcomes of innovation support programmes for SMEs in traditional manufacturing industry by selecting typical firms with the most to gain from support rather than selecting those with the greatest propensity to innovate but the least to gain from support. To reform the selection process by making it more inclusive requires many more firms to select from. Without greater awareness on the part of SMEs and correspondingly higher levels of interest, programme managers will continue to have to target and recruit firms in order to spend their programme budgets. Consequently, a corollary of moving away from cream-skimming is the need to remove participation obstacles; in particular, by making application, selection and reporting procedures less bureaucratic. Increasing the number of firms wanting to participate in innovation support programmes will increase the scope for reforming the selection process in favour of typical SMEs.

References

1 In Germany the overall innovation intensity (innovation spending as share of turnover) was 2.74 per cent in 2009 (see ZEW 2011a, p. 6).
Research intensive industries had an innovation intensity of 8.4 per cent in 2009 (see ZEW 2011a, p. 6).

THE ROLE OF SOCIAL INNOVATIONS' NETWORKS IN REGIONAL DEVELOPMENT

Ingrida Geciene[1]

[1]*Lithuanian Social Research Centre, Gostauto 11, Institute of Social Innovations, Sauletekio 15,Vilnius, Lithuania, gecieneingrida@gmail.com*

Abstract

The purpose of research is to investigate the recent formation of social innovations' networks and their role in the regional development. As the empirical basis for such research the experience of EU EQUAL program is taken, which aimed to search for new solutions in combating social problems in European countries. The presentation uses the results of case study and network analysis of one particular social innovation network of international EQUAL program project, devoted for strengthening of social inclusion of socially disadvantaged youth in Lithuania, Sweden, the Netherlands and Slovenia.

The main finding shows that in context of post-communist countries the formation of social innovations networks is inspired by the good examples from the networks from countries that have older traditions in social innovations. Besides, the formation of these networks is facilitated by special programs for promotion of collaboration between the organizations in the region. However in post-communist countries the formation of such networks is burdened by organizational culture inherited from soviet times, characterized by high level of centralization and hierarchy. It appeared that the most active, flexible and most interested in continuity are nongovernmental organizations and social enterprises.

The research results reveal the possible measures for facilitating the social innovation networks in order to increase their role in country and region development. Also it generates the evidence of failure and good practice to be transferred for interested organizations willing to create fruitful social innovation networks.

This paper is based on the research project "Analysis of Innovation Networks in Lithuania and Their Integration in European Research Area", which was funded by a grant (No. MIP-114/2011) from the Research Council of Lithuania.

Keywords

Social innovation networks, regional development

1. Introduction

The recent global crisis made it clear that "most of the challenges we face today have taken on an increasingly social dimension" (Empowering people, driving change: Social innovation in the European Union, 2010, 8). Suspended regional development and in some regions dramatically worsening situation press to look for new ways to address the most pressing issues of our times – such as climate change, environmental protection, chronic disease, widening inequality, aging, unemployment, poverty and many others (Murray, Caulier-Grice and Mulgan, 2010, 3; Empowering people, driving change: Social innovation in the European Union, 2010, 8; Study on Social Innovation, 2010, 10). These challenges invoke the development of social economy (Murray, Caulier-Grice and Mulgan, 2010, 4) and even wisdom economy (Findlay and Straus, 2011, 7), for which social innovations, networks and wise application of them are essential.

The most influential definition of social innovation is provided in prominent work "Open book of Social Innovation": "Social innovations are new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations" (Murray, Caulier-Grice and Mulgan, 2010, 3). Creation of the innovations requires convergence of many kinds of knowledge detained by different categories of actors (Landry, Amara and Lamari, 2000, 7), thus for this process cooperation networks are indispensable: "innovations can be created and implemented through social relationships networks between actors"(Coe and Bunnell, 2003, 440). Innovation networks have all characteristics of social networks, just in innovation networks the result of social interaction is accentuated – innovations, specific actors of networks, knowledge transfer and sharing mechanisms and strategies of cooperation facilitating the creation of innovation.

The purpose of research is to investigate the recent formation of social innovations' networks and their role in the regional development. As the empirical basis for such research the experience of EU EQUAL program is taken, which aimed to search for new solutions in combating social problems in European countries. The paper uses the results of case study and network analysis of one particular social innovation network of international EQUAL program project "Strengthening Youth Motivation for Employment" (SYME) In Lithuania. This project was devoted for strengthening of social inclusion of socially disadvantaged youth through the creation of social partnership between 24 interested institutions (municipalities, schools, think tank organisation, universities and NGO's) and development of innovative solutions for this aim. Also during this project the transnational partnership "Youthlinks" was created between similarly oriented partners from Lithuania, Sweden, the Netherlands and Slovenia.

2. The role of social innovations networks in regional development

The need of social innovations is grounded in the observation that nor market solutions, neither government and NGO's are able to solve intractable social problems. As Murray Caulier-Grice and Mulgan (2010, 4) explain: the market, by itself, lacks the incentives and appropriate models to solve many of these issues; current policies and structures of

government have tended to reinforce old rather than new models; and civil society lacks the capital, skills and resources. For the successful solutions the mutual cooperation between these three actors – third sector organisations, government and business – is needed (Social Innovation Europe, 2012).

Alongside with traditional actors of social innovations it is worth to mention new emerging types: social and public entrepreneurs, who are also directed towards solution of social problems or some public goods. Social enterprises differ from traditional non-profit or charitable institutions by focusing on "innovative approaches to social problems, pursue financial self-sustainability and independence from the State, set clear performance goals and apply proven management skills to ensure efficiency, effectiveness and accountability" (Schoof, 2006, 9). Public entrepreneurs are one of the least explored type among social innovations actors: they occur within public institutions and organizations and help them become more responsive to their customers, clients and communities (Heinonen, 23001).

The emerging interest of business towards social innovation are explained by authors of report "The New Nature of Innovation" (2006), who argue that companies constantly search for new business opportunities and that social and environmental challenges constitute a huge new market. They argue that "by creating new and more responsible and sustainable solutions, companies can cultivate new business opportunities", therefore, "'corporate social innovation' may be an important new business area for private companies and a core driver of innovation" (The New Nature of Innovation, 2006, 11).

Through regulation and special programmes, government can help accelerate the widespread adoption of social innovations. By encouraging social innovation, policy-makers strive to pursue a triple triumph (Empowering people, driving change: Social innovation in the European Union, 2010, 9): a triumph for society and individuals by providing services that are of high quality, beneficial and affordable to users and add value to their daily lives; a triumph for governments by making the provision of those services more sustainable in the long term; and a triumph for industry by creating new business opportunities and new entrepreneurship.

Reviews and evaluations of EU programmes managed by the Commission have highlighted a number of obstacles to the development and mainstreaming of social innovations, including the traditional risk-averse and cautious organisational cultures of administrations, closed systems which favour single-issue solutions developed within clusters of organisations lacking mutual awareness, communication, networking and trust, fragmented capacities (resources, infrastructures and intermediaries) and skills (training, design tools, monitoring, validation and evaluation) preventing the development of a rich 'eco-system' for enabling social innovations, and insufficient stable, seamless and sustainable funding throughout all stages of the innovation cycle (Empowering people, driving change: Social innovation in the European Union, 2010, 11).

Fostering innovation in response to pressing social challenges requires a move away from closed systems processes and a need to harness "the power of networks" and collaborations (Study on Social Innovations, 2010, 99). The need for cooperation of different actors of social innovations appears due the fact that no single actor has "all the elements of knowledge required to innovate on their own" (The New Nature of Innovation, 2006, 35). Therefore such collaborations as social innovations' networks provide synergy effect for solving social challenges and create valuable solutions by the spread of learning, sharing and disseminating best practices and new models.

One type of social innovation networks forms special innovation ecosystem – social partnership. Social partnership can be defined as a multi-party arrangement involving public authorities (the state and/or local/regional authorities) and the private sector and/or non-governmental organisations (Partnership working, 2004, 7). Social partnership is usually concerned with areas of economic and social policy formation and implementation. The notion of social partnership was developed to mark the transition from strictly centralized public policy towards social dialogue. In this way social partnership reflects the principle of participative democracy and can be related to the idea of civil society that social organizations can help to solve social problems.

Partnerships allow for the integrated, or "holistic", approach to policy development, which is so often advocated as a way to achieve social cohesion and sustainable development. In gathering within the same structure the relevant partners from the public, private and civil-society sectors, partnerships add information to decision-making processes, increase the appropriateness of implementation of government policy and co-ordinate with it the actions of other participants. According to Sylvain (2002), social partnership promotes modern public management methods based on contradicting relationships and empowering local stakeholders in the implementation of more lasting solutions. Partnerships have also proved useful in helping public services improve the effectiveness of the programmes they implement: partnerships stimulate the use of measures that correspond to shared priorities; they help adapt programmes to local needs and conditions, taking advantage of the knowledge of the various partners of the local problems and target groups; and they identify and draw on synergies between government programmes and local initiatives that can enhance their mutual impact.

Therefore it is possible to extract six main principles of social partnership (Boyd, 2002, 2):

- Societal aim: achieving social benefit by joint action;
- Innovation - a new approach to the solution of social and economic problems;
- Multi-constituency - involvement of different sectors;
- Voluntarism - organisations and institutions voluntarily join the partnership;
- Mutual benefit and shared investment - shared risks, costs and benefits;
- Alchemic effect - a partnership becomes more than the sum of its separate parts; rather evolves into organisational environment.

The implementation methods of social partnership principles are extremely diverse and often region specific. Social partnership means different things in different European countries (Boyd, 2002, 2). Some of them have long-lasting tradition of solving problems through social partnerships (such as Austria, Netherlands, Sweden, etc.), some have no such tradition at all (as many new accession countries). Social partnership was one of the main principles of the EQUAL initiative. The full realisation of the task to combat social exclusion depends, to a large extent, on the system's ability to reposition its resources quickly to meet changing needs. Meeting these needs adequately requires new ways of working together, a more meaningful consultation process, and innovative solutions to system-wide challenges. Therefore social partnership was used as an innovative approach to facilitating changes, joint problem solving and improving performance in some policy areas. In this way EQUAL projects and international cooperation initiative allowed exchange the experience in using social partnership as a way of public management. Especially it is important for countries where can be observed the remnants of strictly centralized public policy and which can benefit most from facilitating social dialogue and implementing the principle of social partnership.

2. Case study: Lithuanian social innovation network

In the "Youthlinks" international cooperation the two participating countries – Sweden and The Netherlands – use social partnership as a customized way of solving problems, while in Lithuania and Slovenia social partnerships are in the first stage of development. In Lithuania case from very beginning it was decided to make case study research by use of triangulation of methods: social network analysis, survey of partners, participant observation, interviews with project participants and experts. This research sets out the benefits of the partnership approach, identifies the treats for successful social partnership and recommends actions to ensure the most efficient work in social partnerships for the integration of disadvantaged youth into the labour market.

In the area of integrating disadvantaged youth into the labour market, it is important to include in social partnership all three sectors: public, private and NGOs. State and especially municipal institutions can benefit from the knowhow and practical experience of non-governmental organizations which work directly with disadvantaged youth. NGO's in face of public institutions receive support in promoting new ways of solving problems and innovative work methods. Neither the public nor the voluntary sector can achieve the task of integration to labour market without the active involvement of the private sector, which can provide job opportunities for disadvantaged youth.

However, the engaging of the private sector in solving social exclusion problems was the biggest challenge for social partnership creation: the private sector players confront barriers which diminish their enthusiasm or put them off all together. The main barriers for committing to social inclusion interventions are demands on staff time and resources, bureaucracy in management of projects, difficult client (such as disadvantaged youth) groups, etc. (Glass, Lavery and McGregor, 2001). However, some factors can help to convince players to take part in social partnerships:

- participation in projects can increase good publicity for businesses, which can lead to a greater likelihood of winning contracts;
- workforce development, as recruitment from the socially excluded can help to build up a pool of skilled and loyal workers, particularly important at a time of labour market tightening;
- staff training and development, which occurs from the involvement of staff in inclusion initiatives;
- recognition of responsibility as key players within the community;
- in new accession countries the financial subsidy for reimbursement of salary for new employee from project target group may also help to convince the private sector to participate in the projects.

Nevertheless in new accession countries there are some obstacles for social partnership even between the public and non-governmental sectors. These obstacles are mainly based on the lack of a social partnership practice on the national administration level. Despite the fact that the obligation to use social partnerships as a way of working is emphasized in law for ministries, municipalities and schools, this principle of work is far from being truly implemented. During the research on social partnership in Lithuania it appeared that in the public sector the prevailing attitude towards social partnerships is quite negative: work in partnerships adds one more function for overworked administrative staff and it is unpaid. Most of administration staff already involved in social partnership declared that they feel isolation, powerlessness and pessimistic about involving the rest of the institution in solving social exclusion problems (Ciupailaite, 2007, 209).

Therefore there is a need to put more effort into explain to the public sector the added value of participation in social partnerships and to create mechanisms of motivation. The only motivation that really works in this stage of implementing the social partnership principle is additional employment of administration staff members in the projects. However, the employment of one person (usually not powerful in terms of decision making) from public administration still is not enough for the creation of a successful social partnership. There is a need to involve all the institution in order to avoid participation in social partnership only on individual level and to secure succession after staff changes. Moreover, the involvement of a leading person is also crucial for more effective participation of the public sector in mainstreaming of projects' results.

In new accession countries mainly non-governmental organizations are interested in social partnerships, as they have no stable financing and decision making power. However, it is hard for them to create stable social partnerships, as they are based on projects and have no guaranteed succession due to the above mentioned lack of tradition and interest from private and the public sectors. Moreover, in some regions there is still a lack of NGO's which are capable to offer social services for disadvantaged youth. Thus in such cases non-governmental organizations must be encouraged more to take part in solving social exclusion problems by additional measures.

By ensuring the participation of all interest groups in social partnership it is possible to prepare decisions best suited to disadvantaged youth and adapted to local context. Besides, these decisions would have a more holistic approach towards social change, because in such social partnerships attention towards combining different experiences (know-how), matching institutional capacities, benefiting from different competences, contacts and relationships between organisations can be ensured.

For countries that have no social partnership tradition one of the main problems is to ensure continuity of mutual work between organisations and institutions. Despite the declaration of the principle to work in social partnerships in providing social services, the social partnerships that are created tend to be disrupted soon after the end of social projects. The main reason for the absence of lasting effect for social partnerships in these countries is rooted in a lack of understanding of the benefits of partnerships, the possibility to fulfil the interests of the organisation and to have added value of cooperation from all interested parts: decision making bodies, the private sector, and practitioners from NGOs working with disadvantaged youth.

The bureaucratic restriction on the managing of social partnerships in new accession countries also does not increase the motivation to participate in mutual work. The restrictive attitude to social partnership management is mainly caused by the habitually centralised and hierarchical manner of management in general and partly because of a deep distrust of flexible styles of management in social partnerships and distrust of the honesty of partners. Such tradition and distrust causes even stricter financial accountability rules for social projects in the new accession countries, actually implemented not by EU bodies, but by each countries' government. Therefore it is a big challenge to promote and introduce this type of working together in countries without a social partnership tradition, as organisations are unwilling to go through all these difficulties.

Because of the above mentioned conditions, most social partnerships in Lithuania were created quite artificially – it was a requirement of the EQUAL initiative. Due to the lack of experience in the managing of social partnership, most of these partnerships still have remnants of hierarchical organisations: most of the partnerships have a leading partner, which holds the responsibilities for the organising of all the activities, meetings and financial accountability for the whole partnership. As such it has more power in decision making which damages the idea of equal participation and decreases the initiative and motivation of the

partners. Thus the experience of a different tradition of working in social partnership (e.g. from the Netherlands and Sweden) provides a clearer understanding of how it is possible to improve the performance of social partnerships in countries without this tradition.

For more effective social partnership first of all it is important to have an internally clear vision of aims, roles and liabilities (Ciupailaite, 2007, 210). This vision helps to identify the main directions of changes, to motivate partners to act in the right direction, and allows coordination of the actions of different institutions and organisations. A common vision must be thoroughly discussed and deeply understood among all partners. All decisions should be made only after discussion and mutual agreement that increases more equal participation of all partners in social partnership. The permanent discussions between partners also weaken preconceptions and distrust, which are rooted in a lack of information and communication. It is exactly the information boundaries between partners, especially from different sectors, which invokes the lack of motivation for cooperation and as a result an organisation or institution looses interest in participating and a partnership fails to develop. Thus, at the initial stage of the project, it is important to make clear a common vision, all interests, common objectives, work principles and capacities and to “talk, talk and talk” to reach mutual understanding and decisions about how to decrease the social exclusion not only of projects target group, but also of partners in social partnership.

An external obstacle in the way of successful partnership is insufficient feedback, which causes restricted possibilities for social partnerships to reach their aims to foster the social integration of youngsters into the labour market. It decreases the motivation of interested partners to participate in such non-effective partnerships. The main reason of such invisibility of social partnership activities is insufficient communication with the environment (society). Therefore strong attention must be paid to disseminating results and innovative measures for problem solving through the means of public relations and social marketing/advertisement.

However, all the partners must understand the importance of the mainstreaming of social innovations and to participate in this process. An especially effective measure for increasing visibility and mainstreaming is connection and involvement of policy-makers in a partnership. This can help not only in promoting social inclusion solutions, but also in changing the attitude of policy makers – from the control to support relations. Therefore measures for capacity building are also important for social partnership: as well as involvement of the partners from decision making bodies to influence policy or practice; and working with organisations that can make a difference parallel to the partnership.

3. Conclusions

The experience of the use of social partnership principle of work in solving social exclusion problems emphasises the crucial role of social partnerships in achieving the objectives of social inclusion projects. Social inclusion is such a complex issue that it also requires innovative solutions many-sided and well grounded in local context. Only strong and long-term cooperation between public, private and non-governmental sectors at locality can successfully generate the most suitable decisions on how to integrate disadvantaged target groups into society and the labour market.

In context of post-communist countries the formation of social innovations networks is inspired by the good examples from the networks from countries that have older traditions in social innovations. Besides, the formation of these networks is facilitated by special

programs for promotion of collaboration between the organizations in the region.

In countries without a social partnership tradition this principle of mutual work has a positive effect not only on social inclusion issues, but also for fostering the development of non-governmental organisations, as they have more guarantees for the financing of their activities, support for their ideas and attempts as well as easier access to participation in social policy formation and to influence the local government decisions due to participation in social partnerships. Successful social partnerships via the participation of organisations from different sectors can mainstream good practice of mutual work and accumulated experience in solving social exclusion problems at institutional, political and administrative levels. In this way successful partnerships can foster further implementation of this principle of work.

The success of a social partnership in achieving its objectives depends on a clear understanding of common vision, interests, benefits and complementarity between all the participating parties. Only a permanent exchange of information and communication between all the partners allows the reaching of mutual agreements and the facilitation of an effective problem solving and decision-making process. By using the experience, know-how and social networks of key organisations, successful social partnership is certainly more effective in comparison to the attempts of only one organisation to make a positive change in the integrating of disadvantaged youth into the labour market.

Nevertheless, the implementing of the social partnership principle in the context of a lack of social partnership tradition also raises big challenges: unwillingness to participate in partnerships, more difficult coordination of mutual work, time consuming decision making processes and the necessity to change attitudes and working habits. The remnants of centralised management, unequal participation of partners, lack of information and communication also creates preconditions for preconceptions and distrust among partners. The widespread practice of delivering the participation in social partnership through one representative of an organisation without the involvement of all the organisations also poses disadvantages, as after this person leaves the organisation the continuity of participation in the project is at risk. All these obstacles weaken social partnerships and their abilities to be effective in solving social exclusion problems.

All the difficulties of creating successful social partnerships in countries without a deep tradition of working in this way can be addressed as a feature of so called “first generation” (Building Coalition for Change, 2002) of social partnerships. Despite some failures, this stage of development of social partnerships in these countries is crucial for creating the preconditions for the next step for implementing the social partnership principle – for the “second generation” of social partnerships.

References

1 Building a Coalition for Change: Implementing the Health Strategy using a Partnership Approach, National Centre for Partnership and Performance. 2002. http://www.nesc.ie/en/publications/publications/archived-documents/ncpp-new/ncpp-reports/ncpp_4/

2 Ciupailaite, D. Social Partnership as possibility to solve complex social Problem. 2007. PPMI, Vilnius.

3 Empowering people, driving change: Social innovation in the European Union. Bureau of European Policy Advisers, European Commission. 2011. ec.europa.eu/bepa/pdf/publications_pdf/social_innovation.pdf

4 Findlay J, Straus A. Are you Wisdom Economy ready? Maverick and Boutique/Zing. 2011. http://www.slideshare.net/herbalin/the-wisdom-economy-8990358

5 Giguere, S. Local Governance and Partnerships - A Summary of the Findings of the OECD Study on Local Partnerships. 2002.
http://unpanl.un.org/intradoc/groups/public/documents/NISPAcee/UNPAN012874.pdf
6 Glass, Andrea, Lavery, Anne and McGregor, Alan (2001): The Role of the Private Sector in Social Inclusion Partnerships, Training and Employment Research Unit, University of Glasgow.
7 Heinonen, J. Entrepreneurship in public sector organizations. Conference proceedings of RENT (Research in entrepreneurship and small business) XV in Turku, Finland, November 22-23, 2001. (Ed. Paula Kuopusjärvi) Business Research and Development Centre, Turku School of Economics and Business Administration, 223-235.
8 Murray R, Caulier-Grice J, and Mulgan G. Open Book of Social Innovation. NESTA and Young Foundation 2010.
http://www.nesta.org.uk/publications/assets/features/the_open_book_of_social_innovation
9 Schoof, U. Stimulating Youth Entrepreneurship: Barriers and incentives to Enterprise start-ups by young people, SEED Working Paper No. 76, 2006.
http://www.ilo.org/empent/Publications/WCMS_094025/lang--en/index.htm

10 Social Innovation Europe. European Commission. 2012.
http://ec.europa.eu/enterprise/policies/innovation/files/social-innovation/sie-final-report_en.pdf
11 Partnership working. Scottish Executive Social Research. 2004.
www.scotland.gov.uk/socialresearch.
12 The New Nature of Innovation. FORA report to OECD. 2006.
http://www.newnatureofinnovation.org/full_report.pdf

USING THE POTENTIAL OF SALASH IN VOJVODINA FOR AN ENTREPRENEURIAL VENTURE

Dunja Vujičić[1], Ana S. Trbovich[2], Danijela Lalić[3]

[1]*University of Novi Sad, Novi Sad, Serbia, dunja.vujicic@uns.ac.rs*

[2]*Singidunum University, Faculty of Economics, Finance and Administration, Belgrade, Serbia, atrbovic@fefa.edu.rs*

[3]*University of Novi Sad, Novi Sad, Serbia, danijelalalic@uns.ac.rs*

This paper analyses whether there are any elements of entrepreneurship at a "salash" in Vojvodina region of Serbia. Those elements should include autonomy, pro-activeness, and risk-taking, as well as innovation (process innovation, product innovation and administrative innovation are measured). The aim of this paper is to investigate possibilities for rural ethno-tourism entrepreneurial development in Vojvodina based on the concept of "salash". Salash is a ranch with a residential house, outbuildings and farming land, and livestock in a rural area. Although a trademark of Vojvodina and a culturally specific townscape of this region, the salash has been underutilized in the region's tourism presentation. Research methods include content and comparative analysis (Hungarian and other countries' similar rural tourism concepts are reviewed as best practices), interviews with salash owners or managers, and innovation analysis using software program Innovate (http://icip-serbia.org/innovate/).

Keywords
Entrepreneurship, Innovation, Salash, Serbia, Tourism.

1. Introduction: Rural Tourism and the Concept of Salash Tourism

The purpose of this paper is to investigate possibilities for rural, ethno-tourism entrepreneurial development in Vojvodina based on the hospitality concept of "a salash". Characteristics important for developing a successful entrepreneurship model, namely autonomy, pro-activeness, risk-taking and innovation [1] will be studied, as it is present among salash owners. Particular attention shall be paid to the dimension of innovation management.

According to the UNWTO World Tourism Barometer, international tourist arrivals have increased by over 4% worldwide in 2011 (980 million arrivals). Tourism represents a major global activity that has grown by 25% in the past 10 years. Forecasts for the next ten years predict tourism growth in all regions of the world, with the strongest relative growth occurring in parts of the developing world [2]. Tourism plays an important role in transition economies. Unlike high profile industries in which a small number of internationally known players dominates as it is the case in oil and motor industries, the tourism industry comprises a large number of small players, many of which are family-owned enterprises. Moreover, tourism has tremendous impact on numerous sectors of the economy and offers a high 'added value' to a country's balance of payments. Additionally, tourism represents an important employment

generator and can help sustain jobs in the economy; it is especially effective in developing employment in rural and disadvantaged areas. Table 1 demonstrates rural tourism impact on local entrepreneurs and community [3].

Table 1 Rural tourism impact on local entrepreneurs and community

	Socio-economic	Environmental
For local entrepreneurs	• new jobs • new SME-s • additional incomes • market for local agricultural products	• reconstruction of rural buildings • maintain the quality of environment • make villages more attractive
For local community	• new incomes and new taxes • improved life standards of local community • better infrastructure • lower unemployment rate • local identity • prosperity for other businesses	• resources for protection and rehabilitation of environment and local heritage • returning guests • improved urban-rural relations

Rural tourism is one of the tourism development priorities in many European countries as an essential component of an integrated, sustainable development and rural revitalisation. European Union has created an active rural development policy. The Council Regulation **(**EC) No. 1698/2005 sets the rural development policy goals for 2007-2013 as follows:

- improving the competitiveness of the agricultural and forestry sector;
- improving the environment and the countryside;
- improving the quality of life in rural areas and encouraging diversification of the rural economy [4].

Government role is crucial in supporting the development of sustainable rural tourism [5]. In the last twenty years Europe has been the world's leading provider of rural tourism with expected continued growth based on domestic demand and support for the concept of sustainable development [6]. Serbia, on the other hand, is a country with untapped opportunities for rural tourism based on different models: rural tourism in villages of the sub-region of Šumadija, salash tourism in the Vojvodina region, the monastery grounds, wineries, beer houses, etc. [7]. Vojvodina possesses colourful ethnic variety, which can result in creation of numerous tourist products that include a focus on folklore, culinary specialties and events demonstrating diversity and wealth of cultural and historical heritage.

According to the “Strategy for Tourism Development of the Republic of Serbia” [6], the following steps are necessary in order to ensure long-term development of rural tourism product:

- Development of central reservation system (rural tourism in destination level);
- Linking with the booking systems of rural tourism in Europe;
- Creating a standardised system of rural facilities (quality of accommodation, food, and staff);
- Creating a calendar of local events, celebrations and festivals, with the purpose of boosting the sales in the domestic market;
- Initiating interregional (and/or cross-border) cooperation.

Although a trademark of Vojvodina and culturally specific townscape of the Pannonian region, the salash has not been a sufficiently explored tourism concept [8]. Historically, salash was considered a temporary habitat of farmers and herders, who eventually turned them into a permanent habitat. They were built mostly in the middle of the 19th century. Some

salashes are more than 200 years old and represent genuine ethno museums with many old objects, furniture and agricultural tools. They usually have a masonry stove and antique guest rooms with large beds [9]. Distinctive national architectural heritage of a salash stems from Vojvodina's geographic, historical and cultural development. The Ottoman rule did not leave any trace in the way of building houses in this area. Environmental and physiognomic value of today's villages dates from the 18th century, from the time of Austro-Hungarian colonisation. The first colonist houses consisted of two-rooms - a small kitchen and a large bedroom [10]. At present, the national architectural heritage sites (houses, mills, windmills) are located in about 30 settlements in Vojvodina.

Salashes in Vojvodina represents an innovative and an entrepreneurial tourism business venture. Some have preserved the region's traditional way of life while many have been redesigned and adapted to modern needs, so as to have swimming pools, sports fields, ponds and other recreational facilities. Larger salashes also have horse stables, zoos and modest ethnic museums and collections. There is an increasing awareness in recent years of salash's importance to the culture and tradition of Vojvodina [11]. Salashes that are used for the purpose of rural tourism should retain the original appearance and authenticity of surroundings to create differential tourism value compared to regular restaurant or even farm tourism. At present most salashes have simply been converted into restaurants, sometimes with accommodation. Yet, a salash can also be set up as a museum, where visitors would be introduced to the historical background and the traditional way of life in the salash. The salashes should be operated so as to enable the owners to live there throughout the year, performing agricultural work, but also providing accommodation for tourists. In this way, tourists would have an opportunity to participate in daily life of people who live there, exploring traditions and folk art, as well as the unique experience of the Vojvodina plains [8].

2. Understanding entrepreneurship and entrepreneurial orientation of family firms

OECD definition [13] of entrepreneurship comprises three components: Entrepreneurs, Entrepreneurial Activity and Entrepreneurship:

- Entrepreneurs are those persons (business owners) who seek to generate value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.
- Entrepreneurial activity is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.
- Entrepreneurship is the phenomenon associated with entrepreneurial activity.

Although there are numerous definitions of entrepreneurship and an entrepreneur, there are several characteristics of entrepreneurship that are widely mentioned in the literature. Those are freedom and autonomy [14, innovativeness [15], and risk taking propensity [16]. Several authors suggest that entrepreneurship mainly includes product innovation, risk taking, proactiveness, business venturing and intrapreneuring [17]. Furthermore, entrepreneurship is defined as "a process of enhancement of wealth through innovation and exploitation of opportunities, which requires the entrepreneurial characteristics of risk-taking, autonomy, and proactiveness" [18]. Most definitions point to one crucial element - *change*. Entrepreneurship is closely related to change [19]. There is correlation between entrepreneurship and innovation, but the underlying differential is based on the fact that entrepreneurship is mostly

considered as a new entry, i.e. entering a new or established market with new or existing products or services [20].

There has been increasing amount of research conducted on the intersection of entrepreneurship and family business [21]. Their purpose was to explore how a closer integration between the two fields can advance our understanding of the contribution of family businesses to entrepreneurship, as well as the contribution of entrepreneurship to family businesses [22]. Family firms represent organisations in which ownership and control are combined to a varying extent [23]. Family provides unique advantages in searching for, identifying, and exploiting opportunities. Compared to the managers in nonfamily firms, family firm managers are driven by noneconomic motives. Moreover, peculiar conditions resulting from sociocognitive bonds among family members result in unique knowledge structures and promote the speedy combinability of diverse consideration sets [24]. In the most researches entrepreneurship theory has been applied to family businesses, in order to examine the impact of family contexts on entrepreneurial activities and processes [25].

3. Researching salash potential as entrepreneurial venture

Rural areas of Vojvodina, where salashes are located, are characterised by natural areas that have their own characteristics (natural landscapes, anthropological developments customs, traditions and languages). Nevertheless, sources of creating wealth of a country or region does not come solely from their natural comparative advantages that are the result of inherited factors (land, people, physical factors), but also depend on the ability to improve the quality of the factors that has, and the ability to create an environment that will attract increasingly mobile and sensitive factors of production (skilled labour and capital) [26].

Vojvodina is composed of 45 municipalities. According to official data, 40 salashes operate within 16 municipalities. The majority is located in the municipalities of Novi Sad and Subotica. Some of the most famous salashes are Salash 137, Majkin salash (Mother's Salash), Cvetni salash (Floral Salash), Rokin salash (Roka's Salash) and Perkov salash (Perko's Salash) [27].

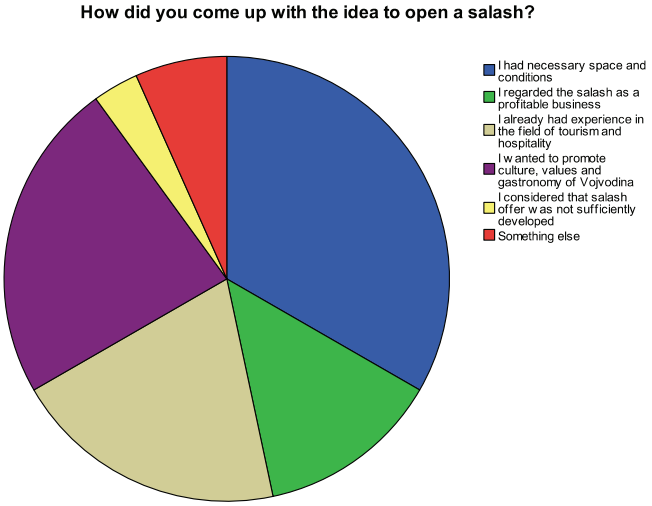
The objectives of the research. The main objective of the research was to determine whether and to what extent there is an entrepreneurial orientation of the salash owners.

Data collection and measurement. The instrument used for this study is a questionnaire created by the authors. The questionnaire consists of 14 questions, which were divided into three parts. The first group of questions explored the issue of starting a business venture (three questions). The second part of the questionnaire related to salash organisation and management (seven questions). The third part of the questionnaire investigated dimensions of innovation management based on adjusted Innovation software developed by Improved Competitiveness and Innovation Project Serbia (four questions). We surveyed 30 of possible 40 respondents who are owners of salashes in Vojvodina municipalities which accounts for a 70% response rate. We conducted a phone questionnaire survey using the direct questioning (DQ) technique, with follow-up interviews in person based on visits to five salashes to ensure additional survey quality.

3.1. Results

As can be seen in Chart 1, in responding to the question that inquired about the motivation to start operating a salash as a tourism venture, the majority of salash owners responded they had the necessary space and conditions (33.3%). Approximately the same number of respondents indicated that they wanted to promote culture, values and gastronomy of the Vojvodina region of Serbia (23.3%) and/or that they had had prior experience in tourism and hospitality services (20.0%).

Chart 1 Responses to the first question:



A small number of the interviewed salash owners said that they had regarded the salash as profitable business (13.3%) or they had considered the salash tourism offer to be insufficiently developed on the market (3.3%).

In terms of access to finance, the results shown in Table 2 have demonstrated that the strong majority of respondents (63.3%) did not have any financial or other type of aid. Nonetheless, a relatively high share of 36.7% of the salash owners stated that they had some state aid from the province of Vojvodina or the local government. Prior experience does not seem to be a key determinant. Namely, 40.0% of the surveyed salash owners claimed that they did not have any previous experience in tourism and hospitality industry, while 60% of the interviewed salash owners answered positively.

Table 2 Survey results

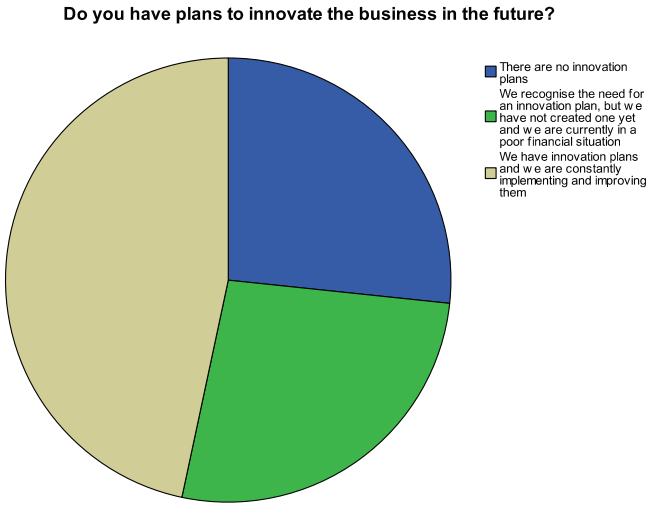
Questions	Answers	Percent
1. How did you come up with the idea to open a salash?	I had necessary space and conditions	33.3
	I regarded the salash as a profitable business	13.3
	I already had experience in the field of tourism and hospitality	20.0
	I wanted to promote culture, values and gastronomy of Vojvodina	23.3
	I considered that salash offer was not sufficiently developed	3.3
	Something else	6.7
2. Have you had any financial or other kind of support?	Yes, I have	36.7
	No, I have not	63.3
3. Have you got any previous experience in the tourism and hospitality industry?	Yes, I have	40.0
	No, I have not	60.0
4. Is the owner of the salash, at the same time the director/manager of the salash?	Yes, he/she is the director or manager	86.7
	No, he/she is not	13.3
5. Is salash organized as a family business?	Yes, it is	80.0
	No, it is not	20.0
6. Does the farm work round the year or seasonally?	Throughout the year	50.0
	Seasonal	50.0
7. How many workers are employed in the salash (regardless of the type of contract)?	Less than 5	46.7
	From 5 to 10	26.7
	From 10 to 15	10.0
	From 15 to 20	10.0
	Over 20	6.7
8. What is the mode of financing the farm?	Consolidated private ownership	86.7
	Pooled funds (partnership, more owners)	10.0
	Borrowed funds (a bank loan)	3.3
9. Is the statistics on the number of salash visits kept?	Yes, it is kept	50.0
	No, it is not kept	50.0
10. Do you buy local products for the salash from farmers in the neighbourhood?	Yes, I do	76.7
	No, I do not	23.3
11. Do you have plans to innovate the business in the future?	There are no innovation plans.	26.7
	We recognise the need for an innovation plan, but we have not created one yet and we are currently in a poor financial situation.	26.7
	We have innovation plans and we are constantly implementing and improving them	46.7
12. How do you come up with new ideas to improve your business?	Ideas come from the employees	23.3
	Ideas come from guests	33.3
	Ideas come from the competition/what competition does	3.3
	All mentioned above	40.0
13. What is the attitude toward change on the salash?	Changes are hard to accept	36.7
	We are aware that something needs to change, but we are not sure what and how •	30.0
	We are actively working on adopting changes. Moreover, we are involved in a constant process of change, because without change, there is no progress.	33.3
14. Do you analyse the market and follow the competition?	We do not analyse the market and its opportunities.	43.3
	We rely on clients' feedback.	16.7
	We analyse the market opportunities, monitor the competition and act accordingly.	40.0

There seems to be a tendency of salash owners being managers and directors of the salash at the same time (86.7% respondents). Furthermore, salash is generally a family-run business, as demonstrated by obtained data (80.0% of the respondents answered that the salash was organised as a family business, and most of the salashes employ from two to seven family members).

As for the question regarding the salash seasonal character, the same percentage of the respondents answered that the salash works throughout the year and seasonally, so we cannot conclude that there is a clear demarcation of a seasonal character. Most salashes employ less than five employees (46.7%) followed by 5 to 10 employees (26.7%). Approximately the same number of salashes employ from 10 to 15 employees (10.0%) and from 15 to 20 employees (10.0%). The smallest share employs over 20 employees (6.7%). Regarding the question about the mode of financing, answers appear to favour consolidated private ownership (86.7%) over pooled funds such as partnership or more owners (10.0%), and borrowed funds such as bank loan (3.3%). When questioned about keeping the statistics on the number of salash visits, the answers are evenly divided (50.0%), which means that only one half of the interviewed salash owners keeps the statistics on the number of salash visits. The majority of the respondents answered that they tend to buy local products for the salash from farmers in the neighbourhood (76.7%). When asked to what extent they supply from the local farmers, the salash owners responses were generally all at about 70-80% of total supply.

As shown in Chart 2, 46.7% of the respondents claimed that they had plans to innovate the business in the future. A smaller number of the respondents recognises the need for an innovation plan, but for some reason they have not created one (26.7%), or do not envisage an innovation plan at this moment (26.7%).

Chart 2 Responses to the eleventh question:



Respondents who were interviewed indicated that the most of the ideas for business improvement came from multiple sources – guests, competition, and the employees (40.0%). A notable percentage answered that they obtained most ideas from guests (33.3%) or from the employees (23.3%). An insignificant percentage noted competition (3.3%) as the answer for this question. When asked about the attitude toward change in operating a salash, the

opinions were almost evenly divided. The highest percentage of the respondents (36.0%) found change hard to accept, while 33.3% of the respondents is actively working on adopting changes. The smallest, but not insignificant percentage of the tested sample (30.0%) recognises that something needs to be changed, but has not identified exactly what and how. The minority of respondents claimed that they relied on clients' feedback (16.7%), while a surprisingly large percentage does not analyse the market and its opportunities (43.3%). On the other hand, a large percentage (40.0%) does analyse market opportunities, monitors competition and acts accordingly.

4. Conclusions

This study focuses on potential for rural ethno-tourism entrepreneurial development in Vojvodina based on the concept of salash. Salash in Vojvodina is an exceptional place for a peaceful holiday with numerous leisure activities. In addition, tourists can enjoy excellent Vojvodina cuisine, local wines and spirits, with the marvellous sounds of the traditional music of Vojvodina. Salash in Vojvodina represents both an innovative and entrepreneurial business venture in the tourism sector, which has an important role in rural and overall economic development. A questionnaire was conducted with the aim to explore the entrepreneurial orientation of the salash owners in Vojvodina. We surveyed 30 respondents who are owners and/or managers of salashes. Contradicting previous research on entrepreneurship which claims that most individuals become entrepreneurs out of necessity [28], this study suggest that the majority of salash owners decided to open a salash because they had the necessary space and conditions. In most cases they did not have any financial or other type of support, though 36.7% did had some state aid from the province of Vojvodina or local government. Furthermore, 60.0% of the interviewed salash owners stated that they had previous experience in tourism and hospitality industry, which further induces initiative.

The compiled data relating to organisation and management of salash, depict salash as a fully family-run business, with most salashes employing from two to seven family members. The largest share employs from two to ten employees (73.4%), while only 6.7% of salashes employ over 20 employees. Therefore, we can say that most salashes represent micro or small enterprises. All salashes are managed by men.

Furthermore, we cannot claim that there is clear demarcation of salash's seasonal character. Consolidated private ownership is the most common mode of ownership and accompanying financial structure, with little outside financing which limits potential for business growth. A striking fact is that only one half of the interviewed salash owners regularly keeps statistics on the number of salash visits. The majority of salash owners buys local products for the salash from the local farmers (approximately 70-80% of purchases), which demonstrates the multiple effect of this entrepreneurial venture for local economic growth.

It is affirmative that nearly half of the respondents have plans to innovate business operations in the future. The interviewed respondents have indicated that most of ideas for business improvement stem from multiple sources – guests, competition and/or the employees, which represents a solid result because constant feedback from different sources is highly valuable for business development. The attitude toward change on the salash is divided. Although more than one third of the respondents find changes hard to accept, a significant percentage of the surveyed salash owners (40.0%) claims that they analyse market opportunities, monitor competition and act accordingly.

This study concludes that salashes in Vojvodina have a notable entrepreneurial potential that is not fully recognised and utilised. It is essential to improve dimensions of innovation management, which includes supporting the creation and development of innovative ideas, pre-built plans of innovation, continuous monitoring of the market and competition, quickly detecting and adapting to changes, etc. Innovation would need to be supported by increased external financing and possible changes in ownership and management structure.

The data on all items were self-reported, raising the possibility of overestimating entrepreneurship; thus, future studies should use different sources (for example, employees or salash guests). Furthermore, access to finance would need to be separately explored so as to determine whether it is cost or type of financing available – or risk-aversion that is limiting external financing as a source of business growth in the case of salashes.

To further validate the study conclusions, research could be put in an international perspective by comparing rural tourism development in Serbia to a Central and Eastern European country, such as Hungary, which is of similar size and geographic position. Hungary has developed the New Hungary Rural Development Programme, 2007-2013, as a result of negotiations between the European Commission and the Hungarian government. Objectives of this programme have been to improve the competitiveness of agricultural production and food processing and assist the realignment of rural areas. Main operations covered by the programme are as follows: developing small-scale quality accommodations and other agro-tourism services, display of agricultural folk art and handcrafting, wine tourism services, fishing tourism services, equestrian tourism services, collective tourist product marketing, and small-scale infrastructure development [3]. Moreover, in Hungary, there are several rural tourism marketing organisations such as Hungarian Federation of Rural and Agro-Tourism (FATOSZ), Centre for Rural Tourism (Falusi Turizmus Centrum), etc. The FATOSZ has introduced the quality assurance and quality grading system of rural accommodations in Hungary. The quality of accommodation is graded according to the number of sunflowers (from 1 to 4 - whereas four sunflowers represents the best grade).

In contrast, development of rural tourism in Voivodina in the last few years has been characterised by uncoordinated development, which has resulted in the formation of an incomplete and insufficiently differentiated rural tourism offer in the province [29]. Therefore, it is necessary to create a rural development program in the Republic of Serbia, including the province Vojvodina, which would be based on the wider strategic framework (Tourism development strategy), and implemented by central, regional and local authorities, tourism organisations, non-governmental organisations, private sector, etc. [30]. Entrepreneurial and management training programs would be an essential component of state support, and should target older and less educated prospective entrepreneurs [31]. The government or privately-owned training companies can be initiators of such developmental efforts. Moreover, such training can also be incorporated into university-sponsored, adult-targeted business education.

While awaiting a more structured wider framework, the salashes in Vojvodina, as a specific tourism product with identified entrepreneurial potential, should focus on the following:

- Create constancy of purpose toward improvement of the product and service so as to become competitive, particularly in terms of a niche product development;
- Set the right price for its tourist products;
- Increase accommodation capacities;
- Improve the quality of incoming materials;

- Add new distribution channels or increase the intensity of distribution in each channel (e.g. a shared web portal);
- Create new attractions/tourism activities;
- Introduce new technological solutions related to operations for example;
- Increase employees' skills and competencies;
- Increase synergy (cooperation with others tourism service providers in the region internationally).

References

1 Slater S, Narver J C. Market orientation and the learning orientation. Journal of Marketing. 1995; 3 (59): 63−74.
2 UNWTO. Paper presented at: 2011 International Tourism Results and Prospects for 2012; UNWTO News Conference; 2012; Madrid.
3 Bacsi Z, Zemankovics F. Rural Tourism Development in Hungary. Nitra: University of Agriculture; 2009.
4 European Commission. Rural Development policy 2007-2013.
http://ec.europa.eu/agriculture/rurdev/index_en.htm 2013 January.
5 Mac Nulty P. Keynote Presentation: Establishing the Principles for Sustainable Rural Tourism. Paper presented at: Rural Tourism in Europe: Experiences, Development and Perspectives. World Tourism Organization; 2002; Belgrade.
6 Horwath Consulting Zagreb i Ekonomski fakultet Beograd. Strategija razvoja turizma Republike Srbije. Beograd: 2005.
7 Čomić L. Ruralni turizam u Srbiji – mogućnosti i perspektive. Turizam. 2002; 6: 119-121.
8 Dragićević V. Turizam kao faktor revitalizacije salasha – Primer Cvetnog i Majkinog salasha na Paliću. Zbornik radova Geografskog instituta "Jovan Cvijić". 2007; 57: 223-231.
9 Anđelković V A. Salaši kao simbol idilične vojvođanske prošlosti. Glasnik Etnografskog muzeja u Beogradu. 2006; 70: 291-309.
10 Executive Council, the Secretariat of Economy. Marketing strategy of tourism development in Vojvodina; 2009; Novi Sad: Autonomous Province of Vojvodina, Republic of Serbia.
11 Tomić P R. Kulturna dobra u turističkoj ponudi Vojvodine. Novi Sad: PMF, Departman za geografiju, turizam i hotelijerstvo. 2002.
12 OECD. SME and Entrepreneurship Outlook; 2005; Paris.
13 OECD. A Framework for Addressing and Measuring Entrepreneurship; 2007; Paris: Entrepreneurship Indicators Steering Group.
14 Kuratko D F, Hodgetts R M. Entrepreneurship: A contemporary approach, Third Edition ed. Fort Worth: Dryden Press. 2001.
15 Pitt L F. Entrepreneurial pricing: The Cinderella of marketing strategy. Management Decision. 1997; 5 (35): 344−350.
16 Hornsby J S, Naffziger D W, Kuratko D F, Montagno R V. An interactive model of the corporate entrepreneurship Process. Theory and Practice. 1993; 17: 29–37.
17 Kuratko D F, Hodgetts R M. Entrepreneurship: A contemporary approach, Third Edition ed. Fort Worth: Dryden Press. 2001.
18 Nasution H N, Mavondo F T, Matanda M J, Ndubisi N O. Entrepreneurship: Its relationship with market orientation and learning orientation and as antecedents to innovation and customer value. Industrial Marketing Management. 2011; 3 (40): 336–345.
19 Suresh S, Sudesh K. Social Entrepreneurship: A Growing Trend in Indian Business. Entrepreneurial Practice Review. 2011; 1 (4): 4-20.
20 Lumpkin G T, Dess G G. Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. Journal of Business Venturing. 2001; 16: 429−451.

21 Habbershon T G, Williams M, MacMillan C I. A unified systems perspective of family firm performance. Journal of Business Venturing. 2003; 18: 451–65.

22 Nordqvist M. Entrepreneurial families and family firms. Entrepreneurship & Regional Development. 2010; 3/4 (22): 211-239.

23 Chen S, Chen X, Cheng Q, Shevlin T. Are family firms more tax aggressive than non-family firms? Journal of Financial Economics. 2010; 1 (95): 41–61.

24 Patel P C, Fiet J O. Knowledge Combination and the Potential Advantages of Family Firms in Searching for Opportunities. Entrepreneurship: Theory & Practice. 2011; 6 (35): 1179-1197.

25 Aldrich H, Cliff J. The pervasive effects of family on entrepreneurship: Toward a family embeddedness perspective. Journal of Business Venturing. 2003; 18: 573–96.

26 Vojvodina CESS. Konkurentnost Srbije i Vojvodine; 2010; Novi Sad: Centar za strateško ekonomska istraživanja „Vojvodina-CESS".

27 Tourist organization of Vojvodina (TOV). Vojvodina online.
http://www.vojvodinaonline.com/en/opstine.php?op=23 January 2013.

28 Minniti M, Bygrave W D, Autio E. Global Entrepreneurship Monitor Executive Report. Babson College and London Business School; 2005; Wellesley MA and London.

29 Hrabovski-Tomić E. How to achieve sustainable development of rural tourism in Voivodina? Paper presented at: 17th Biennial International Congress: Tourism and Hospitality Industry; 2004; Opatija.

30 Muhi B, Jovanović D V. Rural tourism as a factor of integral and sustainable development of rural areas and Villages of Serbia and Vojvodina. Herald Journal of Geography and Regional Planning. 2012; 1 (2): 14-18.

31 Kropp F, Lindsay N J, Shoham A. Entrepreneurial orientation and international entrepreneurial business venture startup. International Journal of Entrepreneurial Behaviour & Research. 2008; 2 (14): 102-117.

ENTREPRENEURSHIP AS AN INTEGRAL PART TO ECONOMIC RESILIENCE: THE CASE OF KOSOVA

Abetare Domi, Ketikidis H. Panayiotis

The International Faculty of the University of Sheffield, CITY College,13, Tsimiski Street, 54634, Thessaloniki, Greece

E-mail:
adomi@city.academic.gr
ketikidis@city.academic.gr

ABSTRACT

Purpose: The concept of resilience has received attention from researchers in the past decades. The purpose of this paper is to examine scholarly literature and policy documents for creating economic resilience in a post-war country, such as Kosova, and to investigate the role of the private sector and policymakers in facilitating entrepreneurial activity as a key to economic growth and improved resilience.

Methodology/approach: A qualitative approach, comprising of a review of relevant policy documents relating to economic development and data gathered from in-depth semi-structured interviews. Themes identified from the literature and policy review formed the basis of the interview questions with key stakeholders in Kosova.

Findings: In developing, transition and post-conflict countries, the institutional environment can hamper economic resilience. Entrepreneurship and competitiveness can become integral parts in promoting diversification and capacity building. The paper reveals that the under-developed institutional environment in Kosova has undermined the local entrepreneurial capacity and that numerous present challenges require long-term approaches for restructuring in a post-war context. The region seems to need effective institutions and a favourable business environment which harness higher levels of productive entrepreneurship for an improved economic resilience.

Implications: The study contributes to the emergent literature on regional resilience with an investigation of how policy is aiming to improve resilience through the support of entrepreneurship and competitiveness.

***KEY WORDS**: Economic Resilience, Entrepreneurship, Competitiveness, Post-war*

1. Introduction

The concept of resilience has seen an increased attraction from various fields such as engineering, psychology, and ecology concerning the dynamics and evolutions of these fields [1-2] and has recently emerged in the field of regional development with a narrow focus on economic growth [3-4]. The growing interest in the concept increased attraction also from academics and policymakers [5]. As such, resilience offers an alternative concept framework that is used to explain differences in regional economic adaptability and particularly its potential contibuton to regional economic changes, analysing dynamics, conditions, causes and effects of the changing environmental conditions [6], and understanding growth pathway of regional economies [3, 7].

Along with the increased interest in resilience, there has been a political and academic interest that emphasise the importance of entrepreneurship as the main engine of economic development and competitiveness [8]. The role of entrepreneurship has become increasingly vital for economies since it is critical to sustaining vibrant and diverse economies. In particular, entrepreneurship is considered the main driving force behind economic recovery in developing countries and for countries in transition [9]. Thus, the need for harnessing competition is essential for the regions in order to foster entrepreneurship, they are considered to be two sides of the same coin [10].

As the last country to enter Europe, Kosova has had difficulties and barriers to reconstruct its economic environment. After the conflict in late 1990s, as a post-war country, Kosova faced critical impediments as a result of a hostile and unpredictable environment for doing business, characterized by week institutions and poor enforcement of laws and regulations [11]. After gaining its independence in 2008, Kosova remains challenged by high levels of insecurity which require developing institutions that support resilience, entrepreneurship and competitiveness. Economic resilience is an emergent field of study, with a lack of research examining new born, transitional and post-war contexts. Consequently, this paper contributes to the emergent literature on economic resilience and adds value by examining the role of entrepreneurship and competitiveness, of a post-war country, as integral parts in the process of making localities (more) resilient.

The paper is structured as follows. Section 2 reviews the literature on the emergent field of economic resilience, and outlines some of the definitions of the concept and how it relates to entrepreneurship. Section 3 provides empirical evidence and an overview on Kosova, a specific case of a post-war context, and outlines the methodological approach of the empirical study. Section 4 analyses the findings and provides results to understand resilience within Kosova. The paper concludes by discussing findings and reflecting upon the wider view of entrepreneurship as a dimension of resilience in terms of the implications for policymakers and academic research.

2. Resilience Economy

The concept of resilience has been applied in a wide range of disciplines from ecology to strategic management, focusing on varius geographical and organisational scales concerning on the dynamics and evolution of these fields, and how such system can respond to disturbances, perturbations and to shocks [1-2, 12]. Some regions can adapt faster their economies to the equilibrium standing point in order to respond to changes in socio-economic environment while others do not have an adaptable system [3, 6, 13].

Literature on regional economic growth suggests that the role of product can impact on regional economic growth (if introduced new goods and services, this would create competitive advantage and would increase exports). Also determinants such as human capital, training, educating and improving skills of the region's workforce can improve economic growth and development [1]. These potential determinants of economic and regional growth are determinants of regional economic resilience as well [1]. Authors have various explanations of the term 'resilience' since it has recently emerged in several disciplines and there is no agreed definition regarding the meaning and relevance of the concept [3, 7].

Walker et al [14] defines resilience as a measure of a system's ability to cope with shocks and disturbances and retain to the same structure and function. Individuals, groups, firms, regions and countries are all part of a diverse and changing environment therefore they need to respond to external changes and shocks [15]. In addition, Foster [2] "regional resilience is defined as the ability of a region to anticipate, prepare for, respond to, and recover from a disturbance" (2 p.14).

In economic terms shocks and disturbances that occur in regions permanently lower employment in those regions for around four years [1]. There can be several types of shocks; major economic shocks as expressed by Martin [1] can be a national economic downturn and an industry shock, whereas non-economic shocks can be natural disasters, terrorist attacks and other non-economic events that affect regional economy. Thus, Pendall et al [12] state, "When we say that a person, society, ecosystem, or city is resilient, we generally mean that in the face of shock or stress, it either "returns to normal" (i.e., equilibrium) rapidly afterward or at the least does not easily get pushed into a "new normal" (i.e., an alternative equilibrium)" (12 p.5).

Contrary to the equilibrium approach which is seen as a restrict definition of the resilience idea is the evolutionary approach of adaption and change as a key process of a region's ability to adapt to changes in a dynamic changing environment over time developed by [7]. Authors state that organizations, firms and institutions are continuously changing and are never in equilibrium, therefore a four-phase cycle model of adaption and change can be effective for regional economic resilience followed by continual phases of "adaptive cycles" [7, 12]. The cycle phases are:

Table 1 Cycle Phases

Phases	**Periods**
The conservation phase	Period of stability and increasing rigidity
The reorganization phase	Period of innovation and restructuring
The exploitation phase	Period of seizing opportunities and growth
Release phase	Period of decline and destruction

Source:Simmie and Martin [7]

These four phases are characterised by varying levels of three dimensions of change: 1. the potential of available accumulated resources to the system, 2. the internal connectedness of system components and, 3. resilience, that can be a measure of a system vulnerability to shocks, stresses and disturbances associated with creative and flexible response [12, 15-16].

In the regional economic development context, the accumulated resources would comprise the skills of the local workers and the capabilities of individual firms, institutional forms and arrangements, which would also depend on the previous structures of social and economic development in the region [7, 15]. The internal connectedness relate to the system among local firms including supply inputs, inter-firm divisions of production labour and knowledge spillover,

while creative and flexible response relay on the innovative means of local firms, entrepreneurial capabilities, policy actors, institutional innovation, skills of workers and similar factors [7, 12].

These adaptive capabilities of a region's economy may depend also on the nature of the region's pre-existing economy, shaped by the industrial legacy and re-orientating skills of the region, resources and technologies that determine adaptation as a key source of economic resilience [3]. Furthermore, Martin [3] gives a four dimensions model of regional resilience that is needed to fulfil the meaning of the notion as a description of how regional economies respond to recession and similar shocks. The first dimension is '*resistance'*, which relates to the vulnerability of a regional economy to disruptions such as recessions, the second dimension is that of the speed or extent of the *recovery* from such disturbance and whether it is determined by the first place of the resistance degree, the third aspect implies the '*structural re-orientation'* degree of the regional economy and what implications it has for the output, jobs and incomes, and the fourth dimension concerns the extent of '*renewal'* of the growth path that characterised regional economy before the shock [3].

In the same sense that regional economic debates have emphasised the important role of the private sector for competitiveness and growth, so the resilience of a region has to be built and depends upon its firms [17]. Consequently when a region experiences an exogenous shock that threatens economic development, firms may close or move out of a region, which thereby undermines regional resilience. In addition, the existence of enterprises is crucial for the resilience (and competitiveness) of regional economies, and this can be applied to entrepreneurship, as well.

Entrepreneurship has emerged as a fundamental organisational form for economic growth by serving as a tool for the knowledge spillover; entrepreneurship is a mechanism by which investments, both public and private can generate larger returns in terms of economic growth and job creation [18]. In addition, Acs and Storey [19] explore the hypothesis of variations of entrepreneurship levels across countries to be the source of differing levels of efficiency in knowledge spillovers therefore eventually on economic growth and resilience.

The knowledge spillover theory of entrepreneurship contests the observation that entrepreneurial opportunities are seen as only individual characteristics and attributes that influence the process underlying the entrepreneurial decision to start a business. This theory clearly identifies important sources of opportunities such as investment in ideas and knowledge made by universities and firms, thus entrepreneurial opportunities are no exogenous but rather endogenous to the extent of the investment in knowledge [20]. High potential entrepreneurial activity and opportunity entrepreneurship have a positive effect on technological change and innovation, which therefore increases resilience. Consequently, it is suggested that enhancing research and development expenditures could be more effective if they are associated by increasing entrepreneurial activities [21-22].

These interpretations of the link between resilience and entrepreneurship demonstrate the crucial role of firms and individual actors with a critical importance to the economic growth and social development that contribute to productivity and innovation and create more opportunities for others [15]. Therefore, the view of resilience with regard to organizations focuses on the firm's ability to withstand disturbances, turbulences and discontinuities. Organizations need to continually adapt to the new risk environments in order to sustain competitiveness [17, 23-24]. According to Vogus and Sutcliffe [25], organisational resilience is defined as the maintenance of a positive change under organisational challenges that emerge from specific conditions. The term 'challenging conditions" is used to describe disruptive events such as crises, scandals, errors, shocks, disruption as well as ongoing risks like competition that cause stress and strain. Thus, in this sense a resilient organization would have the capacity and capability to learn from past incidents and adapt to change [26].

These concepts refer mainly to organisational behaviour and not much to the enterprise system like processes, systems, technology and infrastructure [27]. Enterprise system is used within the wide enterprise system which supports business functions, operations and services of an enterprise. In addition, Erol et al [27] introduce a framework for extended enterprise which relies on the role of information technology contributing to resilience, that is divided into the capability of an enterprise to link together systems, processes, people and information in the way to become more responsive to the changing environment, stakeholders and competitors; and the alignment of information technology with business goals. The effective use of the system can provide better performance, faster decision making and increased flexibility and adaptability [28-30]. The adaptive capacity of an enterprise to cope with and recover after disruptions, depends on how well the organization reorganises itself and is prepared for unexpected risks from the changing environment [30]. Furthermore, organizations must manage the complexity of their infrastructures in order to adjust to potential risks and disturbances, the key to achieving this, is to understand the interrelationships between the business process, information, and additional technologies within the enterprises [31].

While the literature has tended to focus on competitiveness and more recently on the resilience of firms, it explained briefly the regional resilience according to institutional structure, institutional history, and institutional culture [32]. Hence, another important factor of resilience is the resistance of the population and the speed of they response to a given shock or crisis. In particular, entrepreneurial individuals have been identified to respond properly to exogenous factors, with their main qualities including flexibility, motivation, perseverance and optimism [33]. The flexibility of entrepreneurs represents an integral source of resilience to external shocks and is critical to an economy's competitiveness and growth. This is one reason why resilience is linked with entrepreneurship literature, not just in terms of the adaptive capacity of entrepreneurs, but in terms of a broader implication of entrepreneurship to the economy.

To this end, the economic structure of a region such as the innovative and competitiveness propensity of its firms, entrepreneurial skills, the linkages of its firms with other networks in other regions and countries, institutional forms like cultural and political conditions, and the region's economic governance policy, may help or hinder a region's recovery. Consequently all these factors will shape the resistance and response of a region to recover from a shock, downturn or a disturbance [3].

This brief review of the literature has sought to introduce the concept of resilience, and reflect its relevance to understand the perfomance of regional economies. It was emphasised that not much of the literature on regional economic resilience is linked with entrepreneurshp and the role that entrepreneurship can play in making regions (more) resilient. In doing so, this section highlighted the importance of entrepreneurial individuals and firms for creating more resilient economies and providing the basis of future competitiveness and growth. Entrepreneurship, therefore, provides an alternative perspective to understand the resilience of regional economies. The empirical focus of this paper addresses this void by examining the institutional arrangements and entrepreneurship in Kosova as means to analyse economic resilience. The following section presents the methodology that this paper uses.

3. Methodology

The paper seeks to undertake an empirically-led but conceptually grounded assessment in regard to the resilience of Kosova. Regarding the entrepreneurship research it is fair to say that quantitative methodology dominated the literature in the majority of journals addressing this field. According to Chandler and Lyon [34] only 18% out of four hounded and sixteen articles in nine

top-tier journals employed qualitative techniques in their sample which is seen as a lack of use of qualitative methods in this field. Thus, the research approach that best accomplishes the aim and objectives of this paper is the qualitative approach. This approach is seen to be the most appropriate method since it observes views on entrepreneurial cognition and not to test specific variables. The data collection that we employ comprise of a review of relevant policy documents and in-depth interviews with the key stakeholders in Kosova.

The first phase of the research included reviewing literature on resilience and establishing an economic profile of Kosova by reviewing policy documents and reports relating to the country's economic development. The review focused on relevant documents relating to the economic development, and identified those themes relating to economic resilience and competitiveness. The identified themes from the literature and policy review served as the basis for the interview questions for the twenty-five semi-structured interviews that were carried out with key stakeholders in Kosova. The sample of the people that were choosen to participate in interviews was made randomly. The stakeholders included representatives from public institutions listed in Table 2.

Table 2 Public Institutions Interviewed

Key Stakeholders	**Key Stakeholders**
Representatives of Vice-Presidents Office	Vice-President of Public Procurement Office
Vice-President of Municipality of Prishtina	Representatives of Kosova Chamber of Commerce
Representatives of Customs Department	Professor of Economics, University of Prishtina
Officer at Ministry of Trade and Industry	Director of Business Support Centre Kosova
Manager of Regional Development Agency	Professor of Economics, Private College

Individual interviews as a data collection tool of qualitative methods are probably the most widely used method in this type of research. In-depth interviews are particularly applicable to policy research since they address issues and objectives concerning contextual, evaluative and strategic problems that provide rich and worthwhile data [56]. The semi-structured nature of scheduled interviews meant that from a number of questions emerged further questions and issues which were then discussed and explored. This gave a thorough and comprehensive view from stakeholders' side about the institutional context for facilitating entrepreneurship, the role of policy development, and the overall strategy to promote economic growth in Kosova. The interviews were about half an hour long, they were recorded and later transcribed and translated into English. The translated interviews were then coded into topics in order to analyse separately each topic that the paper sought to investigate. The participants of the individual interviews were ensured to remain anonymous because of the political sensitivity of the research and the posititon of many participants in public offices. The interviews were undertaken in June 2012 and provided an inclusive overview of the institutional arrangements of Kosova as well as providing deep insights into the role of individuals as a part of the entrepreneurial ecosystem. A possible limitation can be the selection of participants that was made mainly from the capital city of Prishtina. This was due to the restriction of time and resulted with a limited number of participants representing the entire region of Kosovo. The following section argues the need for entrepreneurship to be centered as the key of creating more resilient economies in the context of Kosova.

4. Empirical Focus

4.1 Kosova: Challenges of a post-war country

Kosova declared its indepedence in 2008 and is a new born state with under-developed institutions of government. As the last country to enter transition Kosova has faced numerous obstacles to its development, many of which are a consequence of the previous socialist system and the legacy of the war [11]. Kosova remains characterised by high levels of insecurity and political marginalisation [9]. The economic challenges facing Kosova are considerable, with high unemployment, low levels of growth, poor infrastructure and high levels of poverty [9, 35]. Economic growth compared with other neighbour countries has been below the average rate and the income level per capita is among the lowest level in the Balkan region [36-38]. Also the unemployment rate stands at more than 40% [39]. These critical issues had an impact on the economy by limiting direct investments and making the economy depend on the international aid, service sector and remittances from the Kosovan Diaspora [40-41]. International emigration, initiated by the conflict in the late 1999s and also motivated by economic reasons, is the highest in the world. According to Migration Survey every third or fourth household in Kosova has a family member living abroad [42]. The export sector remains very small and even for the regional standard production is mainly in low-value-added goods [37]. The financial system on the other hand has expanded rapidly since 2000, with its financial assets contributing a 73 oercent share of GDP in 2010 and, banks having remained liquid and profitable [43]. Thus, in 2010 the private sector credit amount to 35 percent of GDP while 80 percent of loans were given to retail trade, other services and households [37].

Harnessing economic growth is clearly crucial for Kosova and the national government along with international development agencies are seeking to indentify and analyse policy interventions that are needed for a higher and sustained economic growth trajectory [44]. Economic development strategies are particularly focused on job creation and growth, and aim to involve public and private stakeholders in designing and implementing strategy, increasing the number of projects, developing the infrastructure, providing employment schemes and social services [45]. Specific objectives of this line of action is to develop these strategies in the regions of Kosova in order to facilitate the local economic development and employment, to strengthen its economic areas and expand regional development practices in line with EU practices, develop an institutional capability to manage the economic development process and support the economic regeneration for growth and employment [45].

A further key component for economic growth and development is the emergence of the private sector and entrepreneurship which is the best stimulation for growth and the best hope for Kosova's population by providing employment and revenues for the unemployed labour market [42, 46-47]. However, there are numerous constraints impeding the development of this sector, such as the lack of public infrastructure particularly in energy and transport, low skills and education and, limited judiciary and administrative capacity hampering the business climate. The government has adopted an economic development strategy and policy that led in the right direction where the key pillars are legal and administrative reforms to improve Kosova's ranking in the "Doing Business". The figure 2 below shows the report for Kosova on the Ease of Doing Business (2013) where Kosova made an improvement in the ranking from the 113th place in 2012 to the 98th rank in the Doing Business Report for 2013.

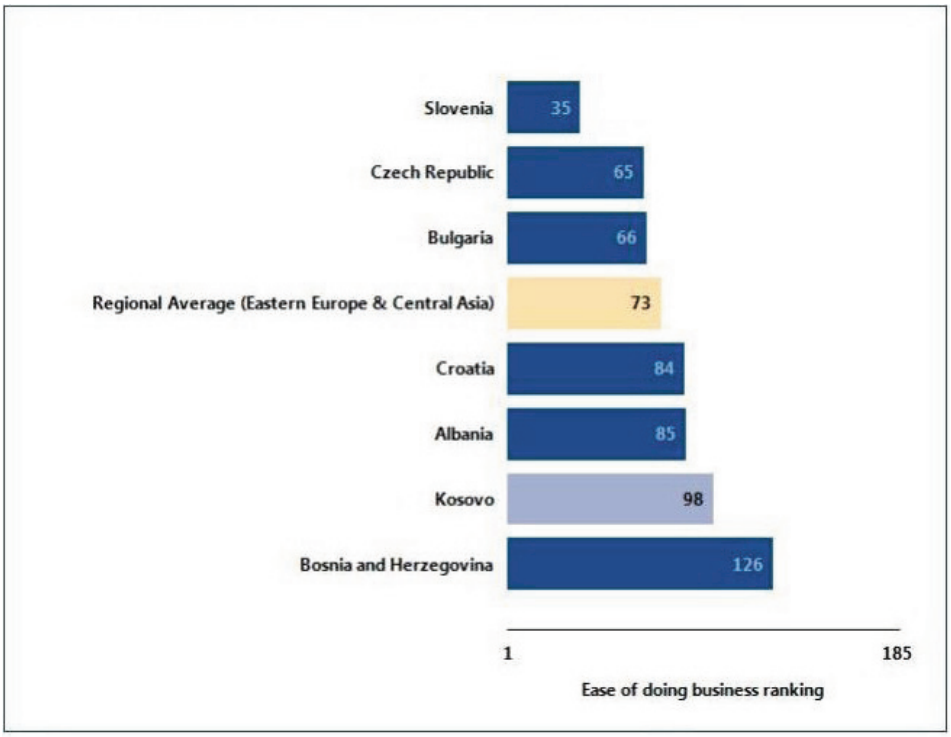


Figure 1 Kosova rank on the ease of doing business 2013

Several steps have been done to improve the business environment, government support for the agricultural sector and the construction programme. A package of twelve laws was prepared by the government to further foster the trade sector development and strengthen the business environment by reducing the cost of setting up a business, simplifying business registration and licensing system, reporting and auditing, improving property rights registers, control and management of state borders and, external trade [39]. A number of policies have been established by the government to improve the business environment and to make it easier for entrepreneurs to develop the businesses and also to stimulate the creation of new start-ups [36]. Business registration is simple and inexpensive, the taxation policies are also very efficient and streamlined compared to other countries in the region. Kosova has a taxation system which is very simple and there are only few taxes, and the government is creating incentives for taxes that support domestic production [48].

Despite these efforts, the complex circumstances present in an extreme socio-economic environment such as Kosova have made the area of entrepreneurship a difficult sector to enter considering huge barriers such as institutional barriers, resource inadequacies, and lack of the rule of law [11, 44, 49]. According to Solymossy[35], lack of availability of resources led to limited choices and opportunities for entrepreneurs, competition, and the inability of using efficiently the available resources. The huge importance of SMEs, with about 98 percent the vast majority of the existing enterprises in Kosova [50], is confronted with lots of barriers that hinder the growth of firms. These barriers include business environment factors, such as difficulties in accessing financial resources, inefficient regulations, poor education quality, lack of experience, and barriers on internationalization [51-52]. The institutional barriers that are also qualified as formal obstacles such as fiscal policy, high taxation levels, poor legal regulations, and informal barriers such as property rights, corruption and bribery [9, 49, 53-54] have a critical impact and negative

influence on the development of entrepreneurship, and thus also a negative influence on economic growth, furthermore creating an unproductive or destructive effect on the economy [49, 55-56].

5. Results

5.1 Economic Structure

The main component to understanding the economic structure of a region is to start addressing the key challenges it faces in order to be resilient in terms of economic shocks or public spending cuts. Challenges that the region faces are considered to be similar to the majority of stakeholders, such as, bad governance, huge level of unemployment, lack of competitive market in private sector, lack of domestic production, high manufacturing costs as a result of inefficient function of electric supply and weak infrastructure, low productivity of labour market, the economic structure being dependent on imports, low efficacy of law system which raises the cost of implementing projects, and high level of corruption.

Since Kosova is a new state, the engagement for economic development has started relatively late. As a result of the last conflict Kosova has inherited a destroyed economy and inefficient economic system from the past, yet it cannot be concurred for economic sustainability in the region. Economic growth compared with other neighbour countries has been below the average rate and the income level per capita is among the lowest levels in the Balkan region [38-39, 58]. Although the annual real GDP has steadily grown with an average of four percent in the past decade, the unemployment rate in 2011 has grown around 45 percent with more than one third of the population work force being unemployed, most apparently the young generation and women [39].

Stakeholders stress that the main challenges still remain creation of the right climate for foreign investors, for the reason that Kosova institutions still face high levels of corruption which has seriously damaged the region's reputation, turning it into an unstable region for foreign investors:

> *"Economic sustainability of a country depends on its internal economic development, in this context Kosova last year has experienced significant economic growth, but insufficient to guarantee economic stability." (Representative of Kosova Chamber of Commerce)*

> *"We still need to improve economic structure and the finalization of privatization process, also the change perception of relying on public sector enterprises to transfer economic growth on private sector." (Professor of Economics, University of Prishtina)*

In order to improve the economic structure, it is important to know the assets of the region so that to give space for improving economic development and create resilience. Stakeholders referred to different assets, such as natural resources as rare assets to use for manufacturing and increasing exports, human capital referring to the large number of young capital entering labour market every year as an important aspect of development, and SMEs. Many stakeholders consider these aspects as strengths of the Kosova region and stress the need to build more on them to create resilience in the region. It is considered that the region of Kosova has around 14.000 billion tones of lignite and other natural assets such as zinc, silver, nickel, cobalt, copper, iron, and bauxite. Considering the large number of natural assets, Kosova could benefit from them by investing more in local manufacturing and exporting those products.

Using natural capacities has a lot to do with human capital which therefore is interlinked with the quality of education. Two stakeholders consider that the large number of young people entering the labour force every year is another asset of Kosova which can be used for economic development. This is linked with innovation were a number of qualified labour market would be more innovative and easily used from the private sector in the meaning of lowering cost and helping business development or creating innovative ideas [49, 59].

The growth of the private sector can generate a lot of powerful benefits including direct benefits such as wealth creation for families and communities, positive effects on quality and price of goods, stimulation of enterprises leading to empowerment and more jobs, introduction of innovations and additional social programmes, whereas indirect benefits could include reinforcement of education system, better capacity for revenue redistribution, and more opportunities for public-private partnerships. Kosova also has a large number of small and medium enterprises which could make the economy more resilient to shocks and to public spending cuts.

Despite that, there are other views for the lacks and areas to be improved in order to increase the capabilities of the region to overcome crisis and economic downturns. Consequently, several stakeholders mentioned the need of having the appropriate strategy for economic development which has to be developed under several economic actors including governmental institutions and private sector. Another impediment is seen in the low liquidity of firms and individuals, this issue raised as a consequence of low cash circulation in the market. Privatization has negatively contributet to this situation by blocking a significant amount of cash and consequently lowering the demand for doing business. Whereas, other respondents stress that Kosova lacks having opportunities for diversification of the economic activity. This opinion is supported by the findings from the literature review where a large number of activities have been functioning to create opportunities for businesses during the past years and for the current year which is an important step for development [48, 61-62]. But informal economy, corruption, and access to finance for investment which is hard to collect as a result of high interest norms, remain the key challenge for Kosova [11, 35].

Many stakeholders state that priority areas for improvement are the enforcement of the rule of law in order to grow the productivity, to develop a fair competitive market, and to rise the number of exported goods. Since Kosova lacks on having a satisfactory level of domestic products, the manufacturing and private secotor need increased attention. Therefore, three stakeholders highlight the main priorities for business development such as:

1. The promotion of a formal competitive market of the private sector and shifting away from the rise of public spending cuts.
2. Drafting general and specific policies for small business development,
3. Improving access to finance and,
4. Addressing all legal concerns which hinder small business creation and development.

For the mentioned reasons, stakeholders highlight that all other aspects of creating a stable environment are connected by firstly creating fair market competition and competing ability of firms that impact in the long-term on economic development.

5.2 Business Start-up Strategies

The start-up strategies are very important as it is estimated that this group of firms will generate a large number of employment. These initiatives face difficulties from the environment which is not very favourable as a result of informal competition, inefficient administrative system

and institutional problems [11, 35]. Creating an entrepreneurship culture needs to play a significant role in Kosova's economy, including the promotion of innovative ideas, and entrepreneurial understanding for the importance of implementing new start-up strategies.

"Kosova has proved that can provide strong services on information technology and export these services to developed countries. If this has to be considered more from the institutions and invest more in these abilities, Kosova may efficiently export a lot of services considering the low average cost in salary" (Business Development Consultant).

"*Therefore, creating the relevant policies from the institutions and creating a specific and appropriate fund for financing businesses with low interest norms is very necessary to support and encourage entrepreneurs*" (Chamber of Commerce Representative).

For future activities, it is recommended that the government of Kosova has to actively continue to be part of economic international conferences, to work actively on improving the region's reputation and, to promote economic development by creating economic partnerships with international institutions of countries for a bilateral interest. Regarding the internal engagements, the main focus needs to remain promotion of local products and stimulation of new businesses, improving education system, reducing red tape and corruption, and improving the business environment.

Many stakeholders state that collabouration of key stakeholders such as Universities, private sector, chambers of commerce, and public institutions can help each other in order to understand specific needs of the economic environment in Kosova. Activities in this context need to be regulated in order to create a stable economy and sustainable development. Furthermore, respondents add:

> *I consider that representatives of the institutions have the key role on creating and improving the reputation of the country. By fighting corruption, transforming the region into a safe country for everyone, ofering the neccesary infrastructure, stability of energy supply and support for business development, can retrain the interest of investors in our region* (Economic Development Manager).

> *There is weak or nonexistent collabouration especially between Universities, private sector and public institutions. The collabouration can be fostered through different internship programmes, business incubators jointly established by the Universities and private sector, and other similar programmes that link entrepreneurship with Universities. These activities are of crucial importance since they target the young unemployed people* (Public Sector Organization).

A further key component of creating economic resilience is the level of skilled workforce. Stakeholders make clear that among other challenges that Kosova faces, is also the education system which is not considered to be a strong area and needs further development. The lack of skilled work force and the overall low labour demand is a critical problem in Kosova, these issues are considered important causes of high unemployment [63-65]. Moreover, stakeholders emphasise that with the large number of young population Kosova could benefit from this aspect and create competitive advantage by investing more in education. While people could start a business easily, it requires skills and education to further develop and expand the business [66]. One respondent state that many people lack the abilities to develop these enterprises.

"…people here have the ambition to start a business but they lack the skills and knowledge to develop them" (Banking Sector Representative).

This sort of comment clarifies the need for appropriate education on entrepreneurial activity. Universities are promoters of economic development and innovation. Universities can plan to take an important role in facilitating knowledge transfer, through different cooperation programmes between universities and private firms [67-68].
Respondents emphasise that the biggest challenge for a universitiy in order to play the role of sharing knowledge is the quality of education and also, the need for providing entrepreneurial education so that a more resilient and dynamic economy could be developed:

"Entrepreneurship education is important to influence young people to see entrepreneurship as a positive option, so they could be more confident about starting a business and there will be more knowledge transfer and innovation" (Director of Business Support Center Kosova).

As underlined above there is weak or nonexistent cooperation between universities and the private sector which otherwise could enable spin offs and knowledge transfer. Thus, universities should design specific curricula based on the private sector's needs so that the private sector could benefit from the knowledge transfer of Universities. This sector is considered to be one of the primary areas, with a very young generation, through which Kosova can easily start offering various services and create competitive advantage if institutions invest more in education.

6. Conclusions

This study investigated the motives behind the entrepreneurial activity and the levels of entrepreneurship activity as a key factor in effecting the economic growth of a country and the ways to improve economic resilience. The concept of resilience has been used by researchers of several fields, such as ecology, psychology, and political science, but it is only very recently that it has attracted attention from regional analysts and spatial economists, consequently the concept is very fuzzy [3, 69]. Over the past years urban and regional analysts have begun to consider the applicability of the concept in local and regional economy, representing a framework to analyse natural and environmental disasters, causes and effects of uneven development in local and regional economies [3, 7]. However, in spite of the exploration of the notion and attempts to conceptualise a framework in economic resilience, not much has been done to link the role of entrepreneurship and economic resilience.

Entrepreneurship and competitiveness have to be viewed as an integral part for sustaining a dynamic and a diverse economy, by stimulating competition and creating employment, driving innovation, and increasing productivity. In addition, this study analysed two factors: (i) how can entrepreneurship impact on economic growth and resilience in Kosova, (ii) stakeholders influence in facilitating entrepreneurship and improving business environment to promote regional economic resilience in Kosova

Kosova is subjected to an extreme business environment and has inherited numerous economic and business challenges from the past as a result of the past conflict [9, 35]. Some of the challenges are internal which can be improved through effective policy making, while other challenges are linked with the external environment and require an improvement in the political marginalization of Kosova in order to expand the scope of entrepreneurial capacity. Economic growth in Kosova is below the national level compared to the neighbour countires and the high

level of unemployment at more than 40% which is mainly affecting the young generation makes Kosova one of the poorest countries in Europe [70]. In order to overcome these challenge and improve the employment levels in the region, stakeholders communicated in the conducted interviews the priority areas for development which were considered to be the development of agriculture sector and particularly to foster private sector growth by building more on the existing strengths of the economy. The region needs to effectively use its assets in order to improve local manufacturing and expand it abroad by exporting these goods; getting growth in these areas is the main challenge for policy and strategy makers. Stakeholders stressed that institutions and government have helped in improving the business environment by easing the number of procedures for business registration and, lowering the tax payment for business. Several activities have been developed to promote entrepreneurship levels in Kosova, activities from international and local organizations have participated by trainings, rewards and grants for start-ups. However they need to actively operate so that the scope of entrepreneurial activity can be expanded. Unless institutional environment and business environment are better developed, the entrepreneurial activity will be further hampered in the future. Many stakeholders stressed that the collabouration between key stakeholders such as Universities, Public and Private Sector, and Chambers of Commerce as a key in facilitating knowledge transfer and spillovers is not functioning properly. Thus, the private sector is not benefiting in this context as a result of the weak collabouration among these sectors.

This study underlines that entrepreneurship as the main engine for competitiveness and economic growth should be the primary key to economic resilience. In this view, the concept of regional resilience is a dynamic and an on-going process presented in a geographically situated context, with the adaptive capabilities of the region – its firms, institutions, workers, and policy actors depending on the pre-existing nature of the region's economy [3, 15, 71]. Thus, the scope for re-orienting skills, resources and technologies in the adaption process differs among countries. The economic environment and business environment in Kosova has gone through critical changes during past years and everything in the economic activity had to start over from scratch since the end of the conflict. Our findings suggest that entrepreneurship is not contributing to economic growth in the country as much as it should due to the critical challenges that stem mainly from the under-developed institutional environment in Kosova which consequently negatively impacts on creating productive and local entrepreneurship. Work-based education is a key area needed for investment in order to drive up competitiveness and growth. To do this, policy makers and institutions have to actively work on creating a favourable business environment. To develop the appropriate strategy for businesses and a competitive economy, they should seek to foster greater collabouration between the private sector and educational institutions, so that beneficial knowledge transfer is promoted. Such approaches will require a long-term focus from the institutions and policy makers in order to create an entrepreneurial culture. Equipping with the skills and knowledge for entrepreneurs to work in a dynamic environment, will contribute to the overall resilience of the country.

References

1. Martin R. Regional economic resilience, hysteresis and recessionary shocks. Journal of Economic Geography. 2012; 12.
2. Foster K. A Caste Study Approach to Understanding Regional Resilience. Institute of Urban and Regional Development, University of California. 2007.

3. Martin R. Regional economic resilience, hysteresis and recessionary shocks. Journal of Economic Geography. 2012; 12.
4. Dawley S, Pike A and Tomaney J. Towards the Resilient Region? Local Economy. 2012; 25.
5. Bristow G. Resilient regions: re-'place'ing regional competitiveness. Cambridge Journal of Regions, Economy and Society. 2010; 3: 153–167.
6. Hassink R. Regional resilience: a promising concept to explain differences in regional economic adaptability? Cambridge Journal of Regions, Economy and Society. 2010; 3.
7. Simmie J, Martin R. The economic resilience of regions: towards an evolutionary approach. Cambridge Journal of Regions, Economy and Society. 2009; 3:1.
8. Huggins R, Williams N. Enterprise and public policy: a review of Labour government intervention in the United Kingdom. Environment and Planning C: Government and Policy. 2009; 27.
9. Hoxha D. Barriers to doing business in Kosova: an institutional approach. International Journal on Entrepreneurship and Small Business. 2009; 8:2.
10. Sautet F, Kirzne I. The Nature and Role of Entrepreneurship in Markets: Implications for Policy. 2006; 4.
11. Peci F, Kutllovci E, Tmava Q, Shala, V. Small and Medium Enterprises Facing Institutional Barriers in Kosova. International Journal of Marketing Studies. 2012; 4:1.
12. Pendall R, Foster K A, Cowell M. Resilience and Regions: Building Understanding of the Metaphor. Institute of Urban and Regional Development. 2007.
13. Reggiani A. Resilience: An evolutionary Approach to Spatial Economic Systems. Network and spatial Economics. 2002; 2.
14. Walker B H, Abel N, Anderies J M, Ryan P. Resilience, Adaptability, and Transformability in the Goulburn-Broken Catchment, Australia . Ecology and Society. 2009; 14:1.
15. Rodgers P, Vorley T, Williams N. Creating Economic Resilience: Harnessing Entrepreneurship, Work and Enterprise in the Sheffield City Region. The University of Sheffield, Centre for Regional Economic and Enterprise Development. 2011.
16. Petersen G. Political ecology and ecological resilience: an integration of human and ecological dynamics. Ecological economics. 2000; 35:6.
17. Sullivn-Taylor B, Branicki L. Creating resilient SMEs: why one size might not fit all. International Journal of Production Research . 2011.
Swan, T. (1956) Economic Growth and Capital Accumulation. Economic Record, 32, p. 344-361.
18. Acs Z J, Audretsch D B, Braunerhjelm P, Carlsson B. The knowledge Spillover Theory of Entrepreneurship. Discussion Papers on Entrepreneurship, Growth and Public Policy. 2005.
19. Acs Z, Storey D. Introduction: Entrepreneurship and Economic Development. Regional Studies. 2004; 38:8.
20. Audretsch D B, Keilbach M. The theory of knowledge spillover entrepreneurship. Journal of Management Studies. 2007; 44:7.
21. Acs Z, Armington C. Employment Growth and Entrepreneurial Activity in Cities. Regional Studies. 2004; 38:8.
22. Audretsch D B, Thurik A R. A model of the entrepreneurial economy. International Journal of Entrepreneurship and Education. 2004; 2:2.
23. Bharma R, Dani S, Burnard K. Resilience: the concept, a literature review and future directions. International Journal of Production Research (online first). 2011.
24. Starr R, Newfrock J, Delurey M. Enterprise resilience: managing risk in the networked economy. Strategy and Business. 2003; 30.

25. Vogus T J, Sutcliffe K M. Organizational Resilience: towards a theory and research agenda. ISIC. IEEE Conference on Systems, Man and Cybernetics. 2007.
26. Patterson E S. Collaborative cross-checking to enhance resilience. Cognition, Techonology & Work. 2007; 9.
27. Erol O, Sauser B J, Mansouri M. A framework for investigation into extended enterprise resilience. Enterprise Information Systems. 2010; 4:2.
28. Ignatiadis I, Nandhakumar J. The impact of enterprise systems on organizational resilience. Journal of Information Technology Case and Application Research. 2007; 22.
29. Gallopin G. Linkages between vulnerability, resilience, and adaptive capacity. Global Environmental Change. 2006; 16.
30. Gunderson L H. Resilience and the behaviour of large-scale systems. Washington DC: Island Press. 2002.
31. Goble G, Fields H, Cochiara R. Resilient infrastructure. IBM Global Services. Somers, NY. 2002.
32. Hill E W, Wial H, Wolman H. Exploring Regional Economic Resilience. Working Paper 2008–04, Institute of Urban and Regional Development, University of California, Berkeley. 2008.
33. Cooper N, Estes C A, Allen L. Bouncing back. Parks and Recreation. 2004; 39: 28-35.
34. Chandler N H, Lyon W D. Issues of research design and construct measurement in entrepreneurship research: The past decade. Entrepreneurship Theory & Practice. 20011; 25:4. 101-113.
35. Solymossy E. Entrepreneurship in Extreme Environments: Building an Expanded Model. International Entrepreneurship and Management Journal. 2005; 1: 501-518.
36. IMF. Republic of Kosova: 2011 Article IV Consolation and the Initiation of Staff-Monitored Program. Washington, D.C: International Monetary Fund- Publication Services. 2011. Report No.: 11/210.
37. World Bank. Kosova Public Expenditure Review. Washington, DC. 2010. Report No.: 53709-XK.
38. UNDP. Kosova Remittance Study. Kosova: UNDP. 2010.
39. IMF. Republic of Kosova: Request for Stand-By Arrangement--Staff Report. IMF Country. 2012. Report No.: 12/100. 1-70.
40. Loxha A. Economic Development. UNDP Kosova, Prishtine. 2012.
41. Maddock N, Ramguttee L. Responding to Falling Remittances and Returning Migrants. Development & Tansition 5, UNDP, Kosova. 2009.
42. World Bank. Migration and Economic Development in Kosova. Washington, DC. 2011; Report No.: 60590- XK.
43. Toci V, Mustafa A. Global Financial Crisis and Banking System in Kosova. Development & Transition 5, UNDP, Kosova. 2009
44. Sen K, Kirkpatrick C. A diagnostics approach to economic growth and employment policy in low economies: The case of Kosova. Institute for Development Policy and Management School of Environment and Development, University of Manchester. IARC Working Papers Series. 2009; 29: 1-39.
45. European Commission. Regional Development Strategy for the Economic Region Centre. EU Regional Economic Development, Prishtine. 2010.
46. UNDP. Kosova Human Development Report 2012 - Private Sector and employment. 2012; 1-133.
47. Krasniqi B. Personal, Household and Business Environmental Determinants of Entrepreneurship. Journal of Small Business and Enterprise Development. 2009; 16:1. 146-166.
48. MTI. Investing in Kosova. Ministry of Trade and Industry. Kosova, Prishtine: Economic Initiative for Kosova - ECIKS; IPAK. 2011.
49. Sautet F. Local and Systemic Entrepreneurship: Solving the Puzzle of Entrepreneurship and economic Development. Baylor University. 2011; 10. 1-16.

50. Riinvest. Education and Economic Development of Kosova. Institute for Development Research. Kosove, Prishtine: Riinvest Institute. 2004.
51. Krasniqi B. Barriers to SME Growth in Kosova: An Empirical Study. 2nd Interdisciplinary European Conference on Entrepreneurship Research, University of Regensburg, Germany. 2003.
52. Smallbone D. Institutions, administrative reform and SME development in transition economies: Some policy issues. Papers presents at Conference on Economic Development and Reconstruction Policies in SEE, Dubrovnik. 2002.
53. Estrin S, Meyer K, Bytchkova M. Entrepreneurship in transition economies. In the Handbook of Entrepreneurship. Casson M, Yeung B, Basu A, Wadeson N, Eds. London: Oxford University Press. 2005.
54. Schaffer M, Weder B. Firm size and the business environment: Worldwide survey results. International Finance Corporation (4), Discussion Paper. 2001.
55. Foss K, Foss K J. Economic Organization and the Trade-Offs Between Productive and Destructive Entrepreneurship. In N. a. Foss (Ed.), Entrepreneurship and the Firm: Austrian Perspectives on Economic Organization. Northampton: Mass.: Edward Elgar. 2002; 102-127.
56. Baumol W. Entrepreneurship: Productive, unproductive and destructive. Journal of Political Economy. 1990; 98: 893-921.
57. Burton D. Research Training for Social Scientists: A Handbook for Postgraduate Researchers, London. 2000.
58. World Bank. Kosova Unlocking Growth Potential: Strategies, Policies, Actions. Washington, DC. 2010; Report No.: 53185-XK.
59. Wong P K, Ho Y P, Autio E. Entrepreneurship, Innovation and Economic Growth: Evidence from GEM data. Small Business Economics. 2005; 24. 335-350.
60. Baumol W J. Education for Innovation: Entrepreneurial Breakthroughs VS. Corporate Incremental Improvements. National Bureau of economic research, NBER Working Paper Series. 2004.
61. USAID. Kosova Strategic Plan/ 2010-2014. USAID, Kosova. 2010.
62. Government of Kosova (GOK). Labour and Employment – Kosova. 2006.
63. BEEPS. Business Environment Enterprise Performance Survey. www.enterprisesurveys.org. 2009.
64. World Bank. Kosova Youth in Jeopardy: Being Young, Unemployed, and Poor in Kosova. Washington, DC. 2008.
65. IMF. Gearing Policies toward Growth and Development. Washington, DC: International Monetary Fund. 2004.
66. Filippetti A, Guy F. Labour market institutions, skills, and the resilience of innovation during the financial crisis in Europe. World Intellectual Property Indicators, WIPO. 2010; 1-28.
67. Tahirsylaj A. Higher Education in Kosova: Major Changes, Reforms and Development Trends at University of Prishtina and University of Mitrovica and their role in peace building and reconciliation during post-conflict period. Proceedings of the 4th International Barcelona Conference on Higher Education. GUNI - Global University Network for Innovation. 2010.
68. Mustafa I, Hoti A, Gashi P, Demukaj V, Havolli Y, Kotorri M. Education and economic development of Kosova. Prishtina: Institute for Development Research (RIINVEST). 2004.
69. Pendall R, Foster K A, Cowell M. Resilience and Regions: Building Understanding of the Metaphor. Cambridge Journal of Regions, Economy and Society. 2010; 3: 71-84.
70. World Bank. Kosova Partnership Program Snapshot. World Bank Kosova Office. 2011.
71. Williams N, Vorley T, Ketikidis P. Economic resilience and entrepreneurship: A case study of the Thessaloniki City Region. Local Economy. 2013.

NETWORKING BUSINESS INCUBATORS AND CLUSTERS IN SERBIA AS A TOOL FOR FOSTERING REGIONAL DEVELOPMENT

MSc Ildiko Zedi[1], MSc Bojan Lekovic[2]

[1] *Director of Business Incubator Subotica, PhD student in Faculty of Economic, University Novi Sad, "Poslovni Inkubator Subotica – Business Incubator Subotica – Szabadkai Üzleti Inkubátor" Ltd, Magnetna polja 6, 24000 Subotica, Serbia, izodi@bis-su.rs*

[2] *Teaching assistant Faculty of Economic, University of Novi Sad, bojan.lekovic@ef.uns.ac.rs*

ABSTRACT

The establishment and development of cooperation networks. Creating conditions and fostering technological development. Platform for cooperating incubators and clasters.
Metodology that we use – Reconciliation, planning, action, checking and monitoring (individually, control, comprehensive).

Bases: Cooperation between incubators and clusters. Highly concentrated development and innovative activities are supported by all stakeholders. Creating appropriate concentration of professional and competent people and organization.

Among the biggest problems identified by the general economic situation, poor infrastructure, lack of legislation, unclear responsibilities, unclear ownership situation, the lack of security of ownership, inefficient administrations, poor investment climate, pollution is on the rise as poor banking system, environmental problems are solved slowly.

Establishing action plan (peopre, tehnology and structure). Training and staff development and the creation of conditions for their mobility. Each element must be visible and recognizable. Must identify the role of factors and its impact on the environment. Professional capacities of peopre who work in them must, in some way, be accessible and visible.

Strengthening cooperation on the level of the urban areas to the level of the region. Cooperation between industries, universities, institutions and companies in and outside of our country. Work together with – experts from different fields, development centres and agencies, organizations for support economic development, development Funds, support institutions (at the level of EU countries).

Value network, cooperation, entrepreneurial venture, technology transfer

1. Introduction

Today, the number of business incubators in the world is estimated at around 5,000. In Asia there are more than 1,000 of them, approximately 1,000 business incubators are situated in North America, in Europe a little bit less than 900, while the rest is spread out across other continents. Business incubators have been grouped into 60 national and regional associations, from which the following are considered to be the most important ones: *the National Business Incubation Association,* which gathers more than 1,900 members from 60 countries, most of them coming from the U.S.A., and *the European Business & Innovation Centre Network*, the biggest association of business incubators in Europe, which gathers more than 240 members from the European Union and 11 members coming from other countries. The Business Incubator Network of Serbia has been active in our country, gathering all the business incubators from Serbia.

"Incubators are *Companies whose main task is to provide and to rent available office space, and to provide administrative, technical, and other services to newly-formed enterprises or innovative organizations..."*
Incubators have been defined as organizations, which provide infrastructural support to innovative activities.
Today, there are 23 incubators in Serbia. Most of them have been set up on the territory of the Vojvodina region, a total of 8, and they are situated in the following towns and municipalities: Novi Sad, Subotica, Zrenjanin, Bački Petrovac, Pančevo, Senta, Kanjiža and Beočin. More incubators in Vojvodina than in the rest of Serbia is an achievement based both on the BBI program success and on the Vojvodina government larger investments into development of this sector. 7 incubators have been set up in the region of East and Southeast Serbia and they are situated in the following towns and municipalities: Niš, Vranje, Zaječar, Bor, Knjaževac, Prokuplje and Medveđa. There is an initiative to form two new incubators in this region, one in Majdanpek and the other one in Kladovo. 6 incubators have been identified in the region of Šumadija and Western Serbia; four of them already existing with an initiative to form two new incubators. They are situated in the following towns and municipalities: Kragujevac, Rača, Kruševac, Užice, Valjevo and Kraljevo. Ther are two incubators in the region of Belgrade, situated in Zvezdara and Rakovica municipalities.
Setting up of business incubators in a particular place will boost the economic development of the whole region, since they attract new investments and are considered to be economic growth engines, while new companies enable commercial publicity and boost international trade. Also, they can create specialized knowledge centers and increase production, based on which the competitive advantage has been built, and as such they are often good examples of regional success, progress and successful entrepreneurship.
While improving the system of cooperation among businesses, organizations which provide support to businesses and academic community, universities are focused on transfer of technology, joint research activities, as well as on how to stimulate entrepreneurs and subject matter experts to cooperate closer with local communities.

„A cluster represents the geographical concentration of inter-connected enterprises, specialized suppliers, service providers, firms coming from related industries, and institutions connected to them (eg. universities, agencies, tourist and trade associations), which compete among themselves, but also cooperate."

The Province Secretariat for Economy, Employment and Gender Equality has recognized clustering in the economy, business connecting and networking as one of the strategic measures for economic development, with the aim of grouping industrial capacity and strengthening the competitiveness of the region.
Strategic guidance to support clusters and business associations, which aim to strengthen the competitiveness of the economy and regional development, are related to the following areas:

- Development of Innovation
- Business Sustainability
- Internationalization of cooperation and networking
- Regional specialization
- New skills and creation of new jobs

Flexible organizations, such as clusters (districts and cooperation in Italy) represent very good instruments of assembling and clustering of small businesses, and give them the strength and competitiveness to enter the international market, develop new technologies and improve skills of the employees.
Cluster Development Strategy in Vojvodina should be based on the recognition and support of 10 to 15 clusters in various areas evenly distributed on the territory of AP Vojvodina with 3-5 priority areas that will be particularly encouraged by the Provincial government, and will rely on traditional comparative advantages that Vojvodina has. These areas are:
the efficient use of arable land, food-processing facilities, infrastructure and logistics, metals and textile area, as well as development of modern advanced technologies and ICT, which can be used in the above mentioned traditional areas.

2. Networking

An important aspect is the networking of the incubators. Activites that pertain to common public relations work must be carried out by all incubators.
Facilitating the exchange of founders within the individual incubators of Vojvodina, as well as across Serbia, must be initiated. Moreover, the group of the incubator alumni must be involved to a greater extent and networked. As a result, knowledge and know-how transfer form experienced businessmen to start-up ventures and potential entrepreneurs should be forced and reinforced.
Networking with other organizations (such as, for example, investment funds, VIP, clusters and trade associations) with respect to complementary services and sinergies must be checked and pursued.

2.1 Creating conditions for joint action

Based on the current economic condition of businesses and based on the current condition of strategic tools for the development of business clusters and incubators, it is necessary to establish networks of all the relevant factors affecting economic development, in line with the following principles:

- each factor must be visible and recognizable,
- the role of the factor must be identified as well as its impact on the environment,
- professional capacities of the employees must be, in a certain way, available and visible.

Based on these principles it is necessary to create conditions for all the economic development factors to focus together on the following activities:

- to define information flows among the factors,
- to train people on how to communicate better, on how to exchange relevant information and on how to use the information flows that have been established,
- to designate and to train contact/cooperation person that will serve as an "interface" between an organization and an environment,
- to train employees on how to use the established networks and to adjust the enterprise operations to that purpose,
- to create a subject matter experts database covering different areas,
- to initiate all types of cooperation through joint development projects. To start with small projects in order to teach the factors how to cooperate with each other,
- to create conditions for obtaining applicable knowledge through student practice and to create conditions for lifelong learning, and,
- to create conditions for funding business ventures, innovative activities of entrepreneurs through incubators and their development through clusters.

Connecting of business incubators, clusters and universities will create significant development potential. By doing so it will boost the economic development of the particular area or region, which, without the proper support of the authorities at all levels and without the logistic support of public institutions, will be very much limited.

That is why it is very important to prepare the said institutions, to familiarize and, in some cases, to train the management for providing full support to all the mentioned activities.

It is also important to say that without meeting the financial prerequisites for the development of businesses and without significant financial support provided to clusters and business incubators, development projects and economic sustainability at local and regional levels, in general, are put at risk.

Activities concerning the establishment of cooperation between business incubators and clusters and provision of support to their joint actions are specific for each region and local authority and institutions, and they can be classified into the following categories:

- support to translation of scientific and technical-technological achievements into concrete products or services through joint engagement of professional capacities in business incubators, clusters and universities,
- transfer of ideas, innovative solutions and technologies from universities, public research institutes and clusters on entrepreneurs` initiatives supports through business incubators,
- fostering of joint industry-academic community projects,
- revitalization and development of the existing companies in clusters and incubators using the existing professional potentials of universities, business incubators and clusters,
- strengthening of professional, scientific and technical-technological capacities through joint education, procurement of modern equipment and joint activities aiming to further develop economic capacities in order to enable balanced economic development and to disable wasting money through accumulation of particular type of equipment and machinery.
- support to *greenfield* and *brownfield* investments.

2.2 Methodology

Although there is a need for significant changes, they do not occur overnight. Economy and businesses demand strategic and long-term development oriented action meaning that development processes must be adjusted to the existing developing potential. It does not mean that we should wait, activities should be undertaken as soon as possible, but one must be realistic when it comes to results, which are expected to take place within the reasonable period from 3 – 5 years. A lot has to be done and it cannot be done overnight. The use of iterative – progressive cycle is required, which is presented in a very picturesque way as a spiral of progress (picture 1). In the course of the first iteration all factors are supposed to make a small step forward and to prepare themselves for the next one, during which they will be able to make even bigger step forward and so on. Each iteration consists of four segments: planning, action based on the defined plan, progress control, taking actions aiming to adjust and to remove identified obstacles. In the next iteration identified problems and plan shortcomings are incorporated into the next planning cycle, which is known as Deming cycle of continuous improvement or PDCA (Plan, Do, Check, Action). Each iteration segment (there are four of them) consists of three fields or aspects: individual aspect, comprehensive aspect and control aspect. Each of the given aspects must be present in all segments:

2.2.1 First segment - planning:

- Individual aspect: an Individual improvement plan consists of a vision, of a scenario, of an objective, etc. and it is made by each factor separately.
- Comprehensive aspect: It is based on individual plans and it implies the use of versatile tools, by means of which policies and objectives in common to each individual plan are unified and the comprehensive plan of action and support is produced. Based on the comprehensive plan the role of all factors in a single development plan is defined and guidelines are given to adjust individual plans in order to accomplish better results.
- Control aspect: It is important to establish one efficient flow of information towards all the factors, setting up control mechanisms in order to prevent information from losses, misuse, or abuse.
- The control aspect is repeated in all the segments and it is particularly present in the third one.

2.2.2 Second segment - action:

- Individual aspect: in the second segment individual factors are carrying out what has been planned. It is assumed that all the factors have harmonized their action plans in order to increase effectiveness.
- Comprehensive aspect: In parallel with realization of individual plans, elements of the comprehensive plan are also carried out. The basic factors which carry out this part of the plan are authorities at all levels and public institutions. The objective is to create adequate conditions for realization of individual development plans.
- Control aspect: It is present in all the elements, as it has been said for the previous segment. The control aspect, among other things, includes:
- Control of the cooperation policies implementation – what is the form of and the motive for cooperation among the factors,
- Control of the local resources use and improvements,
- Control of the business environment improvements,

- Control of the innovations and development activities effects,

2.2.3.Third segment - control:

- Individual aspect: progress of the realization of individual plans is analyzed, problems and discrepancies are identified and the basis for resolving them is defined.
- Comprehensive aspect: Harmonization of individual plans with the comprehensive one is subject of the analysis. Progress in realization of both plans is checked, as well as their comprehensive effects.
- Control aspect: The special emphasis is put on the data loss prevention and on the prevention of misuse or abuse of information.

2.2.4 Fourth segment – adjusting and harmonizing:

- Individual aspect: Activities are taken in order to correct the identified discrepancies, adequate measures are taken towards modification and harmonization of what has been set up as an objective and of what has been achieved and the experience database is produced, based on which a new planning cycle will be launched.
- Comprehensive aspect: Activities are taken aiming to correct the identified discrepancies in realization of the comprehensive plan; support is provided to enterprises to carry out their plans and to resolve the identified problems.
- Control aspect: The special emphasis is put on monitoring" the what has been planned – what has been done ratio".

2.3 Plan formulation

Plan formulation - individual aspect

The current condition of the economic development factors is analyzed, and then, based on this analysis, an annual development plan is prepared for each factor separately, following the following structure:

- Development and harmonization of process/business structures – which processes should be improved, which processes should be established, which processes should be carried out in cooperation with other factors
- Development of the physical infrastructure which follows process development and enables cooperation among the economic development factors
- Development and harmonization of organizational structures – how to harmonize the organizational structure in order to enable effective and efficient process implementation and to enable better cooperation with other factors
- Development and training of management structures – to establish PDCA cycle of improvement in all management processes, to familiarize and to train the management structure on how to establish effective and efficient cooperation with other development factors
- Development of the business environment in which innovations are created by means of "new fusion" – development projects and business activities initiated and carried out through cooperation with other factors that affect the economic development
- Construction of the business network, in fact of one "network in which each face is visible" (development of widely based development and promotion organizations) and expanding cooperation with local organizations which provide support to businesses

Plan completion scenario, time plan and objectives that are supposed to point at what has been the original idea, must be defined by each plan.

Plan formulation - the comprehensive aspect

Networking: Cooperation with local authorities and organizations which provide support to businesses (in particular with organizations for support at regional level), improvement of the promotion system.
R&D: Improvement of cooperation among enterprises, scientific research institutions, technology licensing organizations, developmental and experimental laboratories and public institutions and intellectual property protection.
Market processing: Using the existing distribution systems, trade companies, IT, etc., cooperation with marketing specialists, and similar activities.
Cooperation with financial institutions: Connecting with banks and improvement of their role and function.
Human resources improvements: Selecting and developing experts from different areas of expertise, professional development of employees working for enterprises as well as for other organizations and institutions.
Establishment of cooperation with all those ministries whose role and activities are very important for the businesses.
Setting up of operative multidisciplinary teams whose members are employed with different organizations, who might get involved in resolving concrete problems, designing projects or carrying out particular activities important for the economic development.
Business and development oriented cooperation with international organizations foreign markets analysis and processing and enabling transfer of information.

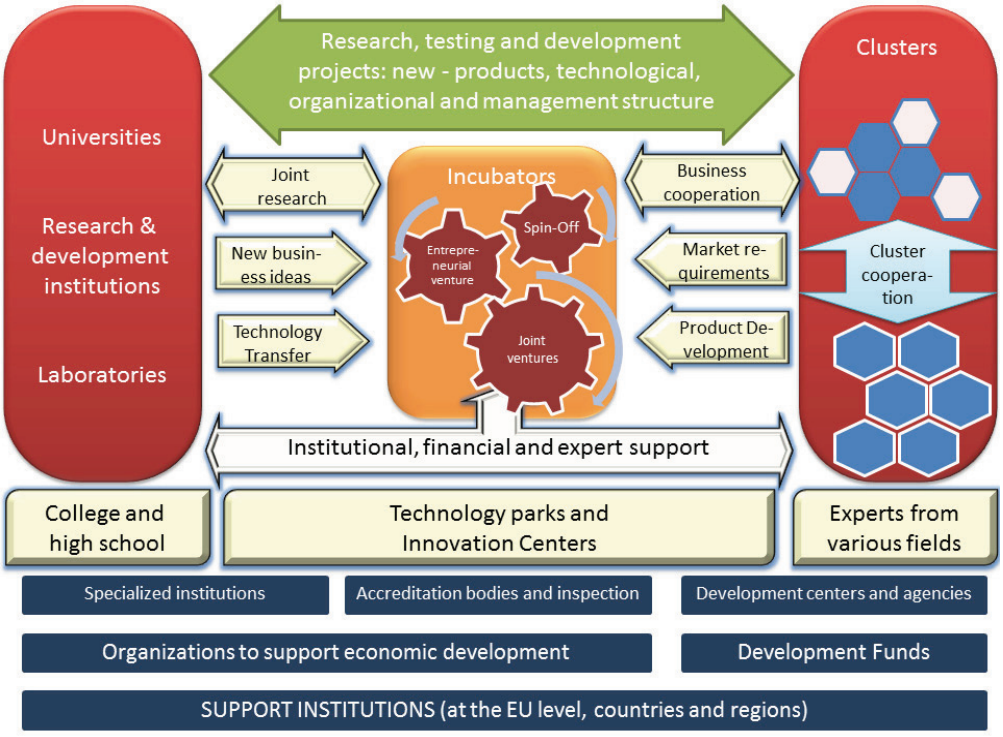


Figure 1. Platform for cooperation

2.4 Expected results and indicators

The following results are expected to take place:

- Experts network register
- Support institutions network register
- Designated contact persons at support institutions, trained to cooperate with universities, clusters and incubators
- Easier access to information on measures taken by the authorities
- Easier understanding of business trends (at regional, national and global level)
- Greater opportunities for interaction with universities and research institutions
- Easier access to information that might lead to starting a new business
- Wider HR network in a new business area
- Greater R&D efforts
- Expanding of existing HR networks
- Obtaining the needed technology
- Launching new products and commodities
- Increase in a new demand and in trade volume
- Development of existing enterprises
- Greater opportunities for cooperation with trade companies, etc.
- Greater opportunities for cooperation with financial institutions
- Easier access to funds
- Easier access to human resources
- Easier access to information that might lead to starting a new business

The overall results can be monitored through the following indicators:

- Number of newly-formed enterprises,
- Sales volume in a particular industry in the region,
- Number of initiated business ventures,
- Number of initiated development projects,
- Number of agreements on cooperation concluded among enterprises,
- Number of agreements on cooperation concluded between enterprises and development organizations etc.
- Number of trained participants – trainings, seminars, practice etc.
- Number of new jobs,
- The total capital turnover in a particular industry of the region
- Export volume per industries and total export volume of the region.

Cooperatin network – establishment of its basic development principles
The economic development of one country is affected by numerous and different factors, such as:

- organizations: enterprises, support organizations, development agencies, laboratories, scientific, research and educational institutions, professional and business associations, business networks, business incubators, clusters, authorities at all levels etc.
- population (labor force), natural resources (subject of labor/objects transformed by labor) and means of labor, and

- factors characterizing the current situation and enabling effective and efficient use of resources: tradition, mindset, culture, knowledge, awareness etc.

Business incubators and clusters play a decisive role in economic development of underdeveloped regions. However, the mere presence of them is not enough to get the complex development spiral started. The strength and dynamics of their action and the total development potential depend on how developed the relations among enterprises, universities, authorities, development agencies and all the other economic development factors are, and on nature of those relations. The economic development concept is based on these relations. Inter-organizational networks are neither run by market forces nor by hierarchic structures. It is assumed instead that one party depends on resources controlled by the other one. And only together they can accomplish successful results.

3. Conclusions

Foundation of the economic development factors cooperation network and, primarily, establishment of cooperation among business incubators and clusters will have enormous impact on the economic development of the Northern Vojvodina region. Gathering information and creation of specific ties among public and private sector, different industries, research institutions and universities is a significant and responsible process whose effects have positive impact on the competitiveness of enterprises in the long run. In order to make this process continuous it is necessary to provide the information system and to strengthen it – database, training and vocational training of the staff that is in charge of the network setup, promoting such an approach as well as enabling and fostering cooperation among all the factors through participation in development projects.

Clusters and business incubators play a central role in creating networks. It is important to have them moving in the right direction. In order to improve their organizational structure and to strengthen their role and significance, there is a need for financial independence, which in addition to support that they get from the authorities, development programs and funds, also includes their own financial resources based on services delivered. Revitalization and economic and infrastructural development projects at local, regional, national and international level should be used to get the professional staff, experts, involved and trained, to procure modern equipment, to build laboratories, to implement standards etc. The medium and the long term task is to increase the number of services that have been offered in order to provide financial independence.

Successful activities and cooperation between business incubators and clusters is possible to achieve through cooperation with local authorities, public companies, local organizations which provide support to businesses, universities and through their support. It is necessary to establish information flows which will enable the “right” information to be received “on time” at the “right“place.

Based on the above-mentioned, the following actions are proposed:

- Establishment and development of cooperation networks
- Meeting conditions and fostering of technical and technological development
- Incubation of new enterprises
- Lack of information on market needs, demands and opportunities
- Provision of funds for development projects
- Human resources development

Businesses of the Northern Vojvodina (and that goes for the rest of Serbia) need highly concentrated cluster and business incubator activities, supported by all institutions. Projects covering this area require strengthening of cooperation with “basic” activities, from the city authorities’ level all the way to the regional one, in line with the defined action guidelines.

Cooperation among different industries, universities and enterprises in the country and abroad should be promoted. Management staff development and training programs should be introduced while promoting and ensuring mobility of managers.

References

1 Kirchweger D., Preisinger H., Profile of Services rendered by Serbian Incubators, Tech2b, Linz, January 2011
2. Morača S., Mihalj S., Lanji Hnis I., Kirchweger D., Action plan, Anex 1. Platform for cooperation, Center for concurency and Claster development, Novi Sad 2011
3. Morača S., Mihalj S., Lanji Hnis I., Kirchweger D., Cooperation Platform factor of economic development, Novi Sad 2011
4. Miljašić D., Analysis of the situation of business infrastructure in Republic of Serbia, National agency for Regional development, 2011
5. Vasin M., Competitiveness and cluster development in Vojvodin,a Provincial Secretariat for Economy, Employment and Gender Equality, Novi Sad 2012

WOMEN ENTREPRENEURSHIP IN BURSA

Alper ALTAN[1], Tamer DEĞİRMENCİ[2], Mehmet Sait CÜLFİK[3]

1 Bursa Eskişehir Bilecik Development Agency (BEBKA), alper.altan@bebka.org.tr

2 Bursa Eskişehir Bilecik Development Agency (BEBKA), tamer.degirmenci@bebka.org.tr

3 Bursa Eskişehir Bilecik Development Agency (BEBKA), mehmet@bebka.org.tr

Women's entrepreneurship is recognized as an important untapped source of economic growth in the last decades. Although women create new jobs and provide society with different solutions to management, organization and business, they still represent a minority of all entrepreneurs not only in Bursa but also in Turkey. For this reason we made a study that aims to define the profile, the work experience, the family life and the obstacles of women entrepreneurs. After investigating these subjects, it has been found that women cannot unite together and create organizations to act as a group. This was determined as one of the biggest obstacles to women entrepreneurship especially in rural areas.

In this study, we offer a model based on establishing a women's association in rural areas which is encouraged by public authorities and granted by regional development agency to overcome this problem. A practical application in three villages was investigated. As a result, the women in these three villages got trained, found their associations, started their business. They produced souvenir and local food in their villages and sold them at touristic areas with coordination of their association. In our study, establishing a federation to bring together these village associations to create better cooperation among the villages and have better competitive advantage was investigated. Also, other future projects for development and sustainability of these organizations were offered.

Keywords
Rural area, Women association, Women entrepreneurship, Development Agency

1. Introduction

Entrepreneur is briefly defined as a person who has one or a few workplaces as a self-employer or a share-holder, who makes decisions about the production, marketing and all other operating activities of a good or service, and implement them, and who has a say in the gain. This definition is also valid for women entrepreneurs and it has taken part in many studies. Women's entrepreneurship recognized as an important untapped source of economic growth in the last decades. Although women create new jobs and provide society with different solutions to management, organization and business, they still represent a minority of all entrepreneurs not only in Bursa but also in Turkey. For this reason we made, firstly, a study that aims to define the profile, the work experience and the obstacles of

women entrepreneurs. Then a model is presented to overcome the obstacles of women entrepreneurs. And finally the results of a practical application are presented.

2. Analysis of Women Entrepreneurs

The study performed with 567 women entrepreneurs who operate actively in Bursa and its districts. The entrepreneurs are chosen randomly in coordination with Bursa Chamber of Commerce. A questionnaire is carried out face-to-face with women entrepreneurs in their offices, from various business sectors. Only 90 questionnaires are performed by using telephone. There were several questions asked to entrepreneurs to identify their profile, family life, experience and obstacles. The questions are tested and modified according to pre-test results.

Primarily, age structure of women entrepreneurs is examined. The average age of women entrepreneurs is 40 years. As seen on the Table 1, most of the women entrepreneurs are middle-aged, 73% of entrepreneurs ages are between 30 and 49. The level of education for women entrepreneurs is also shown on Table 1. 32.3% of them have a high school degree and 31.2% of them have a bachelor's degree. Primary school graduates cannot be neglected as their rate is 19.8%. According to survey results the marital status of participants are inquired and an interesting result is detected. 70.2% of women entrepreneurs are married.

Table 1 Profile of Women Entrepreneurs

Age Structure			Level of Education			Marital Status		
Age<20	2	0,4%	No School	2	0,4%	Married	398	70,2%
20-29	65	11,5%	Primary School	112	19,8%	Single	105	18,5%
30-39	202	35,6%	Secondary School	66	11,6%	Widowed	26	4,6%
40-49	212	37,4%	High School	183	32,3%	Divorced	38	6,7%
50-60	82	14,5%	Bachelor's Degree	177	31,2%			
Age>60	4	0,7%	MSc/PhD Degree	27	4,8%			

Several questions were asked to entrepreneurs about their experience. Most of the participants were workers in another company before they started to do their business. 38.1% of participants were workers in another company and 24.9% of them were unemployed. An interesting result about women entrepreneurs are about their business establishment. 62.4% of women entrepreneurs started their business from scratch. Nearly fifty percent of all participants learned about their business by working. The summary of the results are shown in Table 2.

Numerous questions were asked to the participants to investigate the obstacles that they faced while establishing their business as women. It has been found that the lack of capital is one of the biggest obstacles as a percentage of 55.8%. Lack of experience, lack of courage and lack of family support are the other obstacles. 51.9% of women entrepreneurs has used their own financial resources to establish their business. Only 0.7% of them have got grant or credit from the government. The detailed answers are shown in Table 3.

After analyzing all of the results, it has been found that the biggest obstacle is the lack of capital but the root cause is that women cannot unite together and create organizations to act as a group especially in rural areas. Women in rural areas don't have capital, don't have

experience, and don't have courage. This was determined as one of the biggest obstacles to women entrepreneurship. To overcome this problem, we offer a model based on establishing a women association in rural areas which are encouraged by public authorities and granted by regional development agency.

Table 2 Experience of Women Entrepreneurs

Previous Job			Establish of Business			Learn Business		
Student	85	15,0%	Started from scratch	354	62,4%	Learned by working	282	49,7%
Unemployed	141	24,9%	Started with my family support	161	28,4%	Get training at school	98	17,3%
Worker in another company	216	38,1%	Started from scratch with partners	19	3,4%	Taken course about job	43	7,6%
Owner of another firm	117	20,6%	Family-owned business	14	2,5%	Learned from family	124	21,9%
Other	8	1,4%	Taken over from another person	19	3,4%	Learned from partners	20	3,5%

Table 3 Biggest obstacle and Source of Finance of Women Entrepreneurs

Biggest obstacle			Source of finance		
Lack of Capital	318	55,8%	Self	296	51,9%
Lack of Experience	119	21,0%	Support of Family	192	33,9%
Lack of Courage	81	14,3%	Bank Credit	59	10,4%
Lack of Family Support	25	4,4%	Support of Friends	15	2,6%
Other	24	4,2%	Government Grants/Credits	4	0,7%
			Other	1	0,2%

3. The Model

Our suggested model, as a result of the declaration of financial support from the Bursa, Eskisehir, Bilecik Development Agency, and also through the support of Bursa Nilufer District Special Provincial Administration and other institutions this project of the development of entrepreneurship for women living in three villages, has emerged as a success. Being one of the greatest obstacles to women's entrepreneurship the lack of capital can be overcomed with the support of the state. However, women as an individual are not entitled to apply and

benefit from these incentives and since they are not in a sufficient capacity to institutionalize, it is proposed that they constitute a legal entity by coming together. Especially the village women by coming together and forming associations show that they are strong both in financial and institution aspects. Project-based activities of these associations should be financed by development agencies or through other supporting institutions and by fixed investment and working capital will be created and later revenue oriented activities will be performed.

The case study described here, the applicants of the promotion of entrepreneurship of village women is the special provincial administration. However, in order to have a successful execution of the projects, a need of an establishment of a village women's association emerged and the association was established.

The applicants carrying out the project, the village women, and support mechanisms are taking into account to support village women's entrepreneurship a proposed flow model is listed below.

1. Determining rural areas that have the potential of entrepreneurship
2. Determining what women can produce such as local food, souvenirs, crafts to market and identifying which women can do this job.
3. To ensure women to establish an association
4. The application to appropriate headings to get support from agencies and other government supports
5. Following the success of the application for the project, firstly after the fixed investment and training, the establishment of a executing marketing activities for a sustainable system are needed

The analysis and the identification of problems are taken into account and regional development agency (BEBKA) calls for project proposals prepared by the priorities of the development of women's entrepreneurship in our region are also added. These support programs, such as tourism and other service sectors, especially for women living in rural areas, fostering entrepreneurial activity.

Information about the two projects developed and implemented under the support programs and the results of the project are presented in the next section.

4. Sample Study

The two projects that were supported by the regional development agency and executed in three villages in rural areas of Bursa is a great case example of women entrepreneurship in rural areas.

Bursa Eskişehir Bilecik Regional Development Agency (BEBKA) prepared grant programs based on the Regional Development Plan and research that was done about women entrepreneurship. These grant programs were announced in 2010 and 2011 and aimed to improve women entrepreneurship, increase the social and economic status of women in the region and also support the tourism sector. The two projects that were prepared by the Governorship of Bursa and the Governorship of Nilüfer District and executed in three villages Doğancı, Atlas and Dağyenice with the support of the regional development agency BEBKA.

The three villages where the projects were executed are very close to the area that was declared as a Tourism Region by the Ministry of Tourism and Culture. After this legal regulation, this area is under control of the Ministry of Tourism and Culture and there are very attractive government incentives available for tourism investors. In the near future, big tourism investments are expected in the region and this will increase the number of tourists who visit this area. For that reason, the two projects that were targeted to the tourism sector has a strong potential for sustainability.

These two projects were supported by regional development agency BEBKA under two different grant programs and they are completed in two phases.

In the first phase of the project, patterns, designs and art drawings that were used in the history of the three villages were researched and collected. These are examples of local art that were used on clothes made by women who lived in these villages and they are known by only a few people today. The researched and collected patterns and designs were prepared by the artists for reproduction and they were archived. For the next step, the workshops were prepared to produce souvenirs that were special to the region by using these patterns and designs. These workshops were located in the village school buildings that were not used today. After that, the training programs started to teach women how to make local souvenirs. Total 30 women were trained during the 144 hours on stitching, embroidery, knitting and other subjects. The local souvenirs that were made during these training programs were exhibited and promoted in different locations in the region.

After the first phase, women of these three villages decided to get together and form an organization. Their goal was to develop their production and marketing skills, promote their products and train more people. To reach these goals, they established village women's associations. They also started to work to produce and sell local food.

At the second phase of the project, the machinery and equipment that were needed to make new and different items were purchased. Additional training programs targeted at higher quality and productive production were organized. After these activities, a production system was developed and more products with higher quality could be produced in a shorter time. Also, women got supportive training about maintenance and safety. In this phase, another training program that was executed was about entrepreneurship and marketing. During the 400 hours of training, women have learned the basic subjects of preparing a business plan, cost accounting, customer relationship and marketing techniques.

As a result, with approx. 203.000 TL support from BEBKA, three workshops were established in three villages, total 90 women from these villages got training about producing souvenirs, entrepreneurship, marketing and village women's associations were established. These associations have been continuing their activities on producing souvenirs and local food with the support of local authorities. As an example, they got new souvenirs orders from five star hotels in Bursa.

The presented case is a great example of the model that supports women entrepreneurship in rural areas.

5. Conclusions and Future Projects

The results of the analysis, is that the biggest obstacle for women's entrepreneurship is the lack of capital, and the root cause has been found that not being able to come together and act together. To contribute to the solution of this problem and to support women's entrepreneurship BEBKA prepared and announced financial support programs. For women living in the villages of Doğancı, Atlas and Dağyenice the Bursa Nilufer District Governor's Office applied two project applications each a year apart and both were found to be successful supported by the agency. As a result of these projects, training was given on the production and design of local dress and sample studies were conducted and supplied with the necessary equipment for mass production and marketing activities were funded. With the establishing associations, these village women begun to perform their activities under the roof of this legal entity. In this context, products manufactured for sale in tourist areas and in doing so started to bring income.

With this example, the proposed model is inspired by the potential of rural areas and to identify local products produced in these areas is proposed.

Women living in areas with the potential and become an association can prepare and apply for financial support from the agency and other government areas for education, product design, and the attainment of mass production equipment, supply and marketing activities. After this stage, the sale of products in tourist areas will be generating income.

By coming together of these established associations creating a federation across the province and in this way to reach a wider audience on this topic is one of the future works. Another future work is the establishment of a center operated by women where they can exhibit and sell their products. And also this center will have a training and advisory function and also be a social establishment. Economic sustainability can be provided by this center.

References

1 Bursa Kadın Girişimcilerini Arıyor, Project Report

2 Doğancı,Dağyenice,Atlas Köy Kadınları Girişimcilik Projesi, Project Report

3 Geçmişin Motifleri Gelecekle Buluşuyor Projesi, Project Report

WOMEN ENTREPRENEURSHIP IN WESTERN BALKANS AND TURKEY – INSTITUTIONAL FRAMEWORK, INCENTIVES AND INITIATIVES

Ana S. Trbovich[1], Jana Subotich[1], Danijela Lalich[2]

[1] Singidunum University - Faculty of Economics, Finance and Administration, Belgrade, Serbia, atrbovic@fefa.edu.rs; jsubotic@fefa.edu.rs
[2] University of Novi Sad, Novi Sad, Serbia,

Abstract
Entrepreneurship is one of the tools for transition countries and aspiring EU members such as Western Balkans and Turkey to accelerate economic development and create new employment. Women entrepreneurship in particular is relatively weak in these countries. In transition economies position of women is additionally difficult and women have more challenges to face if they want to start their own business. This paper will therefore study the institutional frameworks, incentives and government and non-government initiatives, based on comparative analysis using available OECD data, and country-specific data. In Western Balkans and Turkey data on women entrepreneurship is still scarce, which is why the synthesis and deduction from available data will contribute to understanding the development of women entrepreneurship in this region.
Keywords: OECD, Transition, Turkey, Western Balkans, Women Entrepreneurship

1. Introduction: Factors Impeding and Developing Women Entrepreneurship

Entrepreneurship is gaining increasing importance in transition countries, with emerging awareness that development of small and medium enterprises is the essential premise for growth, especially in light of decreasing foreign investment in the aftermath of the world economic crisis. Yet the concept of entrepreneurship continues to require clarification.

The French economist Richard Cantillon is generally accredited with being the first to coin the phrase in the context of what we view today as entrepreneurship in about 1730. Loosely, he defined entrepreneurship as self-employment of any sort, and entrepreneurs as risk-takers, in the sense that they purchased goods at certain prices in the present to sell at uncertain prices in the future. [1] Entrepreneurship is also defined as the mindset and process to create and develop economic activity by blending risk-taking, creativity and/or innovation with sound management, within a new or an existing organisation. [2] The link between entrepreneurship and small and medium enterprises' development has also been established in past literature. For instance, Wells et al point out that the emergence of a small and medium enterprise sector and conditions supporting new business are key elements, and entrepreneurs or business owners are essential actors in any new market economy. Long-term success in economic development, particularly in developing economies, depends to a significant degree on a growing network of small entrepreneurial enterprise and human capital in the person of an entrepreneur. The dramatic worldwide increase in the number of women starting businesses in recent years is reflected in increased research on women and entrepreneurship. [3] If we try to define a women

entrepreneur it would be that woman entrepreneur is a person who has shown enterprise, with an eye for opportunity, willingness to take risks, a commercial acumen, and through her enterprising skills and innovativeness can generate employment for others, can create wealth and who has set a new trend in the country in the efforts directed at entrepreneurship development in varied walks of life, particularly in industry, service and business. [4]

OECD has identified enterprise development and entrepreneurship as key drivers of economic growth in OECD member and non-member economies, at both the national and sub-national levels. In this context, women's entrepreneurship represents an untapped "reservoir" for job creation, economic growth and social cohesion. Consequently, it was concluded that women's entrepreneurship and ensuring a favourable Entrepreneurial Business Environment for the start-up and expansion of women-owned businesses should become an issue of strategic importance for governments. [5].

The perception of women entrepreneurship in a particular country depends on several factors. The first stems from prevailing culture, since in many countries women are still primarily associated with family and household responsibilities. Further, the entrepreneur role is often characterised as being more masculine than feminine. This leads us to the second factor and that is gender inequality. Gender inequality creates forces that may increase or decrease the level of women's participation in entrepreneurship. For example, participation of women in entrepreneurial activities may result from their increased participation in the labour market as a whole. But an increasing proportion of female entrepreneurs may also result from labour market discrimination or "glass ceiling" career problems. [6][5] Gender inequality, cultural factors, level of transition, social norms, overall percentage of women in workforce will impact the number of female entrepreneurs. Baughn, Chia and Neupert have suggested that female entrepreneurship would possibly be devalued in a country not because of sex-role stereotyping or gender discrimination, but because entrepreneurship itself is not held in high regard. Differences in the social acceptability of an entrepreneurial career have been noted by a number of researchers examining national differences in entrepreneurship. [6]

Strong social and cultural barriers, and a woman's traditional role centring around family may discourage women from taking up gainful employment. Yet economic independence is essential for social and political empowerment of women. As job opportunities are becoming scarcer and market ever more demanding, more efforts are also required to foster woman entrepreneurship. Entrepreneurship for women is not only considered as a powerful tool to facilitate their direct participation in income generating activities but also as a tool to foster self-reliance, to tap their potentials and to enhance the sense of achievement and self-esteem. Entrepreneurship by definition implies control of one's life and activities, which had historically been denied to women. [7]

Women have been reported to have a myriad of motives for becoming entrepreneurs, including both the so-called "push" motivations such as economic necessity, job security or job discrimination, as well as the so-called "pull" motivations such as the desire for balance between work and personal responsibilities, greater challenge and achievement, greater independence and autonomy, greater job satisfaction or personal fulfilment, better control, greater recognition or equality, and/or simply the desire to be financially successful. Entrepreneurship can, and does, then seem to offer a compelling career opportunity for many women. [8]

Women-owned businesses are a powerful force in today's developed economies. Women own around 30% of all businesses in the United States and the patterns are similar in other countries. In Canada, female entrepreneurs represent around 40% of business owners. Over

one-quarter of business owners in the United Kingdom are women, which is on a par with most Northern European countries. All around the world women are starting and operating their own businesses in record numbers. [10]

2. State of Women Entrepreneurship in Western Balkans and Turkey

As explained above, how women entrepreneurs establish and develop their enterprises, among other factors, depends on the broader cultural context as a reality basis for their identity. The transition of Eastern European communist societies since the 1990s has created new entrepreneurial traditions and a new business culture in those countries. [9] One can make the same deduction for the region of Western Balkans and Turkey, which have also undertaken reforms toward market economy, in hope of reaching the overarching goal of European Union membership. In that context, EU policies to support women entrepreneurship are of direct relevance to the region.

Global Entrepreneurship Monitor (GEM) is the world's leading research consortium dedicated to the understanding of the relation between entrepreneurship and national economic development. For the past ten years GEM reports have been the only source of comparable data across a large variety of countries on attitudes toward entrepreneurship, start-up and established business activities and aspiration of entrepreneurs for their business. [11] Data from two GEM reports from 2009 and 2012 will be compared for the purpose of this paper. The GEM 2009 Global Executive Report includes 54 countries across the globe. In each of these 54 countries, a survey was conducted among a representative sample of at least 2,000 adults. More than 180,000 adults were interviewed between May and October (outside holiday seasons) and answered questions on their attitudes toward and involvement in entrepreneurial activity. [11]

Table 1. Entrepreneurial attitudes and perceptions in Western Balkans countries and Turkey in 2009 and 2012 in %

Countries	Perceived Opportunities 2009/2010	Perceived capabilities	Fear of failure	Entrepreneurial intentions	Entrepreneurship as a good career choice	High status for successful entrepreneurs	Media attention to entrepreneurship
Albania							
Bosnia and Herzegovina	35/38,3	57/62.5	32/27,4	17/16,8	73/76	57/63	51/47,6
Bulgaria							
Croatia	37/23,3	59/53,2	35/31,2	8/7,4	68/67,1	49/49,9	53/41,8
Macedonia	-/34.3	-/59.7	-/30.9	-/26.7	-/71.3	-/66.2	-/56
Montenegro	-/36.1	-/70.9	-/30.4	-/31.9	-/81	-/68.4	-/69.5

Countries	Perceived Opportunities 2011/2012	Perceived capabilities	Fear of failure	Entrepreneurial intentions	Entrepreneurship as a good career choice	High status for successful entrepreneurs	Media attention to entrepreneurship
Albania							
Bosnia and Herzegovina	20.5/20	48.9/49	30.5/27	17.2/22	82.2/81	71/72	42.7/39
Bulgaria							
Croatia	18.3/17	49/44	34.3/36	17.9/19	65.3/64	46.9/42	40.9/40
Macedonia	-/31	-/55	-/39	-/28	-/70	-/67	-/64
Montenegro							
Romania	36.1/37	41.6/38	36.1/41	24.7/27	67.9/71	69.4/74	56.7/55
Serbia							
Turkey	32.4/40	42.1/49	22.5/30	8.5/15	-/67	-/76	-/57
Romania	14/17.5	27/38.2	53/41.1	6/8.6	58/66.5	67/65.5	47/46.9
Serbia	29	72	28	22	69	56	56
Turkey	-/36.1	-/54.2	-/25	-/19.4	-/71.2	-/76.4	-/61.7

Source: [11] [12] [13] [14]

Notably, Albania and Bulgaria have not been included in the analysed countries, while the last report where Serbia was included and analysed is GEM 2009. The reports demonstrate that perceived opportunities are at a low level in Western Balkans countries and Turkey, but that perceived capabilities for entrepreneurship are at high level in all countries except Romania. Fear of failure is not dominant in these countries and entrepreneurship is seen as a good career choice in Bosnia and Herzegovina (76% in 2010), Macedonia (71.3%), Montenegro (81%), and Turkey (71.2). These results are less significant in the later report, but it is notable that entrepreneurial attentions are at higher level in 2011/2012 in comparison to 2009/2010 in all countries except Turkey. The results of the GEM process also indicate that respondents consider that entrepreneurs are not gaining sufficient media attention.

In the separate analysis of entrepreneurial activity, the central indicator is the Total Entrepreneurial Activity (TEA) rate. TEA rate consists of the percentage of individuals aged 18 – 64 years in an economy who are in the process of starting or are already running new businesses. [14] Necessity-driven % of TEA and improvement- driven opportunity of TEA also present important indicators for analysis of entrepreneurial activity.

Table 2 Entrepreneurial activity in Western Balkans countries and Turkey from 2009 to 2012 (%)

Countries	Nascent entre. rate 2009/2010	New business ownership rate	Total early-stage entre. activity (TEA)	Established business ownership rate	Discontinuation of business	Necessity-driven % of (TEA)	Improvement-driven opportunity (% of TEA)
Albania							
Bosnia and Herzegovina	3.1/4.1	1.3/4.1	4.4/7.7	3.9/6.6	3.1/4.7	39/47	20/30
Bulgaria							
Croatia	3.5/3.8	2.2/1.9	5.6/5.5	4.8/2.9	3.9/4.5	37/32	39/49
Macedonia	-/4.4	-/3.6	-/8	-/7.6	-/3.7	-/59	-/23
Montenegro	-/12	-/3.1	-/14.9	-/7.8	-/7.3	-/37	-/38
Romania	2.8/3.3	2.3/1.1	5/4.3	3.4/2.1	3.6/2.6	34/31	31/47
Serbia	2.2/-	2.8/-	4.9/-	10.1/-	1.9/-	41/-	46/-
Turkey	-/3.7	-/5.1	-/8.6	-/10.7	-/4.6	-/37	-/47

Countries	Nascent entre. rate 2011/2012	New business ownership rate	Total early-stage entre. activity (TEA)	Established business ownership rate	Discontinuation of business	Necessity-driven % of (TEA)	Improvement-driven opportunity (% of TEA)
Albania							
Bosnia and Herzegovina	5.4/5	2.8/3	8.1/8	5.0/6	6.7/7	61.3/58	21.7/20
Bulgaria							
Croatia	5.3/6	2.1/2	7.3/8	4.2/3	3.6/4	35.3/34	30.7/36
Macedonia	-/	-/	-/	-/	-/	-/	-/
Montenegro	-/	-/	-/	-/	-/	-/	-/
Romania	5.6/6	4.5/4	9.9/9	4.6/4	3.9/4	41.3/24	34.4/38
Serbia							
Turkey	6.3/7	6.0/5	11.9/12	8/9	3.9/5	31.6/31	44.8/55

Source: [11] [12] [13] [14]

The relatively low level of nascent entrepreneurship rate, new business ownership rate, TEA and established business ownership rate denotes a rather limited entrepreneurial activity in

Western Balkans countries and Turkey. On the other hand, higher necessity-driven % of TEA and improvement-driven opportunity of TEA, indicates that respondents recognise necessity and opportunities for new entrepreneurship ventures.

One more important indicator is TEA by Gender for geographic regions. Interestingly, in 2012 we see that the smallest difference in TEA by gender was in Non-European Union countries (in the report these are Bosnia and Herzegovina, Croatia, Macedonia, Norway, Russia, Switzerland and Turkey). For example TEA average for EU as % of adult population of 10 Male TEA and f5 Female TEA. If we study the available data for Macedonia, Bosnia and Herzegovina, Croatia and Turkey we can see that they are similar or above EU female/male ratio of entrepreneurially active adult population, except Macedonia which is below average. Macedonia is below EU average -9 Male TEA vs. 5 Female TEA, Bosnia and Herzegovina is at EU average – 10 Male TEA vs. 5 Female TEA, Croatia is above EU average - 12 Male TEA vs. 5 Female TEA, Turkey is above EU average - 17 Male TEA vs. 7 Female TEA. [14]

In order to assess the national conditions influencing entrepreneurial activity at least 36 experts in each country have completed a closed questionnaire on factors relating to entrepreneurial environment. [GEM 2012} Analysed factors include: entrepreneurial finance, entrepreneurial education, entry regulations, government policy, research and development, physical infrastructure, government entrepreneurship programs, commercial and legal infrastructure, cultural and social norms. In 2012 in Bosnia and Herzegovina, Croatia, Macedonia and Turkey finance, government policy and programmes, education and R&D transfer were rated as negative. In Bosnia and Herzegovina, Croatia, Macedonia commercial infrastructure and legal infrastructure were assessed as positive, while in Turkey physical infrastructure and cultural and social norms are also seen as positive factors.

Table 3 Employment rates - %, 2008-2012

	Female	Male	Total
Albania	50	71	60
Bosnia and Herzegovina	35	59	46
Croatia	48	60	53
Macedonia	43	69	56
Montenegro	...	...	...
Serbia	51	67	59
Turkey	28	71	50

Source: [15][16]

Table 4 shows participation of women in business ownership, management and workforce in Western Balkans and Turkey to be significantly below their demographic potential.

Table 4 Female participation in business ownership, management and work force

	% of firms with		Proportion of permanent full time (%)	
	Female ownership	female top managers	workers that are female	non-productive workers* that are female
Albania (2007)	10.8	...	37.5	8.9
Bosnia and Herzegovina (2009)	32.8	13.5	32.2	13.8
Croatia (2007)	33.5	...	35.7	12.6
Kosovo* (2009)	10.9	0.3	18.5	4.7
Macedonia (2009)	36.4	19.1	32.4	8.6
Montenegro (2009)	26.0	24.5	51.3	16.7
Serbia (2009)	28.8	15.9	33.9	17.7
Turkey (2008)	40.7	12.4	24.9	6.7

Source: [17]

Women entrepreneurship is additionally evaluated through the Small Business Act assessment, with most countries/entities in the region scoring a relatively low average (on a 5-level scale, 1 being the weakest and 5 the strongest).

Table 5 Scores for Sub-dimension 1.2: Women's entrepreneurship

	ALB	BIH	CRO	KOS*	MCD	MNE	SRB	TUR
Policy support framework for promotion of women's entrepreneurship	2.50	3.00	3.00	1.50	1.50	3.00	3.00	2.50
Training for women's entrepreneurship	1.50	1.50	2.50	1.00	2.50	1.50	2.00	1.50
Financing for women's entrepreneurship	3.00	2.50	3.50	1.50	1.50	2.50	2.50	2.50
Network for women's entrepreneurship	3.00	1.00	4.00	2.50	2.50	3.00	3.00	2.50
Overall weighted average for 1.2	**2.50**	**2.00**	**3.25**	**1.75**	**2.00**	**2.50**	**2.50**	**2.25**

Source: [18]

In the OECD report, SME Policy Index: Western Balkans and Turkey - Progress in the Implementation of the Small Business Act for Europe, policy support framework, training, financing and network for women entrepreneurship are benchmarked as building blocks of institutional infrastructure support. The report stresses that effective development of women's entrepreneurship requires a comprehensive set of gender-sensitive policies covering economic, social, fiscal, education and employment policies. [18] It is also noted that policies rarely address all the policy areas equally and that efforts supported by the United Nations Development Programme to establish policy frameworks, action plans and support institutions to promote gender equality in countries like Albania, Bosnia and Herzegovina and Serbia provide good basis to bring forward policy dialogue and where the competitiveness perspective could be more developed. All this should be implemented so that women's entrepreneurship can be indicated as a pre-condition for growth-oriented economies and improved employment. [18] Assessment of provided trainings found trainings to be underdeveloped, and that systematic development and support is required to enhance skills that make an entrepreneur. The report concluded that special attention should be paid to designing trainings for women entrepreneurs based on specific needs. There was insufficient information about the demand and supply of financing for women's entrepreneurs. One of key recommendations therefore has been that all regional economies should develop better statistics on lending, grants guarantees and particularly how budgetary support could be better steered towards more women entrepreneurship. [18] Access to finance should be further explored as a factor determining the level of entrepreneurial activity especially since a more detailed UN study for Serbia found that in Serbia perception of difficult access to finance was significantly higher than in the European Union [19]. The same study also indicated gaps in formal education in either educating about entrepreneurship or encouraging this activity.

Women entrepreneur networking is of importance because it provides an opportunity for sharing best practices. Notably, women entrepreneurs who regularly cooperate with other companies have 30% higher probability to succeed and sustain their business [19]. All the countries in the region have made a step forward to strengthen networking by joining the EU network of female entrepreneurship ambassadors and EU women's entrepreneurship mentors' network. This network also promotes women who are role models and inspire other women to consider an entrepreneurial career. [20]

One of central research questions is why women engage in entrepreneurship ventures. In research conducted in Serbia in March 2011, and published on the portal www.poslovnažena.com, 925 (44.8%) of 2067 respondents cited earnings and profit growth as a key factor that motivates them at work. In order to determine what are the motives that lead women to enter the world of business and entrepreneurship on the territory of the Municipality of Kragujevac, a survey on a sample of 30 women owners of shops and businesses was conducted in April 2012, with the question what motives led them to enter the world of business. The survey results showed that 40% of the questioned women wanted to provide family income ("providing the means for the life of family") by starting a business. [20]

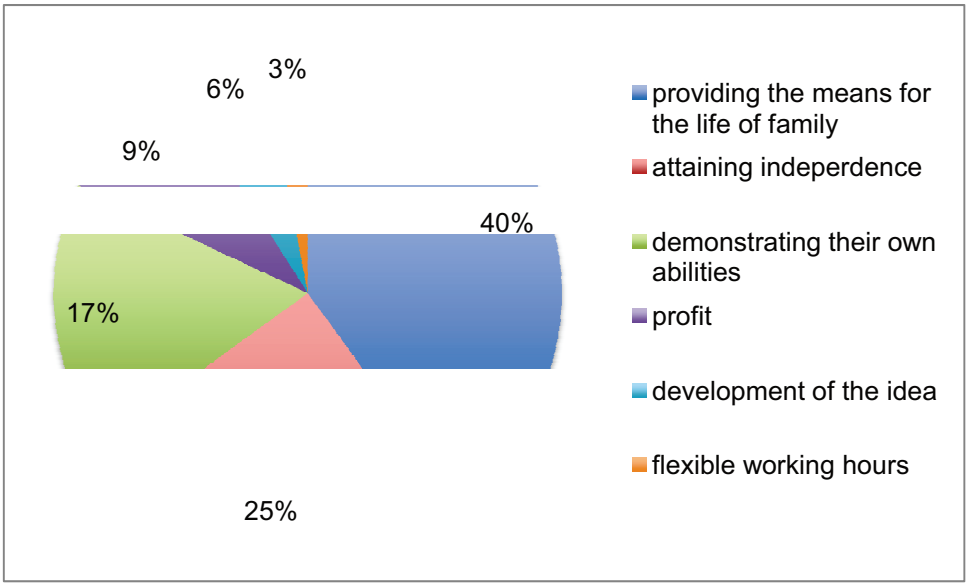


Figure 1 Motives which led women to enter the world of entrepreneurship

When it comes to employment status, women are twice less self-employed than men and they work as contributing family members three times more often than men do. The position of women in the labour market is less favourable because they have less support than men in the sphere of public and private life. The research on female entrepreneurs in Serbia has shown that among the youngest (19-30) more than half have at least one parent who is an entrepreneur (51.5%), while that percentage was significantly lower in case of older entrepreneurs (10.6%) This suggests that entrepreneurship is taught as a lifestyle.

In Serbia, women own only 28% of companies and they are usually owners of smaller companies (according to UN study conducted in 2012 99% of women entrepreneurs in Serbia employ 10 persons or less, [19]), which shows that the economic potential of women is underutilised. On the top of the ownership (management) hierarchy of every fifth company in Serbia is a woman, mostly in smaller companies whose activities are health services and spa or recreation centres. In the region of Belgrade every fourth company is headed by a woman, while in Central and Western Serbia every seventh company is led by a female entrepreneur. Women entrepreneurship should be further encouraged and guided. When women decide to start their own business, they are faced with many difficulties and obstacles, and the biggest hurdle usually lies in the lack of understanding in society which then may be reflected in their lack of confidence. [21]

Situation in Bulgaria, a new EU member from the region, is very interesting because women account for about a quarter of the newly established entrepreneurial ventures in Bulgaria. Their businesses are concentrated in retail, services, and textile manufacturing (62%). Fifty-nine percent of women entrepreneurs cite the lack of an alternative avenue for professional career as a major reason to start their businesses. In comparison, the main motive to start a business identified by men is economic independence. The level of participation in the country's total entrepreneurial activity, the motivations to engage in entrepreneurship, and the sector distribution of women-led entrepreneurial ventures in Bulgaria are broadly comparable to the women-led entrepreneurial initiatives in transitional economies and to the women-led entrepreneurial initiatives worldwide, as reported by the Global Entrepreneurship Monitor. [22] This leads us to conclude that countries that are more advanced in market transition and who have attained EU membership also appear to have a more encouraging climate for women entrepreneurship although motivation for women still differs from that of men and is often an escape route from a male-dominated professional employment.

Conclusion: EU policy and recommendations for Western Balkans and Turkey

In the Gender Equality Strategy 2010-2015, EU has identified several priorities that could be taken as a wider basis for women entrepreneurship policy development:

- Getting more women into the labour market and helping to reach the Europe 2020 target employment rate of 75% overall for women and men;
- Putting forward targeted initiatives to get more women into top jobs in economic decision-making;
- Promoting female entrepreneurship and self employment;
- Instituting an annual European Equal Pay Day to raise awareness of the fact that women continue to earn an average of nearly 18% less than men across the EU [23].

According to Handalic, successful promotion of women's entrepreneurship in the European Union can be achieved by targeted lobbying and provision of free or subsidised consulting, in addition to networking and other activities identified above and monitored by OECD report on implementation of Small Business Act [24], as well as by implementing specific policy recommendations developed by UN Women study conducted in 2012 in Serbia [19]. As many researchers deduct: It is up to government and community leaders to set a clear agenda supporting education and opportunities for women entrepreneurs and to recognise that an investment in women as entrepreneurs and leaders will pay dividends. [25] In Western Balkans and Turkey, EU standards, such as the Gender equality strategy or the Small business act are providing a policy framework for action to develop women entrepreneurship. Importantly women entrepreneurship is increasingly recognised by governments in the region as untapped potential for boosting economic growth, especially in times of World Economic Crisis, which has impacted women and other economically marginal groups more than others. Nonetheless, the crisis also poses a hurdle, as does the underlying, traditional culture in the region, which is less stimulating for women than men in pursuing entrepreneurship. Overall, the Western Balkans and Turkey have made progress and the undertaken activities have produced results in advancing women entrepreneurship in the last decade, as acknowledged by OECD reports. The upcoming challenge, both for the region and the European Union, is to consider the gender dimension in all policies aiming to improve entrepreneurship and business climate and not just in specific policies, moving from pilot initiatives to more systemic, mainstreaming approach to support women entrepreneurship.

References

1.Ahmad, N. and R. G. Seymour (2008), “Defining Entrepreneurial Activity: Definitions Supporting Frameworks for Data Collection”, OECD Statistics Working Papers, 2008/01, OECD Publishing.
2. Commission of the European Communitiew, 2003, Green Paper, Entrepreneurship in Europe, Brussels
3. Wells Betty L., Pfantz T.J., Bryne Jennifer L, Women Business Owners: Evidence of entrepreneurship in a transition economy, Journal od developmental entrepreneurship, Vol 8, No.1, April 2003
4. Rani B. Sobha, Rao Koteswara D, Perspectives on women entrepreneurship, The Icfai Jornal of Entrepreneurship Development, Vol. IV, No. 4, 2007

5. OECD Centre for entrepreneurship, SMEs and local development, Workshop on Building Awareness of Women's Entrepreneurship in the MENA region, 2005, Istanbul, Turkey.
6. Baughn Christopher C., Chia Bee-Leng, Neupert Kent E., The Normative Context for Women's Participation in Entrepreneurship: A Multicountry Study, 2006, Baylor University, ET&P
7. Basargekar P, Women Entrepreneurs: Challenges Faced, 2007, The Icfai Jornal of Entrepreneurship Development, Vol. IV, No. 4, 2007
8. Wilson F, Kickul J, Marlino D, Barbosa S.D, Griffiths M.D., An analysis of the role of gender and self-efficacy in developing female entrepreneurial interest and behavior, Journal of Developmental Entrepreneurship, Vol. 14, No.2, 2009, 105-119, World Scientific Publishing Company.
9. Aaltio I, Peltonen H, Portraits of Russian women entrepreneurs: identification and ways of leadership, Journal of Enterprising Culture, Vol.17, no.4, 2009, 443-471.
10. Pardo-del-Val Manuela, Services supporting female entrepreneurs, The Service Industries Journal, Vol.30, No.9, August 2010, 1479-1498
11. Bosma N, Levie J, Global Entrepreneurship Monitor, 2009 Global Report, Babson College, Universidad del Desarrollo, Reykjavik University, London Business School, 2010.
12. Kelley D, Bosma N, Amoros J.E., Global Entrepreneurship Monitor, 2010 Global Report, Babson College, Universidad del Desarrollo, London Business School, 2011.
13. Kelley D., Singer S, Herrungton M, Global Entrepreneurship Monitor, 2011 Global Report, Babson College, Universidad del Desarrollo, Universiti Tun Abdul Razak, London Business School, 2012.
14. Xavler S, Kelley D, Kew J, Herrington M, Vorderwulbecke A, Global Entrepreneurship Monitor, 2012 Global Report, Babson College, Universidad del Desarrollo, Universiti Tun Abdul Razak, London Business School, 2013.
15. The World Bank. Labor participation rate, female (% of female population ages 15+) available at http://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS
16. The World Bank. Labor participation rate, male (% of male population ages 15+) available at http://data.worldbank.org/indicator/SL.TLF.CACT.MA.ZS
17. International Financial Corporation, The World Bank, Enterprise Surveys, What business Experience available at
http://www.enterprisesurveys.org/Data/ExploreTopics/gender
18. OECD, SME Policy Index: Western Balkans and Turkey 2012, Progress in the Implementation of the Small Business Act for Europe available at http://www.keepeek.com/Digital-Asset-Management/oecd/finance-and-investment/sme-policy-index-western-balkans-and-turkey-2012_9789264178861-en
19. Babović, M. Prepreke i potencijali preduzetništva žena u Srbiji UN Women, 2012.
20. Yildirim, K., Development and Survival Strategies in Jordan and the Contribution of female-owned firms to domestic economic growth in Turkey, JWE (2009, No. 3-4, 88-105)
21. Vujicic, S., et al., The Development of Female Entrepreneurship in the Function of Overcoming Unemployment of Women in Serbia, JWE (2012, No. 3-4, 1-16)
22. Manolova Tatiana S, Carter N, Manev I, Gyoshev B,1042-2587, 2007, Baylor University, Entrepreneurship theory and practice
23. Strategy for equality between women and men 2010-2015, European Commission; adopted in September 2010.
24. Handalic M, The position of female entrepreneurs in the European Union and transition countries, Journal of Women's Entrepreneurship and Education 1-2 (2009) 13-24
25. Terjesen S, Elam Amanda, Women entrepreneurship a force for growth, International Trade Forum No.2, April-June 2012.

USEFUL, MARKET ORIENTED CONTACTS: WHY KNOWING MALE PEERS IS USEFUL TO SMALL FEMALE SERVICE ENTREPRENEURS

Katharina Simbeck[1], Jan Kratzer[2]

[1]Technische Universität Berlin, Straße des 17. Juni 135, Sekretariat H76, 10623 Berlin, Germany, ksimbeck@gmx.de

[2]Technische Universität Berlin, Straße des 17. Juni 135, Sekretariat H76, 10623 Berlin, Germany, jan.kratzer@tu-berlin.de

The objective of this paper is to investigate how social networks (informal peer networks) impact the inferior female business performance using social network analysis and social capital theory.

Keywords
Entrepreneurship, social network analysis, gender

1. Introduction

Women underperform in a variety of aspects of business life: they are underrepresented in top-management, they earn smaller salaries and they underperform as entrepreneurs [1,2, 3]. Researchers are trying to identify the root causes of those facts in order to improve the use of female resources for societies and economies on the one hand and the access to economic success for women on the other.

There are also significant gender differences with regards to social networks. On the one hand it has been found that women are less well integrated into influential networks [4]. Especially if they represent very small minorities they tend to lack sufficient access to information and other resources [5]. On the other hand, a same level of network integration, that is proven to enhance performance of men, does not have the same effect for women [6,7].

Given the abundant research on the importance of formal and informal networks for women in organizations it is surprising that there is a lack of research on how the integration into intra-organizational networks impacts female business performance.

This research will investigate into the role of informal peer network affiliations towards female and male business success. We use a sample of small service business entrepreneurs, namely freelance veterinarians in the city of Berlin. In the chosen base universe men and women are almost equally represented. However, men significantly outperform women in business results. With regards to success drivers for female entrepreneurs we find that especially women benefit from being acquainted with male peers. The benefit of being acquainted with female peers in contrast cannot be proven. In a next step we investigate why informal contacts to male peers are so beneficial. It turns out that it is not the gender itself plays a role but the level of market orientation of the acquainted peer. As males have on average a much higher level of market orientation then their female peers, they serve as useful role models. Knowing (market orientated) men provides a learning opportunity for female entrepreneurs.

2. Theory

2.1 Object of Research

In order to study the link between properties of peer network and business performance a sample of similar, very small business competing in the same market was chosen, namely veterinary practices in Berlin. Veterinary practices operate in a fairly stable environment, are of very small size and low organizational complexity.

This focus on very small businesses also helps to study the link between a business person's network and business success. For very small businesses the individual network contact, which means the business owner is also the main driver of the business success at the same time.

Medical professionals have also been studied by Crompton and Lyonette [8]. They have compared the careers of medical and accounting professionals in Great Britain with special focus on the preferred career options (General practice vs. hospital, employment vs. freelance status, part time vs. full time work) by gender. Similar to veterinarians in Germany, both professions are of high social status and offer the opportunity to earn high salaries; and both have been “feminized” in Great Britain over the last decades leading to an almost equal gender distribution of job starters at this point in time. Crompton and Lyonette [8] find the career choices for both men and women are influenced by family preferences: both male and female GPs have more children than their colleagues in hospital. They also find that the institutionalized options for combining family and work are much better in the medical profession and that the level of institutionalized discrimination appears to be lower in comparison to the accounting profession.

2.2 Development of hypotheses

Relationship between gender and performance

Women tend to seek entrepreneurial opportunities in less attractive and more competitive industrial sectors, but even within the same industry women underachieve in comparison to men [9]. Reasons for the inferior performance of women entrepreneurs are found both in properties of the females themselves and in discrimination by their environment. For example, all things left equal, there are indications that women find it more difficult to get access to sufficient bank financing [10,11]. On the other hand the lower rate of early stage (“angel”) capital financed firms among female owned firms needs to be explained by them seeking less for venture capital funding (whereas when they try to obtain it, they have the same probability) [12]. Another factor discriminating female entrepreneurs might be their lack of active or moral support provided by families: family members tend to help less in women owned businesses [2,13]. With regards to the factors intrinsic to the female business owners, it seems that they start their businesses with less human and financial capital: it was suggested that the smaller success of female entrepreneurs can be explained by their lack of experience in the industry and in starting new business [1, 2, 14, 15]. Also, the smaller wages that women entrepreneurs had received in their past employment history might constrain their ability to successfully fund their start-up [1]. Further intrinsic factors that lead to different performance for men and women are motivation [16], age of their children [15], risk aversion, and formal network affiliation [15]. It was also found that both business skills and achievement motivation pay out for women [15]. Loscocco [9] compares women business owners to immigrant business owners and finds numerous similarities: women business owners are confronted to similar obstacles as immigrants (lack of financing, human capital, experience); also women chose similar business fields as immigrants (namely retail

and services). Further it is debated, why the move towards the knowledge based society and the higher education levels achieved by women are not contributing to closing the pay gap between men and women [17, 18].

Prior studies have confirmed, that the gender gap in income also exists for professionals [19], business owners [2], MBA entrepreneurs [20], small accounting practices [16] and academics in general [21]. Several authors have shown that the gap between men and women increases over time, especially after marriage and child birth [20,21]. On the other hand Robb and Watson [22] and Watson and Robinson [23] show that female entrepreneurs are not less successful than men if industry, risk preferences, working hours and "preferred size of the business" are controlled for. One reason for inferior performance of women was identified by Kanter [5]: If women represent a very small minority in organizations they are forced as "tokens" into stereotypical roles which prevents them from performing to their fullest potential [5]. However this is not the case for the women included in this research both during studies and in professional life they represent approximately half of the veterinarians.

Female entrepreneurship is often considered as a career choice that helps to balance family obligations with economic aspirations [20]. As most veterinarians are self-employed this does not hold true of the group of entrepreneurs studied in this research. Professional self-employment, owning and managing a veterinary practice, belongs to the image of the veterinary profession itself. It can be assumed that the female veterinarians in this study became entrepreneurs because they are veterinarians, they don't really have a choice. Crompton and Lyonette [8] argue that while institutionalized discrimination for accountants and doctors persists, but personal choices, specifically with regard to work-life balance have a big impact on professional achievement, too.

Given the evidence from many industries and settings, we assume thus that in the researched sample

H1 Men outperform their female peers.

Relationship between gender and peer network properties

Formal network affiliations of women have been studied by Andre [24] who finds that women tend to participate in Economic Development Organizations (EDOs) on behalf of rather smaller than bigger companies and on a rather local than national level. He also finds strong regional differences in female representation which suggests either cultural or industry sector differences [24].

There is no indication, that women should have smaller informal peer networks then men [4, 25]. Brass [4] found that women were even slightly more central in the intra-organizational network studied. Loscocco [25] found that even though women seem to be disprivileged in networking because of a higher work-from-home share, shorter working hours and longer professional breaks related to child care, they still have equally big networks as men. For established companies, women's business network tend to be larger and more diverse then men's which is considered to be advantageous but also tend to include more kin [25].

H2 There is no difference in network size between men and women.

Business women tend to seek advice more likely at other women than men [26]. Men might not seek advice with women because they follow a society's belief that women are mainly competent in household and taste related matters [27]. Underrepresented groups (by race or gender) in an organization tend to be excluded from the majority's networks [28]. Loscocco [25] also finds that men are overrepresented (share of 60%) in both men's and women's business owner networks at the same rate. On the other hand Bevelander and Page [29] found that female MBA students tend to have more same gender ties in their networks than their male peers.

Given the high share of women in the sample and the focus on one single service sector we assume that

H3a Both men and women have an equal share of women in their networks.

H3b Women have the same representation in peer networks as in the base universe.

Relationship between peer network and performance, depending on gender

The role of social networks in professional success has been studied many times. Aldrich and Zimmer [30] see "entrepreneurship as embedded in networks of continuing social relations" which provide access to opportunities, innovation, and information but may also reduce room to maneuver if social pressure becomes too high. Ibarra [31] studied social networks of white and minority workers and found that while successful minority managers rely on white sponsors they rather receive psychological and social support from within their minority group. Gargiulo et al. [32] disucss the impact of network closure on the performance of investment bankers and find that it depends on the job role (information provider or acquirer). Maurer and Ebers [33] find that the network configuration of of start-ups needs to change over time to reflect the needs of the company.
Economically successful behavior is a product of prior learning [34, 35]. Individuals can also learn through observation, as theoretically proposed by Bandura in 1969 [34, 36]. What influences learning in networks? Rogers [37] underlines the importance of homophily to social learning: When two individuals share common meanings, beliefs, and mutual understandings, communication between them is more likely to be effective. Individuals enjoy the comfort of interacting with others who are similar. Kraatz [38] shows the homophily effect for liberal arts colleges in the U.S.: organizations imitate successful behavior of similar network partners: they learn from their fellow competitors. According to Tsai and Ghoshal [39] and Tsai [40] (2001) knowledge transfer is enhanced by network centrality and absorptive capacity (modeled as relative R&D expenditures). This effect is based on the trust building effect of central network position [39]. Nyblom et al. [41] show based on the data of organic farming in Finland that innovation spreading is influenced by adjacency, in this case by physical proximity. Confirming the hypothesis that diffusion of innovation is a social process Nyblom et al. [41] find that farms using innovative organic farming approaches are not randomly spread across the country but are more likely to be situated closer to other organic farmers. Borgatti and Cross [42] underline the importance of knowing what another person knows and valuing it highly, and having access to that other person.
Learning is comparable to the adoption of innovation which has also been found to be impacted by personal networks (see Coleman et al.'s [43] study on new drug prescription, Rogers [37] study on family planning in Korea).
Relationships in a social network are referred to as social capital as opposed to financial or human capital [44], taking up the resource based view of the firm. In networks, there is a trade-off between the cost (mainly time investment) of establishing and holding relationships and the benefit from those relationships (see empirical work by Egbert [45]; Ferriani et al., [46]; Kristiansen [47]). Furthermore there is a trade-off between a dense, trustful but potentially more repetitive network and a dispersed one with weaker relationships but potentially yielding more diverse information (for an empirical confirmation see for example [32]). Those two opposing views represent the two perceptions of social capital. According to Burt [44] non-redundant contacts, or structural holes, are of special importance for the access to knowledge in a network as they add new rather than confirm existing information to an actor. Gargiulo and Benassi [48] solve those opposing views by introducing environmental dynamics and required network flexibility: in the case of a highly dynamic environment actors' networks need to adapt which is easier in a less cohesive network with more structural holes. Burt [44] himself states that structural holes are most useful in social frontier settings, that is in settings where two social worlds meet. Social capital, absorptive capacity (ability to acquire and assimilate knowledge), homophily, contagion and proximity were identified as the main drivers of network learning by several authors [37, 49, 50, 51, 52]. Shared cognitions and transactive memory systems influence learning not only in groups, but also in

networks [52, 53]. Learning is dependent on existing meta-knowledge. Learning from others takes place through shared or observed experiences.
In social network analysis the nodes or actors to be analyzed are also referred to as ego [54]. However, for better readability we will always refer to small businesses or small business owners in the following. Despite of being more or less competitors for the same clients, veterinarians have various opportunities of meeting each other as they are obliged to proof their continuous professional education, for example by taking part in courses. Furthermore here are two professional organizations (veterinarian chamber where membership is mandatory and veterinarians' association) which hold various non-mandatory meetings per year. A good integration into a network of peers could result in numerous opportunities to discuss and learn about management topics and therefore improve management know-how of the practice and consequently economic performance. The network position of a small business could be positively linked to economic performance because the business can learn from other firms how to manage a practice. The type of network ties impacts the network result: informal networks can be constituted of friendly and friendship ties [55]. In informal networks, business owner might receive psychological and social support from their peers [31, 56]. On the other hand the time investment into maintaining networks might not be off-set by the positive effect. For example Stam and Elfring [57] find a negative link between performance and network centrality for new ventures. Ostgaard and Birley [58] have found both network size and time spent on networking to be positively related to with performance. Depending on the firm's strategy, social network have been found to provide access to innovation, financing, business development and supplier relationships [58]. Degree centrality [59] is the simplest measure of an actor's importance in a network - it measures the number of direct links, which can be interpreted as the potential communication activity [54]. In-degrees are interpreted as prestige, out-degrees as a measure of integration. Degree centrality is also used as a measure of social capital [44, 52]: Business owners invest time and energy into relationships with other business owners. From those relationships they get a benefit in terms of shared information and knowledge, which enables them to perform better. According to Tsai and Ghoshal [39] and Tsai [40] knowledge transfer is enhanced by network centrality because of the trust building effect of central network position [39].

H4 The size of the peer network is positively associated with performance.

Both formal and informal networks might help women to become more successful. Hersby et al. [60] have researched formal women support networks and found that those are more successful in organizations that fully endorse the equality of men and women.
It has been discussed if and how women network differently than men [4,6,7, 61, 62, 63]. On the one hand, women might be part of different networks then men: Jacobson et al. [6] find women to be less involved in networking relationships that are very beneficial for their male counterparts. The difficulties for women in getting access to relevant networks is also discussed by Kumra and Vinnicombe [63] which can be partly overcome by impression management techniques (act to be seen as available and ambitious). On the other hand, being part of a networking relationship can yield different results for men and women [6,7, 64]. Moore et al. [65] recommend networking as a way to advance female entrepreneurs. According to Jacobson et al. [6] women have a higher benefit from networking with peers. This effect is difficult to explain: Jacobson et al. [6] attribute it to the hierarchical and "gendered nature of public administration", which they researched. On the other hand, neither Forret and Dougherty [7] nor Carter et al. [66] found an effect of social capital on performance for women (in career advancement or getting access to equity funding respectively).
As shown it has been found, that networks impact men and women differently. For two reasons, it might be that men take less advantage of being acquainted with women than vice versa: according to hypothesis one, men are expected to me more successful than women, they might thus have less to learn from them. Further, it has also been found that social

status is one of the drivers in innovation diffusion in networks [36, 37, 67]. If women are considered to be of slightly lower social status than men [11, 25] by network members, men would benefit less from being acquainted with women in their networks, reducing the effective size of networks significantly. This is reflected in the following hypothesis:

H5 The impact of peer network size on performance is stronger for women then for men.

Success and market orientation of peers

Being acquainted with relatively successful peers might provide a superior learning opportunity for both men and women [38, 42, 50]:

H6 Being acquainted with successful peers is positively associated with performance.

Market orientation is one of the most influential factors of small business performance. In order to control for the effect of differing market orientation, we included it as a control variable. The concept of market orientation was described and operationalized by Jaworski and Kohli [68, 69]. They define market orientation as the "generation, dissemination, and responsiveness to market intelligence [69] and put special emphasis to customer focus including the creation of sustainable relationships with the customer network. The authors predict a strong link to company performance [69]. This has been confirmed in many studies (see Cano et al.'s [70] meta analysis).

Since market orientation is such an important driver of small business performance, it is also one of the most valuable capabilities to learn from peers. Market orientation can be considered as a typical example of tacit knowledge [71] as it involves the deep understanding of the importance of customer needs and customer satisfaction as opposed to the mechanical process for example of sending out a mailing. Peers with a high level of this kind of understanding could serve as excellent role models for less successful business owners. Consequently, being acquainted with highly market orientated peers could provide a better learning opportunity.

H7 Level of market orientation of acquainted peers is positively associated with performance.

3. Description of Sample

A survey based empirical analysis of veterinarians in Berlin is used to understand to what extend the hypotheses are correct or need to be rejected. The survey was sent out to all veterinarians practicing in Berlin from the complete list of the Veterinary Chamber's website, downloaded in July 2010.

After removing veterinarians who do not practice anymore or are specialized on horses or pathology and consolidating those veterinarians practicing in a joint practice/partnership, a base sample size of 324 practices remains. The base universe consists of 283 single practices and 41 partnerships.

Out of 121 valid answers received, 20 were from partnerships whereas 101 were single practices. Practices were established on average since 15 years (approximated as 2010 - year of establishment), 32 practices are young practices (<8 years). Practices had on average 2.2 veterinary assistants (including trainees) and employed 2.7 veterinarians including owner(s). Not all questionnaires were returned 100% filled. Those with missing answers were excluded pair wise for analysis. There might be a non-response bias in the data from practices with lower turnover because those practices might be less interested in management questions.. The turnover in the sample has been compared to the German average turnover of small animal veterinary practices as collected by the German Federal Statistical Office [72]. The distribution of the turnover is surprisingly close to the distribution

of turnover within veterinarians in Germany overall. This indicates a good representation of practices in the sample. On the other hand it needs to be expected that the turnover in Berlin is comparably low [73]. 14 respondents did not answer the question concerning their sales.
In order to assess the role of network contacts respondents were asked to tick the fellow veterinarians they were acquainted with in list of all veterinarians practicing in Berlin. The network data, including network contact attributes such as performance and market orientation was analyzed using UCInet [74].

4. Results

4.1 Measurement of Performance

In this study turnover will be used for measuring performance. Turnover is used for three reasons: first, it is easy to survey in the questionnaire. Second turnover is less subject to tax optimizing efforts. Third it is assumed that veterinary practices in Berlin have a similar cost structure. Furthermore, veterinarians are expected to share turnover more willingly with researcher than profit figures. The turnover of small animal veterinarians consists of several main components: on the one hand turnover from both curative and preventive veterinary services. On the other hand turnover from the sale of products (drugs, pet food, dietary supplements). The sale of products as opposed to services is linked to an own set of managerial questions such as capital lockup in inventory, optimization of order quanitity, losses because of aging.
It needs to be considered, that it takes a certain time until a practice has found a sufficient number of clients. However, the curve of customer base growth and management learning flattens. Therefore “years of establishment“ is transformed into a dichotomous variable “young practice” which was set if the age of the practice is <8 years. As partnerships are expected to have a higher turnover then single practices, the dichotomous variable “partnership” is used as a control variable as well.

4.2 Measurement of market orientation

The original scale to measure market orientation contained 32 items [67]: 10 items to analyze marketing intelligence generation, 8 items for market intelligence dissemination, and 14 with regards to the responsiveness (7 for response design and 7 for response implementation) .
While the questionnaire was shortened for the scope of this research, the categories remained: marketing intelligence generation is represented by marketing research (data collection), dissemination is represented by marketing research (data analysis), response design is represented by marketing strategy and response implementation is represented by marketing strategy implementation. 4.3 Bivariate analysis
Correlation analysis (Table 1) reveals that there is a highly significant correlation between gender and turnover, and gender and market orientation. Male owned business owners do not only have a bigger turnover in comparison to female owned businesses (in line with hypothesis 1), but they are also much more market oriented. Male practice owners in our sample are on average older, such as their businesses. Correlations indicate, that higher turnover is also associated with the number of contacts to highly market oriented peers. Successful practice owners do also tend to subjectively consider themselves successful in general and in comparison to other academics and their former fellow students.

Table 1: Means, standard deviations and correlations

	Mean	Std. Dev	N	Pearson Correlations																					
				1		2		3		4		5		6		7		8		9		10		11		12		13
1 Turnover	2.01	1.21	86	1.000		-0.142		0.415	***	0.456	***	-0.140		0.120		0.158		0.162		0.273	*	0.379	***	0.378	***	0.386	***	0.096
2 Age	50.60	9.25	90	-0.142		1.000		0.302	**	0.005		-0.620	***	0.049		0.143		0.084		0.148		-0.093		-0.089		-0.020		-0.075
3 Gender	0.49	0.50	99	0.415	***	0.302	**	1.000		0.297	**	-0.407	***	-0.188		-0.078		-0.079		0.006		0.076		0.241	*	0.150		0.156
4 Market Orientation	- 0.01	1.02	83	0.456	***	0.005		0.297	**	1.000		-0.098		0.042		0.184		0.160		0.214		0.204		0.168		0.285	**	0.022
5 Young Company (<8 years)	0.26	0.44	99	- 0.140		-0.620	***	- 0.407	***	- 0.098		1.000		-0.102		- 0.253	*	- 0.073		- 0.163		0.117		0.072		0.026		0.010
6 Number of contacts to female peers	9.13	7.37	98	0.120		0.049		-0.188		0.042		-0.102		1.000	***	0.734	***	0.807	***	0.747	***	- 0.009		-0.149		0.008		-0.130
7 Number of contacts to male peers	11.21	8.51	98	0.158		0.143		-0.078		0.184		- 0.253	*	0.734	***	1.000	***	0.769	***	0.794	***	0.027		-0.172		-0.088		-0.177
8 Number of contacts to successful peers	5.08	4.16	98	0.162		0.084		-0.079		0.160		- 0.073		0.807	***	0.769	***	1.000	***	0.908	***	0.058		-0.098		0.077		-0.121
9 Number of contacts to highly market oriented peers	4.27	3.55	98	0.273	*	0.148		0.006		0.214		-0.163		0.747	***	0.794	***	0.908	***	1.000	***	0.095		-0.038		0.065		-0.093
10 In comparison to other academics, how satisfied are you with your economic situation?	2.58	0.94	93	0.379	***	-0.093		0.076		0.204		0.117		-0.009		0.027		0.058		0.095		1.000	***	0.713	***	0.497	***	-0.057
11 Are you satisfied with the economic situation of the practice?	2.09	1.16	98	0.378	***	-0.089		0.241	*	0.168		0.072		-0.149		-0.172		-0.098		-0.038		0.713	***	1.000	***	0.549	***	0.020
12 In comparison to you former fellow students, how do you estimate your economic success?	2.69	0.85	95	0.386	***	-0.020		0.150		0.285	**	0.026		0.008		-0.088		0.077		0.065		0.497	***	0.549	***	1.000	***	-0.002
13 When you started your studies, did you plan to become an entrepreneur then?	0.45	0.50	97	0.096		-0.075		0.156		0.022		0.010		-0.130		-0.177		-0.121		-0.093		-0.057		0.020		-0.002		1.000

* p < .05, two-tailed
** p < .01, two-tailed
*** p< .001, two-tailed

4.4 Female and male business owners

Table 2: Means by gender (ANOVA)

Variable	female responde Mean	N	male respondents Mean	N	all respondents Mean	N	ANOVA F	
Turnover category	1.558	43	2.533	45	2.057	88	16.08	***
age	48	46	53	46	50	92	8.65	**
Market Orientation	- 0.305	42	0.326	42	0.011	84	8.59	**
Young Company (<8 years)	0.431	51	0.080	50	0.257	101	19.06	***
number of contacts to female peers	10.680	50	8.900	50	9.790	100	0.93	
number of contacts to male peers	12.040	50	11.280	50	11.660	100	0.17	
number of contacts to successful peers	5.640	50	5.020	50	5.330	100	0.48	
number of contacts to highly market oriented peers	4.460	50	4.540	50	4.500	100	0.01	
In comparison to other academics, how satisfied are you	1.863	51	2.408	49	2.130	100	5.61	*
Are you satisfied with the economic situation of the practice?	2.521	48	2.681	47	2.600	95	0.69	
In comparison to you former fellow students, how do you estimate your economic success?	2.600	50	2.851	47	2.722	97	2.07	
When you started your studies, did you plan to become an entrepreneur then?	0.388	49	0.540	50	0.465	99	2.31	

Table 2 shows the means and standard deviations of the measured variables for both men and women. The number of young practices among female practices is significantly higher (43% in comparison to 8% for male owned businesses). As expected, in line with hypothesis 1 female veterinarians are significantly less successfully in terms of turnover than men. This is also in line with the finding for example by Crompton and Lyonette [8]. However, subjectively, women are equally satisfied with their performance. Only comparing to other academic professions female veterinarians significantly acknowledge that they under-achieve. This confirms the ideas brought forward by Abele [21] and Lortie-Lussier and Rinfret [75] that success is different for men and women and that objectively measured economic performance is not everything that counts for women.

Regression analysis reveals that young practices have smaller turnover. However a test of between subject effects did not prove that “years in business” was linked to the higher turnover of male owned businesses.

The difference in market orientation between female and male business owners is surprising. It is well known that market orientation is an important driver to business performance. Such a low level of market orientation in female business owner might be linked to the special motivations of the veterinarians. In exploratory interviews we have found especially female veterinarians to be extremely motivated to help sick animals. Of course this is an important motivation to their male colleagues as well, but the order of priorities might be different. However this cannot be proved empirically based on our data.

With regards to network contacts, it becomes apparent that females have slightly more network contacts (22.7 in comparison to 20.2 of their male counterparts), however this difference is not significant. Consequently, hypotheses 2 can be accepted, in line with the findings by Brass [4] and Loscocco [25]. Both women and men have without a significant difference a slightly higher share of males in their network (53/56% on average), in line with hypotheses 3a. The share of males in the business owners’ networks deviates thus from the share of females in the base universe (51% of single practices are owned by women), contradicting hypotheses 3b.

Both male and female practices know 5 to 6 colleagues with comparably high turnover and 4.5 colleagues with above average market orientation.

4.5 Regression analysis

As a next step we have looked at the multivariate interdependencies of the different variables for both men and women. We want to evaluate, whether knowing men or women has an effect on business performance. Another objective is to find out whether being acknowledged with successful peers (in terms of turnover) and with high-market-orientation-peers contributes to higher performance. Finally, we will show that effects are quite different for men and women. In order to exclude multicollinearity we calculated the variance inflation factor for every variable in every regression which was clearly below 10.

We perform stepwise regression (Table 3) with turnover as the dependent variable first for the total sample. Age as a control variable alone can only explain 1.5% of the variance (negative impact). Including the number of contacts to females and males significantly increases R^2 to a still low 5.2%. Further significant increases in the variance explained are done by introducing the number of contacts with high turnover/high market orientation (to an adjusted $R^2$of 15.6%). In the model for female veterinarians the number of acquainted male peers has a significant positive effect, whereas the number of acquainted female peers has no significant effect. However the significance of the male peers in the business owner's network disappears when contacts to highly market oriented peers are considered. Obviously males are "useful" contacts because they are so much more market oriented. Being acquainted to successful peers in terms of turnover does not have an impact on performance, contradictory to hypothesis 6. Being acquainted with above average market oriented peers is a clear advantage, in line with hypotheses 7. In the complete model age (slightly negative), and the number of market oriented contacts remain as the significant drivers of success.

Hypotheses 4 can only be confirmed when attributes of the contacts are not controlled for. It is not the number of peers as such, but the number of above average market orientated peers that make a positive impact on performance. The number of contacts be it to males or to females, to successful peers or to market oriented peers, does not significantly contribute to success for male practice owners. In this setup this can only be explained by the higher level of market orientation among men: being acquainted with peers provides a learning opportunity especially with regards to market orientation. As men already are market oriented, they do benefit less from those learning opportunities. Thus hypotheses 5 can be confirmed.

For female business owners, being acquainted with male peers appears to be a success factor first. However when controlled for the number of contacts to highly market oriented peers, the number of contacts to both men and women as such is not a significant contributor anymore.

Table 3: Regression model turnover

	Total Sample		Females		Males	
Base model						
Constant	3.16	***	2.36	*	5.14	***
age	- 0.02		- 0.02		-0.05	**
adj. R square	0.01		- 0.01		0.13	**
Regression with network contacts						
Constant	2.90	***	2.34	**	4.61	***
age	- 0.02		- 0.03		-0.04	*
number of contacts to female peers	0.01		- 0.02		0.05	
number of contacts to male peers	0.03		0.07	*	-0.02	
adj. R square	0.05	*	0.12	*	0.18	**
delta R square	0.06	*	0.17	*	0.09	
Regression with network properties						
Constant	3.15	***	2.30	**	4.79	***
age	- 0.03	*	- 0.03		-0.05	**
number of contacts to female peers	- 0.00		- 0.05		0.04	
number of contacts to male peers	- 0.01		0.03		-0.05	
number of contacts to successful peers	- 0.15	*	- 0.10		-0.06	
number of contacts to highly market oriented peers	0.30	***	0.28	*	0.19	
adj. R square	0.16	**	0.26	**	0.19	*
delta R square	0.12	**	0.16	*	0.06	

* p < .05, two-tailed
** p < .01, two-tailed
*** p< .001, two-tailed

5. Discussion and Conclusion

The object of research chosen for this analysis allowed to control for a number of factors which are sometimes found to impact economic achievements of women: The sample concentrates on professionals in one service sector in one city and thus controls for impacts from industry, location and human capital. In the service sector chosen, men and women are equally represented. We have surveyed male and female business owners about their economic performance and their peer networks. We have analyzed the individuals' networks by total size, by share of male/female peers, and by network quality (contacts to high turnover peers and to highly market orientated peers). In line with prior research we found that men outperform women economically, but that there are only minor differences in network size and share of male/female acquaintances. The same level of network size for men and women seems to be related to environments were both groups are well represented [4]. With regards to the impact on performance we can see though, that only women benefit from having a bigger network size. Taking a more granular approach it becomes apparent, that specifically women benefit from being acquainted with men. This effect disappears when the quality of the contacts is further taken into consideration: entrepreneurs strongly benefit from the contacts with peers with above average market orientation scores.

The reasons for the low level of market orientation among female veterinarians cannot be found in this work. It might be linked to the professional ethics of the veterinarians, who see

their duty in helping animals first before making a bigger profit. One (male, successful) veterinarian commented his returned questionnaire with the words “I am not happy to see that veterinarians should organize their practices more and more from an economic perspective. (…) They are pressured to sell to their customers services which those don’t really need.”

5.1 Implications for theory

This paper contributes to the field of social network analysis by showing how informal peer networks impact business performance; contribute to learning, and why women benefit to a larger extent than men. The application of social network analysis thus not only helped to understand gender differences in performance, but it also provides insights on how gender differences might be reduced.

With regards to the properties of males’ and females’ networks we found that there is no indication that women should have smaller peer networks than men (in line with [4, 25]). Also, in a relatively feminized profession [5] as the veterinarians in the sample represent, women are almost equally well represented in the business owners’ ego networks.

Social networks enable social learning [34, 36] that was found to be enhanced by homophily [37, 38], adjacency [41] and a ground for communication (common knowledge, knowing what others know, common terminology; see [42, 52, 53]. In our highly homogenous sample we have confirmed that network centrality enhances performance through learning, in line with Tsai and Ghoshal [39]. Our empirical work demonstrates that a central network position of a small business not only provides access to capital or innovation but is also positively linked to economical performance because the business can learn management skills from other firms. We have shown in this work that it is not success as such that is contagious, but the capabilities required for success (i.e. market orientation), confirming thus social capital theory [44].

This paper also contributes to confirming networks as entrepreneurial success factors especially of female small service business owners. Women are part of different networks than men [6] Durbin, 2011) and benefit differently from networking than men [7, 62, 63, 64]. In contrast to Forret and Dougherty [7] or Carter et al. [66] we show that women do benefit stronger than men from networks, if the men in the network have a higher level of capabilities that need to be acquired by women to become commercially successful. While market orientation [69] is a widely recognized success factor [70], we have shown that specifically for women also the market orientation of acquainted peers adds to entrepreneurial success. Market orientation turns out to be an important capability that can be learned in informal peer networks. Females benefit strongly from being acquainted with superiorly market orientated male peers, because of their lower level of market orientation. Men, on the other hand, might consider female knowledge as less relevant, if they perceive women to be of lower social status [11, 25, 36, 37].

5.2 Implications for practice

This work underlines the importance of role models entrepreneurs, especially for female entrepreneurs. Market orientation has been found to be a major entrepreneurial success factor many times. The female entrepreneurs in this sample have shown a significant lower level of market orientation than their male peers. One way to improve business results could therefore be to find high market oriented role models. If entrepreneurs find it difficult to identify above average market oriented role models without using a questionnaire, they can use gender as an indicator. In our sample male veterinarians were clearly more market orientated. Male veterinarians thus prove to be useful contacts, especially to their female peers.

This research also confirms prior findings that the pay gap does not only exist for employed workers, but also for freelance workers [8]. This indicates that the pay gap on a similar human capital level is not only created by employer related reasons. Consequently, stronger efforts in gender mainstreaming with higher involvement of employers, as requested by Mósesdóttir [17] will not automatically lead to reducing the pay gap.

5.3 Limitations and directions

The results of this research are of course limited to the researched specific sector and sample group. They should be re-confirmed in different industries and cultural settings.
In this study we did not research into the potentially different functions of social network contacts. Ibarra [76] has found earlier that women tend to find social and psychological support with female contacts whereas male contacts serve more functionally as door-openers and advisors.
It would also be very interesting to do more research on the reasons of lower market orientation among female entrepreneurs (if this is the case in other industries as well).
When networks are analyzed based on sample data, that is when part of the base universe data is missing, it can always be questioned whether the results can be correctly interpreted. Also it would be of great interest to have more data and knowledge about the development of networks over time and in different cultures and the growing or decreasing impact on performance for the two genders. In this respect the more complex approach proposed by Snijders et al. [77] to model networks and behavior could be helpful.

References

1 Boden, R. J., Nucci A. N., 2000. On the survival prospects of men's and women's new business ventures. Journal of Business Venturing 15, p. 347-362.
2 Cliff, J. E., 1998. Does one size fit all? exploring the relationship between attitudes towards growth, gender, and business size. Journal of Business Venturing 13, p. 523-542.
3 Merz, J., Paic, P., 2006. Start-up success of freelancers: New microeconometric evidence from the german socio-economic panel.
4 Brass, D. J., 1985. Men's and Women's Networks: a Study of Interaction Patterns and Influence in an Organization. Academy of Management Journal 28(2), p. 327-343.
5 Kanter, R. M., 1977. Men and Women of the Corporation. Basic Books, New York.
6 Jacobson, W. S., Palus, C. K., Bowling, C. J., 2009. A Woman's Touch? Gendered Management and Performance in State Administration. Journal of Public Administration Research and Theory 20(2), p. 477-504.
7 Forret, M. L., Dougherty, T. W., 2004. Networking behaviors and career outcomes: differences for men and women? Journal of Organizational Behavior 25, p. 419-437.
8 Crompton, R., Lyonette, C., 2011. Women's Career Success and Work-life Adaptations in the Accountancy and Medical Professions in Britain. Gender, Work & Organization 18(2), p. 231-254.
9 Loscocco, K. A., Robinson, J., 1991. Barriers to women's small-business success in the United States. Gender & Society 5, p. 511-532.
10 Ryding, A. L., Swift, C. S., 1990. Women business owners and terms of credit: Some empirical findings of the canadian experience. Journal of Business Venturing 5, p. 327-340.
11 Fay, M., Williams, L., 1993. Gender bias and the availability of business loans. Journal of Business Venturing 8, p. 363-376.
12 Becker-Blease, J.R., Sohl, J. E., 2007. Do women-owned businesses have equal accees to angel capital? Journal of Businss Venturing 22, p. 503-521.
13 Bird, S. R., Sapp, S. G., 2004. Understanding the gender gap in small business success: Urban and rural comparisons. Gender & Society 18, p. 5-28.
14 Fischer, E. M., Reuber, A. R., Dyke, L.S., 1993. A theoretical overview and extension of research on sex, gender, and entrepreneurship. Journal of Business Venturing 8, p. 151-168.

15 Lerner, M., Brush, C., Hisrich, R., 1997. Israeli women entrepreneurs: An examination of factors affecting performance. Journal Business Venturing 12, p. 315-339.
16 Collins-Dodd, C., Gordon, I.M., Smart, C., 2004. Further evidence on the role of gender in financial performance. Journal of Small Business Management 42(4), p. 395-417.
17 Mósesdóttir, L., 2011. Gender (In)equalities in the Knowledge Society. Gender, Work and Organization 18(1), p. 30-47.
18 Caprile, M., Pascual, A. S., 2011. The Move Towards the Knowledge-based Society: a Gender Approach. Gender, Work and Organization 18(1), p. 48-72.
19 Budig, M. J., 2006. Gender, self-employment, and earnings: The interlocking structures of family and professional status. Gender & Society 20, p. 725-753.
20 DeMartino, R., Barbato, R., 2003. Differences between women and men MBA entrepreneurs: exploring family flexibility and wealth creation as career motivators. Journal of Business Venturing 18, p. 815-832.
21 Abele, A. E. , 2003: Beruf - kein Problem, Karriere - schon schwieriger: Berufslaufbahnen von Akademikerinnen und Akademikern im Vergleich. In: A. E. Abele, E.- H. Hoff & H.- U. Hohner, Frauen und Männer in akademischen Professionen. Berufsverläufe und Berufserfolg, Heidelberg u.a.: Asanger, p. 157-182.
22 Robb, A. M., Watson, J., 2012. Gender differences in firm performance: Evidence from new ventures in the United States. Journal of Business Venturing 27(5), p. 544-558.
23 Watson, J., Robinson, S., 2003. Adjusting for risk in comparing the performances of male- and female-controlled SMEs. Journal of Business Venturing 18, p. 773-788.
24 Andre, R., 1992. A national profile of women's participation in networks of small business leaders. Journal of Small Business Management 30(1), p. 66-73.
25 Loscocco, K., Monnat, S. M., Moore, G., Lauber, K. B., 2009. Enterprising women : A comparison of women's and men's small business networks. Gender & Society 23, p. 388-411.
26 Smeltzer, L.R., Fann, G. L.,1989. Gender differences in external networks of small business owner/managers. Journal of Small Business Management, p. 25-32.
27 Bourdieu, P., 1979. Die feinen Unterschriede: Kritik der gesellschaftlichen Urteilskraft (La distinction. Critique sociale du jugement). Suhrkamp, Frankfurt am Main.
28 Mehra, Ajay, Kilduff, Martin, Brass, Daniel J., 1998. At the margins: a distinctiveness approach to the social identify and social networks of underrepresented groups. Academy of Management Journal 41 (4), p. 441-453.
29 Bevelander, D., Page, M. J., 2011. Ms . Trust : Gender , Networks and Trust — Implications for Management. Academy of Management Learning & Education 10 (4), p. 623-643.
30 Aldrich H.E., Zimmer C., 1986. Entrepreneurship through social networks. In: The Art and Science of Entrepreneurship. Sexton D.L., Smilor R.W. (Eds). Ballinger, Cambridge, p. 3-23.
31 Ibarra, H., 1995. Race, Opportunity, and Diversity of Social Circles in Managerial Networks. Academy of Management Journal, p. 673-703.
32 Gargiulo, M., Ertug, G., Galunic, C., 2009. The Two Faces of Control : Network Closure and Individual Knowledge Workers. Administrative Science Quarterly 54, p. 299-333.
33 Maurer, I., Ebers, M., 2006. Dynamics of Social Capital and Their Performance Implications: Lessons from Biotechnology Start-ups. Administrative Science Quarterly 51(2), p. 262-292.
34 Wiswede, G. (1991). Einführung in die Wirtschaftspsychologie. UTB, Stuttgart.
35 Kozlowski, S. W., Bell, B. S. (2008). Work Group Learning. Lawrence Erlbaum Associates, Ch. Team Learning, Development, and Adaptation, p. 15-44.
36 Bandura, A., 1977. Social learning theory. Prentice Hall,Englewood Cliffs.
37 Rogers, E. (1983). Diffusion of Innovations.The Free Press, New York.
38 Kraatz, M. S., 1998. Learning by association: Interorganizational networks and adaptation to environmental change. Academy of Management Journal 41(6), p. 621-643.
39 Tsai, W., Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. The Academy of Management Journal 41 (4), p. 464-476.
40 Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. Academy of Management Journal 44 (5), 996-1004.
41 Nyblom, J., Borgatti, S., Roslakka, J., Salo, M. A. (2003). Statistical analysis of network data - an application to diffusion of innovation. Social Networks 25, 175-195.
42 Borgatti, S. P., Cross, R., 2003. A Relational View of Information Seeking and Learning in Social Networks. Management Science 49(4), p. 432-445.

43 Coleman, J., Katz, E., Menzel, H., 1957. The diffusion of an innovation among phyiscians. Sociometry 20(4), p. 253-270.
44 Burt, R. S. (1992). Structural Holes: The Social Structure of Competition. Cambridge MA: Harvard University Press.
45 Egbert, H. (2001). Netzwerke als unternehmerische Ressourcen und Restriktionen : Unternehmer in der tansanischen Stadt Tanga, 1st Edition. Verlag für Wissenschaft und Forschung.
46 Ferriani, S., Cattani, G., Baden-Fuller, C. 2009. The relational antecedents of project-entrepreneurship: Network centrality, team composition and project performance. Research Policy 38, 1545-1558.
47 Kristiansen, S. (2004). Social networks and business success. The role of subcultures in an African context. American Journal of Economics and Sociology 63, 1149-1171.
48 Gargiulo, M., Benassi, M. (2000). Trapped in your own net? Network cohesion, structural holes, and the adaptation of social capital. Organization Science 11, 183-196.
49 Bapuji, H., Crossan, M. (2005). Co-evolution of social capital and knowledge: An extension of the Nahapiet and Ghoshal (1998) framework. Academy of Management Best Conference Paper.
50 Skerlavaj, M., Dimovski, V., 2008. Social network approach to organizational learning. Journal of Applied Business Research 22(2), p. 89-98.
51 Pahor, M., Dimovski, V., Skerlavaj, M. (2008). Evidence for the network perspective on organizational learning. Journal of the American Society for Information Science and Technology 59, 1985-1994.
52 Monge, P.R., Contractor, N.S. (2003). Theories of Communication Networks. Oxford University Press, New York.
53 Wegner, D. M. 1987. Transactive memory: A contemporary analysis of the group mind. In B. Mullen & G. R. Goethals (Eds.), Theories of group behavior. Springer, New York, p.185-208.
54 Wasserman, S., Faust, K., (1994). Social Network Analysis: Methods and Applications (Structural Analysis in the Social Sciences), 1st Edition. Cambridge University Press.
55 Kratzer, J., Leenders, R. Th.A.J., Engelen, J. M.L. Van, 2005. Informal contacts and performance in innovation teams. International Journal of Manpower, 26(6), p. 513-528.
56 Gibbons, D. E. 2004. Friendship and Advice Networks in the Context of Changing Professional Values. Administrative Science Quarterly 49, p. 238-262.
57 Stam, W., Elfring, T. 2008. Entrepreneurial Orientation and New Venture Performance: the Moderating Role of Intra- and Extraindustry Social Capital. Academy of Management Journal 51(1), p. 97-111.
58 Ostgaard, T.A., Birley, S., 1996. New Venture Growth and Personal Networks. Journal of Business Research 36, p. 37-50.
59 Freeman, Linton C. (1979), “Centrality in Social Networks: Conceptual Clarification,” Social Networks, 1 (3), 215–39.
60 Hersby, M. D., Ryan, M. K., Jetten, J., 2009. Getting Together to Get Ahead: The Impact of Social Structure on Women's Networking. British Journal of Management 20, p. 415-430.
61 Burt, R.S., 1998. The Gender of Social Capital. Rationality and Society 10(1), p. 5-46.
62 Metz, I., 2009. Organisational Factors, Social Factors, and Women's Advancement. Applied Psychology 58(2), p. 192-213.
63 Kumra, S., Vinnicombe, S., 2010. Impressing for Success : A Gendered Analysis of a Key Social Capital. Gender, Work, and Organization 17(5), p. 521-546.
64 Elliott, J. R., Smith, R. A., 2004. Race, Gender, and Workplace Power: American Sociological Review 69(3), p. 365-386.
65 Moore, D. P., Buttner, E.H., Rosen, B.,1992. Stepping off the corporate track: The entrepreneurial alternativie. In: Sekaran, U., Leong, F.T.L. (Eds.), Womanpower: managing in times of demographic turbulence. SAGE, Newbury Park, p. 85-109.
66 Carter, N. M., Brush, C. G., Greene, P. G., Gatewood, E., Hart, M., 2003, Women entrepreneurs who break through to equity financing: The influence of human, social and financial capital. Venture Capital 5(1), p. 1-28.
67 Feder, G., Savastano, S., 2006. The role of opinion leaders in the diffusion of new knowledge: The case of integrated pest management. World Bank Policy Research Working Paper 3916, May 2006.
68 Jaworski, B. J., Kohli, A. K. (1993). Market orientation: Antecedents and consequence. Journal of Marketing 57 (3), 53.

69 Kohli, A. K., Jaworski, B. J., (1990). Market orientation: The construct, research propositions, and managerial implications. Journal of Marketing 54 (2), p. 1-18.
70 Cano, C. R. , Carillat, F. A., Jaramillo, F. (2004). A meta-analysis of the relationship between market orientation and business performance: evidence from five continents. International Journal of Research in Marketing 21 (2), 179-200.
71 Nonaka, I., Takeuchi, H., 1995. The Knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation. New York: Oxford University Press.
72 DESTATIS, 2009. Kostenstruktur bei Arzt- und Zahnarztpraxen, Praxen von psychologischen Psychotherapeuten sowie Tierarztpraxen, Fachserie 2. Statistisches Bundesamt.
73 Statistisches Bundesamt, 2009. Einkommensteuer: Statistik 2004. Deutsches Tierärzteblatt 8, p. 1036-1037.
74 UCInetVI, Borgatti, S.P., Everett, M.G. and Freeman, L.C. 2002. Ucinet for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies.
75 Lortie-Lussier, M., Rinfret, N., 2005. Determinants of objective and subjective success of men and women. International Review of Administrative Sciences 71, p. 607-624.
76 Ibarra, H., 1992. Homophily and Differential Returns : Sex Differences in Netvyork Structure and Access in an Advertising Firm. Administrative Science Quaterly 37, p. 442-447.
77 Snijders, T. A., Steglich, C. E., Schweinberger, M. (2007). Modeling the co-evolution of networks and behavior. Van Montfort, K., Oud, H., Satorra, A. (eds.). Longitudinal Models in the Behavioral and Related Sciences. Lawrence Erlbaum, Mahwa, p.41-71.

THE ROLE OF INDIVIDUALS IN THE PROCESS OF INNOVATION

Sladjana Gajic[1], Danijela Lalic[2], Jelena Stankovic[3]

[1]*Faculty of Technical Sciences, University of Novi Sad, Trg Dositeja Obradovica 6, Novi Sad, gajic.sladjana@uns.ac.rs*

[2] *Faculty of Technical Sciences, University of Novi Sad, Trg Dositeja Obradovica 6, Novi Sad, danijelalalic@uns.ac.rs*

[3]*Faculty of Technical Sciences, University of Novi Sad, Trg Dositeja Obradovica 6, Novi Sad, stankovicj@uns.ac.rs*

The purpose of this paper is to contribute understanding of the role of unconventional individuals for innovation success. The fundamental themes of philosophy of innovation are the importance of individual experience, the importance of unconventional interpretations, and the importance of respect for individual uniqueness. This paper reviews current literature relevant to philosophy of innovation in the context of personal approach to innovations, and contributes the understanding of human elements that are nowadays vital for success of innovation projects.

Keywords
Human resources, Innovation, Organizational Success

1. Introduction

Due to turbulent environment, organizations need to lead their business towards constant development of products, services and processes. Innovation as the part of business strategy seems to be deliberate choice of companies that want to succeed. This strategy includes adequate resources, strategic company orientation, organizational culture and climate that are opened for innovations. Diversity and intensity of economic, technological and social factors that influence innovation make this process even more difficult to manage.

Human factor is an essential element of innovation management. Innovations arise when employees assert their individuality. This includes flexibility and openness of companies to new ideas, as well as a high degree of control, guidance and incentives due to its uncertain nature. Elements of innovative behaviour produce qualitative performance indicators, which are difficult to measure. Companies that use innovation as strategic tool, have to establish mechanisms for evaluation of these innovations, and overall role of unique individuals in the process of innovation.

2. Importance of innovation for organizational success

It is widely recognized that innovation is key to the economic performance of firms. Growth and development of innovative companies is much faster, and their profit is much higher [1]. New ideas, in the form of products, services and processes, are central to the success of the modern company [2]. Analyzing numerous studies about successes and failures of new products, key factors of its success can be identified:

- Market orientation
- Efficiency of development
- Effective use of technology
- Effective internal communication
- The role of key individuals (managers and employees) [2].

Innovation is the specific function, an important element and the basis of success in entrepreneurship, whether it is the existing large business, public service companies, institutions or new venture. “It is the means by which the entrepreneur either creates new wealth-producing resources or endows existing resources with enhanced potential for creating wealth” [3]. The process of creation and exploitation of new ideas makes the innovation.

The main factors that distinguish successful organizations from those less successful or unsuccessful are:

- Having a quality R&D effort, based on strong interfaces with the customer
- Having a technically superior product, featuring strong product uniqueness
- Being first in the market and having a positive market environment
- Delivering a product or service that provides significant value to the customer
- Developing products that build upon the firm’s existing technological and organizational competences [2].

Given that innovation is something new that requires knowledge and creativity and it is a development based on research that results with a significant value for customer, correlation between the success and innovation is evident.

Current literature [4] [5] [6] points to the importance of systematic acquisition of knowledge and its effective use in order to improve organizational performance and competitiveness. This process is measured by the successful development of new or improved products, innovation and implementation of innovative strategies.

Kanter states that traditional characteristics of innovation process are:

- **Uncertainty**. Conditions for innovation or innovation per se are very unpredictable.
- **Knowledge-intensive**. “The innovation process generates new knowledge intensively, relying on individual human intelligence and creativity and involving interactive learning”
- **Controversy**. Innovations are always followed by competition with alternative activities.
- **Crossing boundaries**. Best ideas arise from a combination of different skills and from cooperation between heterogeneous disciplines [7].

It is obvious that basic characteristics of the innovation process can be related to characteristics of human behavior. This indicates the importance of human factor, with all its characteristics, in the process of innovation.

Major stages of the innovation (Figure 3):

1. Idea generation
2. Idea realization
3. Commercialization.

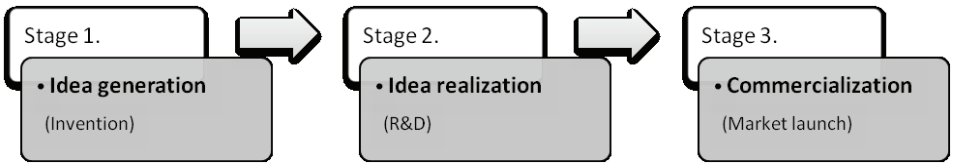


Figure 1 Phases of innovation process [8]

The presence of the human factor is evident at every stage, and its necessity in the first stage is indisputable. If there are no individuals with their own ideas, there will be no conditions for innovation.

Therefore, innovation is a process that requires flexibility, quick action and intensive care, connectedness and healthy organizational culture that encourages individual's talents, collaboration and teamwork.

3. The role of individuals in organizational innovation

It is assumed that individuals produce innovative ideas through processes of rational, deductive reasoning related to satisfying needs and goals of market [9].

It is difficult to really understand the role of scientists in process of innovation, but it is unambiguous that they are vital source of innovation in both products and processes.

Martin Heidegger formulated elements of human nature which can be used for better explaining of the role of unconventional individuals for innovation success. He identified three elements of human nature [10]: (1) it is human nature to be practically involved in a complex world rather than rationally involved with a conceptually simplified world: (2) it is human nature to be authentic (i.e., unconventional uncommitted to one's paradigm) at least some of the time; and (3) it is human nature to be cooperative.

Moments of innovation take place when scientists assert their individuality, break free from the structured thinking of their traditional methods, and synthesize novel interpretations that move their projects in new directions. Philosophy of innovation gives managers a means for understanding and interpreting the human elements of particular innovation projects [10].

It is vital to understand what are the drivers of successful innovation. Organizational creativity mechanisms represent formal approaches and tools which an organization has instituted to encourage innovative behaviour within the organization. Higher innovation level can be achieved by combining management practices that enhance creativity with individual mechanisms. It is necessary to examine the role of team creativity efforts in enhancing innovation performance with an aim of overall improved understanding of creativity, learning, and innovation within organizations [11].

Scott & Bruce defined three determinants of innovative behaviour:

1. leadership,
2. individual problem-solving style,
3. work group relation, and
4. climate for innovation [12].

In the model developed by Scott and Bruce (Figure 2), individual innovative behaviour is presented as the outcome of four interacting systems — individual, leader, work group, and climate for innovation.

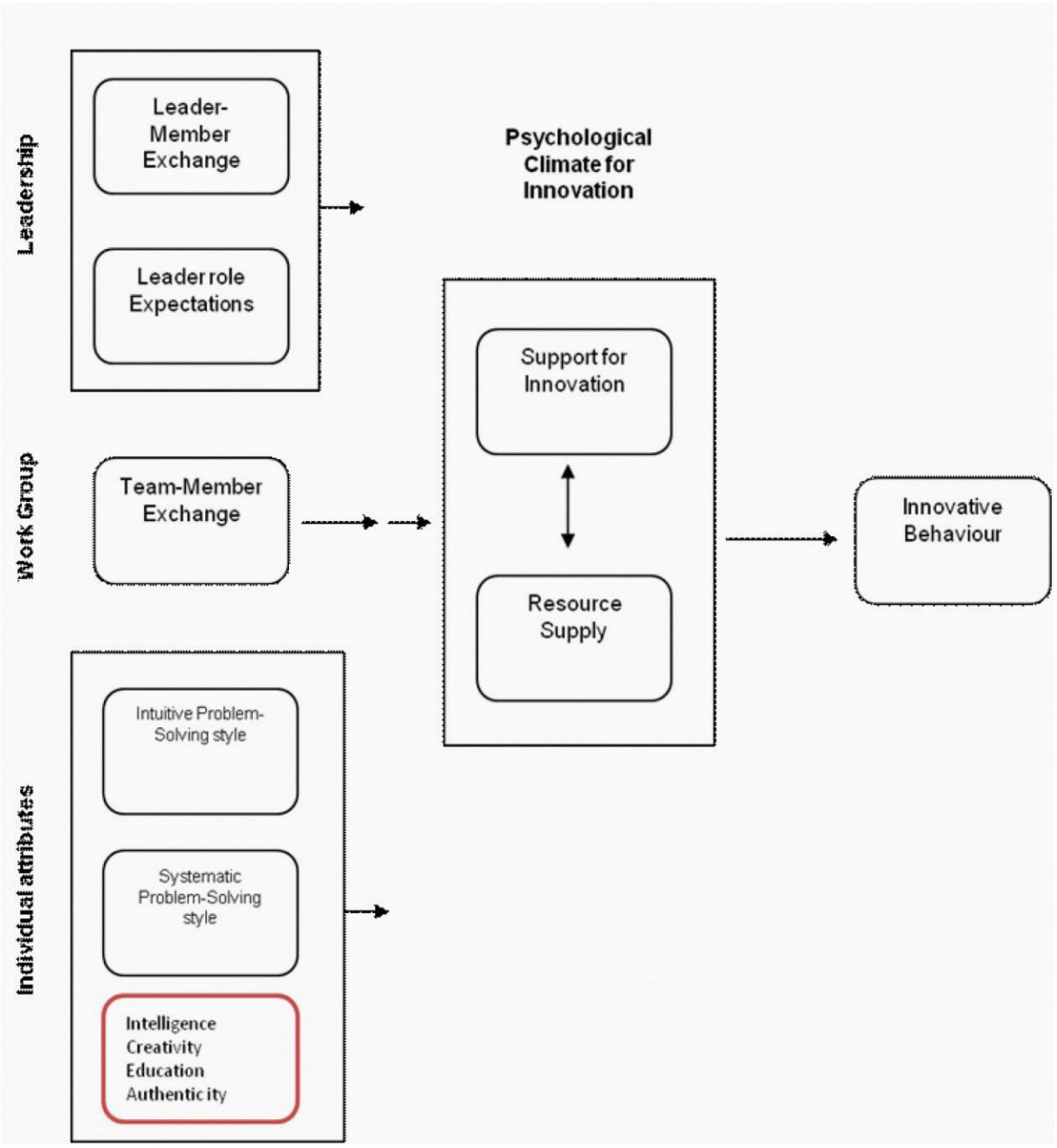


Figure 2 Individual innovative behaviour model [12]

Employees who reported having relationships with their managers characterized by high levels of support, trust, and autonomy also reported the organization to be supportive of innovation and judged the resource supply to be high. It appears that being systematic problem solver inhibits innovation behaviour [12].

Based on Scott and Bruce's model, and with consultation of contemporary literature, we suggested four individual attributes that are important for innovation behaviour of individuals. These are intelligence, creativity, education and authenticity.

Bass states that the innovative behaviour of the scientists was not affected by their managers' role expectations, presumably because of their high levels of education and high independence [13].

The terms "creative" and "innovative" behaviour are used interchangeably very often. Creativity can be defined as the production of novel and useful ideas [14], and innovation refers to the production or adoption of useful ideas and idea implementation [15].

In the literature, different authors agreed that there are a few stages of individual innovation:

1. Individual innovation begins with recognition of a problem and the generation of possible ideas or solutions;
2. Second stage involves seeking for sponsorship for idea;
3. In final stage of innovation process, the innovative individual completes the idea with a creation of a prototype or model of the innovation [16].

Innovation is characterized by sporadic activities rather than regular stages [17], thus it can be expected for innovators to be involved in any combination of these behaviours and stages.

The role of intelligence in innovation is vital. Example for this is when organizations make non-innovative responses to completely new and complex problems [18], or, conversely, when firms make innovative responses to questions or problems that would be solved by routine [19].

Organizational innovation is based on individual and organizational intelligences [20: 1082].

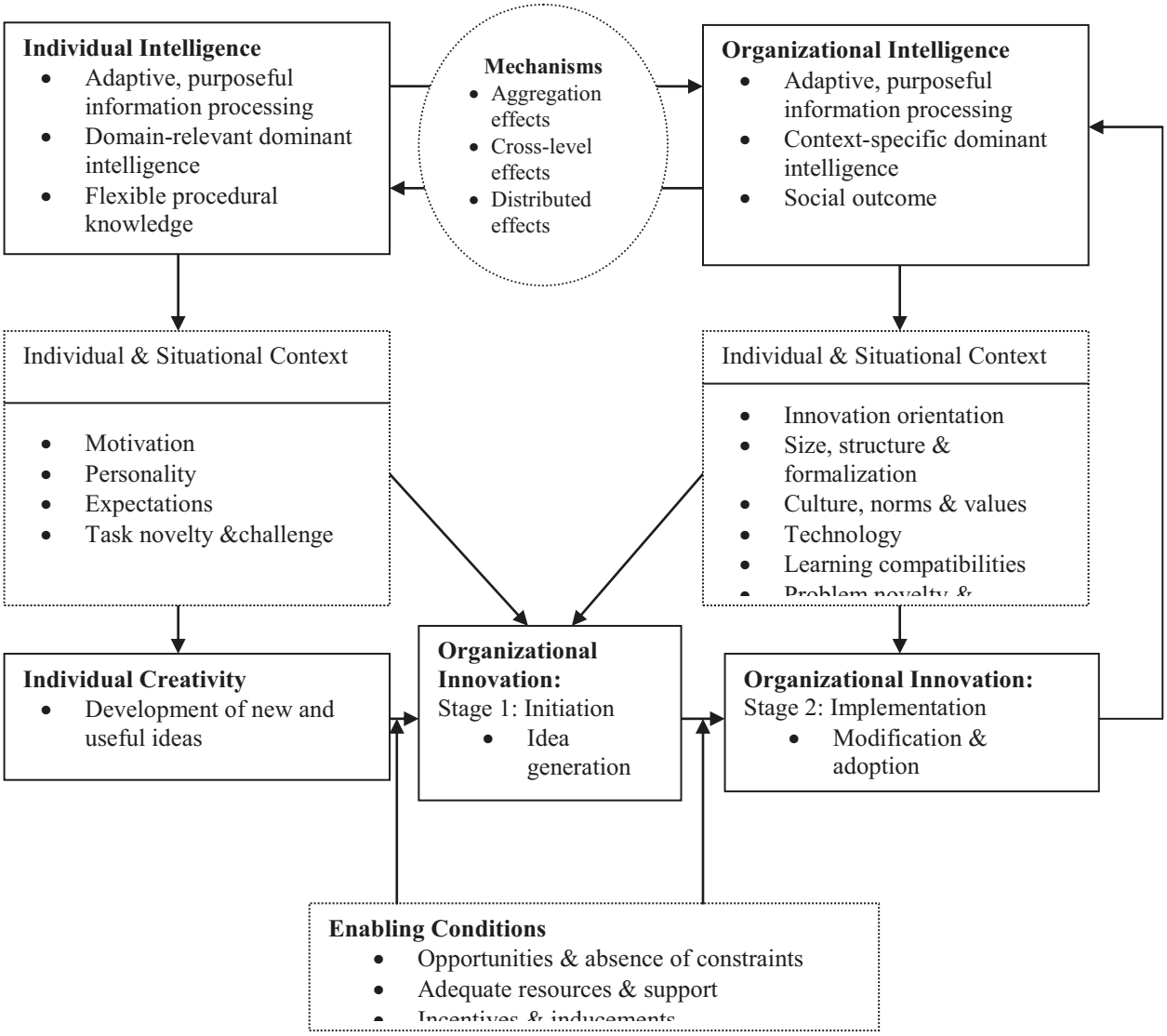


Figure 3 Intelligence and Organizational Innovation [20]

Many researchers have emphasized the importance of key individuals in the innovation process. Quinn claimed that there are types of individuals that are crucial for the success of innovation:

- `inventor/entrepreneurs' who are oriented towards achievements and need,
- experts and
- fanatics [21].

4. Evaluation of innovation

The evaluation of innovations is characterized by environments where uncertainty is high and strategic context is poorly understood. Overconfidence is major and most important bias. It leads individuals to systematically overestimate their evaluation capabilities [22].

Function of evaluation is to show the innovator the significance of his achievement and its success. Role of evaluation in individual innovation is important for the innovator himself. Evaluation has much greater importance to agencies and committees that support or limit the life or the scope of innovation. That is the reason why the evaluation is almost obligatory for innovations of bigger importance that require greater funding [23].

Recommendations for evaluation after every stage of innovation process:

1. **idea generation**: number of suggested innovative ideas, quality of ideas, frequency of ideas, their fitting into the context;
2. **idea realization**:feasibility of ideas, capability of innovators toconduct the adopted ideas;
3. **commercialization**: number of lauched innovative products or services and their succes on the market, market acceptance, diffusion, Return On Sales (ROS), Return on Investment (ROI).

5. Conclusions

Innovation represents specific function, an important element and the basis for success in entrepreneurship.

Process of innovation requires knowledge and creativity, where research and development processes result with a significant value for customer.

Various resources are necessary for the process of innovation. The most dynamic and the most vital sources of innovation are human resources, with a uniqueness of each individual. Innovative ideas are produced through process of rational, deductive reasoning in order to satisfy market needs and organizational goals.

Successful innovation is driven by the mechanism of interaction of individual, leader, work group and organizational climate [12]. The outcome is innovative behaviour of organization that will lead to desired position on the market. In this paper we suggested four individual attributes that are important for innovation behaviour of individuals: intelligence, creativity, education and authenticity.

The importance and the role of individuals must be measured in order to gain insight into the individual contribution to organizational success. Evaluation and monitoring show the significance of achievement of each individual. This is particularly relevant for innovations of bigger importance that require greater investments.

Acknowledgment

This article has been produced as part of a research project no. 47028 "Advancing Serbia's competitiveness in the EU accession process" (2011-2014) supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

References

1 Van der Panne, Gerben, Cees Van Beers, and Alfred Kleinknecht. "Success and Failure of Innovation: A Literature Review." International Journal of Innovation Management, 2003: 309-338.
2 Cooper, Robert G., and Elko J. Kleinschmidt. New Products: The Key Factors in Success. Decatur, USA: Marketing Classics Press, 2011.
3 Drucker, Peter E. "The Discipline of Innovation." Harvard Business Review, 1985: 67-72.
4 Lewis, M., and J. Moultrie. "The organizational innovation laboratory." Creativity and Innovation Management, 2005: 73-83.
5 Vera, D., and M. Crossan. "Improvisation and innovation performance in teams." Organizational Science, 2005: 203-224.
6 Debowski, S. Knowledge Management . Melbourne, Australia: John Wiley & Sons, 2006.
7 Kanter, Rosabeth Moss. "When a Thousand Flowers Bloom: Structural, Collective and Social Conditions for Innovation in Organizations." In Knowledge Management and Organizational Design, by Paul S. Myers. Newton, MA: Butterworth-Heinemann, 1996.
8 Designing innovation communication. 2012. http://blog.iseic-consulting.com/2012/10/05/designing-innovation-communication/.
9 Fonscesca, Jose. "The role of individuals in the process of innovation." In Complexity and Emergence in Organizations, by Jose Fonscesca, 29-50. London: Routledge, 2001.
10 Steiner, Carol J. "A Philosophy for Innpovation: The Role of Unconventional Individuals in Innovation Success." Journal of Product Innovation Management, 1995: 431-440.
11 Bharadwaj, Sundar, and Anil Menon. "Making Innovation Happen in Organizations: Individual Creativity Mechanisms, Organizational Creativity Mechanisms or Both?" Journal of Product Innovation Management, 2000: 424-434.
12 Scott, Susanne G., and Reginald A. Bruce. "Determinants of Innovative Behavior: A Path Model of Individual Innovation in the Workplace." Academy of Management Journal, 1994: 580-607.
13 Bass, B. "Leadership: Good, Better, Best." Organizational Dynamics, 1985: 26-40.
14 Mumford, M., and S. Gustafson. "Creativity Syndrome: Integration, Application and Innovation." Psychological Bulletin, 1988: 27-43.
15 Van de Ven, A. "Central problems in the Management of Innovation." Management Science, 1986: 590-607.
16 Kanter , R. "When a Thousand Flowers Bloom: Structural, Collective and Social Conditions for Innovation in Organizations." Research in Organizational Behavior, 1988: 169-211.
17 Schroeder, R., A. Van de Ven, G. Scudder, and D. Polley. "The Development of Innovation Ideas." Research on the Management of Innovation: The Minesota Studies, 1989: 107-134.
18 Marcus, A. A. "Implementing Externally-Induced Innovations: A Comparasion of Rule_Bound and Autonomous Approaches." Academy of Management Journal, 1988: 235-256.
19 Walsch, J. P., and G. R. Ungson. "Organizational memory." Academy of Management Review, 1991: 57-91.
20 Glynn, Mary Ann. "Innovative Genius: A Framework for Relating Individual and Organizational Intelligences to Innovation." Academy of management Review, 1996: 1081-1111.
21 Quinn, J. B. "Managing Innovation: Controlled Chaos." Harvard Business Review, 1985: 73-84.
22 Luedtke, Jan-Paul, and Christian Lüthje. "The Impact of Overconfidence on the Evaluation of Innovations: An Information Market Experiment." Social Science Research Network, 2012.
23 Trow, Martin. "Methological problems in the evaluation of innovation." Symposium on problems in the evaluation of instruction . Los Angeles: University of California, 1967.

THE GROWTH OF KOSOVO ENTREPRENEUR'S THROUGH EDUCATION & INNOVATION

Fatmir Stublla
Institute for European Integration - IIE, Prishtina, Kosovo

Education and innovation have gained special attention all over the world especially during the last decade.

Based on previous research there is lack of entrepreneur's education in Kosovo. Analysis performed on 2011 with 100 entrepreneurs, resulted that the level of entrepreneur's education in Kosovo is very low.

On this paper research question is: do Kosovo education institutions (private and public) are developing relevant programs related to labor market needs. The paper will present the results of survey with in order to analyze if the education is supporting entrepreneurship activities. Finally there is need also for regional joint projects particularly in Western Balkans as those countries aim integration at the European Union.

Keywords:
Education, Entrepreneurship, Innovation

1. Introduction

All organisations operate in and are affected by an external environment. This creates a dynamic in the environment and indirectly all organisations affect each other and changes the conditions in which they are operating. There is also a limitation of the resources in the environment which create competition among organizations. (March 1991:81) [1]. The organisation itself is not either static and faces changes. These changes can be deliberate and engendered because of changed strategies or organisational goals, but the organisation also changes by the individuals acting in it. These changes emerge from naturally created communities within the organisation where individuals exchanged and share their knowledge and experiences. These communities of knowledge sharing are often more implicit and not so easy to pinpoint. All organisations need to be effective in their use of resources and have the ability to adapt to changes in the external environment so that their survival can be secured. The paper is examining how this can be fulfilled by the knowledge building that takes place within organisations and more specific; how can managers stimulate and control the process of learning in order to achieve desirable outcomes? Firstly, the definite what knowledge and knowledge creation is and what factors stimulate this process that evolves in communities of

knowledge. Do Kosovo entrepreneurs can find educated people at Kosovo higher education institutions, Universities' and Colleges? Further is taken a deeper look at the factors that triggers this knowledge creation and what tools managers have to stimulate and evolve these so that they can be used in order to control de outcome of the knowledge creation. Then will be analyse if there are any dangers of doing so, what they might be and how managers can overcome these.

2. Methodology

In this study, the quantitative methodology has been used as research method. On 2011it was surveyed an investigated research by using quantitative method on field of education, innovation and education.

2. Why should organizations learn and how?

Survive is aim of organization, than can be achieved through learning. Knowledge is ordering of information, we gain knowledge of the world through our experience of it, so potentially everyone's knowledge of it differs. We can find a paradigm which creates a framework and common rules which holds an operation or pattern of operations, and an overall theoretic framework for research and that is conceptual framework in which knowledge is created. The attempt to make sense of environments in the world is not an attempt of discovering reality and truth, but an attempt of maintains the stability, at a very individual level in an organisation in individual level, so that we can continue to function and believe that we do understand the situation as it is or as it can be after the situation is changed. (Jackson N. & Carter P. 2007:67-85) [2].

The environment an organisation is operating in is dynamic, due to different factors, such as; competition, legislation, customer needs, and changes these factors face from time to time. This means that individual has to search for new knowledge where these changes can be taken into consideration and where a new understanding of the world can be made. The creation of new knowledge is made in so called communities. However the knowledge needs to be processed and made explicit before it can be of any use for the organisation and according to Nonaka (1994:17-18) [3] there are four different modes that start the knowledge creation. These modes are:

- Socialization
- Combination
- Externalization
- Internalization

3. Learning by doing

The basic lines of these modes are that first an individual acquires knowledge that is tacit, e.g. when he/she is learning how to perform a task. This kind of knowledge is shared by interaction with other individuals in teams and is often a “learning-by-doing” process. This kind of knowledge is shared by interaction with other individuals in teams and is often a “learning-by-doing” process. The next step is that individuals share and exchange knowledge that they possess and that is interpreted from their own point of view. By this, they can re-interpret existing knowledge, and create new one based on it. Further on, the extern- and internalisation is a part of the organisational learning where individuals expand knowledge that they have and develop it in a way that makes it tacit and create a new common way of doing something. There is though an important aspect to take into consideration when talking about communities and individuals will to share their own knowledge with others and to create new in order to solve different problems that can emerge in their everyday work. First of all individuals will to share information is based on mutual trust. This trust is created by individuals sharing experiences and by mutually shared experiences that enables individuals to understand each others perspectives (Nonaka 1994:24) [3].

Further the knowledge creation needs to be activated by something. There has to be an intention a reason to look for new knowledge. A reason can be that a new problem needs to be solved. This helps the individual to select what information is appropriate and how to use it. Another factor is that individuals might have their own reasons for acquiring new knowledge based on personal goals which creates autonomy and different approaches to the same problem. Finally as mentioned earlier the external environment has a great impact since it distorts the common ways of thinking about the world and forces individuals to order their reality in new ways (Nonaka 1994:17-18) [3]. Since communities are the base of creating changes in organisations and where innovation can take place, it is important for organisation to understand how the communities develop and change (Brown, J.S. & Duguid, P 1991:41) [4]. They are also constantly changing, faced by changing environmental conditions and individual turnover, trying to adapt the views of the organisation to the external (Brown, J.S. & Duguid, P1991:50) [4].
According to Peter Senge (1991:39) [5] the learning is the process of enhancing our capacity for effective action. Brown, J.S. & Duguid, P (1991:53) [4] also claims that if these communities are ignored the organisation might not be able to survive and that it might loose the chance of innovation that could give them larger benefits against competitors. A method for controlled knowledge creation in an organisation is that the managers facilitates and open up possibilities for communities to emerge (Nonaka 1994:22) [3]. However when they create a team, in the form of a conference or workshop, (Contu, A. & Willmott, H. 2003:289) [6], under controlled form the team should be created as if it would be done in a natural way.

The manager has to take into consideration how large the group should be and what individuals to include so that a meaningful exchange can take place in accordance with the problem that needs to be solved.

The individuals should be autonomous, with different experiences and knowledge bases in order to create a meaningful dialogue and exchange. The information that is created in these communities also has to be evaluated and validated by the managers with regard to the goals and aims of the organisation (Nonaka 1994:23-24) [3].

An extension of the view how managers can create these communities of knowledge is that based on the visions and images that top managers have regarding the future of the organisation, it is the middle managers task to transform these visions into a problem formulation, something that the employees can work upon and solve. This way of working is called the Middle-Up-Down Management (Nonaka 1994:29-30) [3]. In other words they have to create a purpose for the employees to create knowledge and they need to give them a base for the knowledge process to take place. This stresses the importance of creating a strong and clear vision that enables employees with different grade of acceptance to understand why a change needs to take place.
So far the discussion has implied that individuals want to create new knowledge and change and that they create these communities in order to do so. Since people are different, with their own knowledge and view of the world, they are not always in favour of changes and they might have their own reasons to reject them. For instance if they are traditional, in the meaning of not wanting to change, they will oppose and not take part in the knowledge sharing process.

An organisation should not only work towards the organisational goals but also support the internal communities and to take into account the knowledge they can create into their strategic development. Through interaction among individuals in an organisation, this knowledge can be shared, extended and create new ideas within the organisation. If managers can succeed to trigger these informal meetings and interactions, and if the organisation is able to extract the knowledge that these communities develop, it could lead to better organisational processes and technologies that can be of great advantage in the competitive environment. However if the individuals in the organisation are not having the same goals and aims and if there are conflicts among individuals the trust, that is the base of knowledge sharing, might be hurt and create inner struggles that destroy an organisations' possibilities to develop.

4. Learning and power

Knowledge sharing is an important possibility of learning in an organization. It means the exchange of knowledge and sharing of experience among individuals and different organizational units. Nowadays, the commitment of organization members becomes more and more important in the process of knowledge development. Because organizations exist, as already mentioned, out of many members with their individual knowledge and skills, they are the main knowledge resources for the organization.

Organizations should learn because first, it is their survival that is at stake and, moreover, it is a precious tool to make successful choices that can help to be ahead from the competition. Being a learning organization means to develop knowledge in cooperation within an organization and

to work as a whole. But then, the role of knowledge itself, its creation and its transmission, should be questioned because what makes a learning organization learn is first the creation of knowledge and secondly its transmission to the members of the organizations.

When the philosophers of all epoch are confronting themselves to the question of power in the political perspective of a state government's legitimation, in the current organizational studies, nowadays, different definitions and taxonomies about power have been defined in order to make organizations more effective. According to Jackson and Carter (2000: 93) [2], it is of capital importance to recognize in the organizational studies the existence of power relationships in order not to eliminate them as it is impossible but to bring different explanations of it.

According to Jackson and Carter (2000) [2], in our capitalist society, we can say that it is how it happens. In a capitalist society, workers are selling their labour force in order to survive by being given a wage and workers are not the ones in position to discuss as people with power are the owners, and so, the one that have the power to decide everything. Indeed, in a capitalist society, the powerful are the owners. In this sense, Jackson and Carter [2] are quite closed to one of the idea of Karl Marx which is developed in *The Capital* (1867) being that the workers lives are dependant of the owners of the production means. Because of their property right, they can do what they want to do with their good, or in our context, with their company, regardless of if it is for the good of the company or not.

So, knowledge can never be dissociated from power because powerful people create knowledge through the discourse, a mechanism that also makes them even more powerful as a consequence. It is important to analyze the knowledge process because it says a lot on who has the power, which type of power, where it is used, how and why.

The concept of knowledge is a subjective, unlinear and anunified concept that is relative to the regime of truth and the paradigms of a society. In the same direction, the concept of power is also relative and dynamic. Indeed, it is an interactional process that is omnipresent. The power relations are part of all human interactions. Therefore, the knowledge creation and transmission is highly dependent on the different power relations.

A leader as a teacher means that other organizational members learn through him respectively get new knowledge. According to Senge (1990) [7], a great teacher or leader clears space for learning and "invites people into that space". But to be a good teacher, the leader has to learn first, and then he can give/ transmit his knowledge to others. Senge [7] mentions another characteristic, namely a leader as steward.

5. Reward power

Reward power or, as Hardy (1996) [8] calls it, '*Power of resources*' exists when the target person percept's that an agent controls scarce resources that are wanted by the target person himself. The power increases along with control over the resources and the reliability of the agent. Compliance will be achieved if the resources are wanted and the target person believes

that he will have access to them when performing the request. The reward in an organization can be a bigger office, wage increase, better job, promotion etc. (Yukl 2006) [9].

6. Information power

Is happening when a manager or a subordinate has control over information. Indeed, by controlling access to information, it is possible to influence perceptions and attitudes of people the way that we want. The manager can keep secret some information in order to enhance the expert power, to avoid possible obstacles that could arise or to increase the subordinate's dependence. On the contrary, the subordinate by keeping information only for himself can influence his superior's decisions (Yukl 2006) [9].

Consultation means that the leader asks other people, for example followers, for their ideas and meanings and makes his decision after considering their views. Another way of participation is a joint decision. The manager discusses the problem and makes the decision together with other involved people.

5. Results

Based on questioner 78% of entrepreneurs responded, that more valuable are informal education then higher education.

On 2011 when we asked our respondents: what is your level of education, 68.7 % of them answered that they have only low level of education, respectively secondary school while 31.3% of them superior
education respectively bachelor degree (Qorraj,G. & Stublla, F.) [10]. Now days (February 2013) to the same question 55.2% of respondents answered that they have higher education such as bachelor or master degree), wail 44.8% have just low lever of education such as secondary school.

According to Kosovo accreditation agency [11] in Kosovo are 25 higher education institutions, three of them are public, and 22 are private.

Kosovo has a population with all most two millions inhabitants. Kosovo Average population age is slightly below 28 years. Kosovo Agency of Statistics (2013) [12].

6. Conclusions

Even Kosovo entrepreneurs have gained some more degree from superior education most of them have les knowledge for entrepreneurs activities. Still superior education institutions, colleges and universities have to improve the curricula to get in level. As it have seen from theoretical framework of this paper and from survey, more valuable are informal courses attending after employed, then courses from universities.

References

1 March, J. (1991) 'Exploration and exploitation in organizational learning', *Organization Science* 2(1): 71-88.
2 Jackson N. & Carter P. (2000) "Rethinking Organisational Behaviour- A Poststructuralist Framework", *Financial Times Prentice Hall*

3 Nonaka, I. (1994) 'A dynamic theory of organizational knowledge creation', *Organization Science* 5(1): 14-37.
4 Brown, J.S. & Duguid, P. (1991) 'Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation', *Organization Science* 2(1): 40-57.

5 Senge P.M. (1992) "The fifth Discipline- the Art and Practice of the Learning Organization", *Century Business*: 4

6 Contu, A. & Willmott, H. (2003) 'Re-embedding situatedness: The importance of power relations in learning theory', *Organization Science* 14(3): 283-296.

7 Senge P.M. (1990) "The Leader's new work: Building learning organizations', *Sloan Management Review* 32(1): 7-23

8 Hardy C. (1996) 'Understanding power: Bringing about strategic change', *British Journal of Management 7 (special issue March*): 3-16

9 Yukl G. (2006) "Leadership in Organizations", *Pearson*, 6th edition: 54, 145-155

10 Qorraj,G. & Stublla, F. (2011) "ICEIRD2011" Ohrid.

11 http://www.akreditimi-ks.org
12 http://esk.rks-gov.net/rekos2011/?cid=1,40,265

THE NEEDS ASSESSMENT FOR UNIVERSITY BUSINESS INCUBATORS IN SOUTH-EASTERN EUROPEAN COUNTRIES

Dimitar Nikoloski [1], Evis Kushi [2], Gjorgji Mancheski [3], Marjan Angeleski [4]

[1] *University "St. Kliment Ohridski", Faculty of economics-Prilep, dimitar.nikoloski@uklo.edu.mk*
[2] *University "Aleksander Xhuvani", Faculty of economics-Elbasan, eviscaku@yahoo.com*
[3] *University "St. Kliment Ohridski", Faculty of economics-Prilep, gmanceski@t-home.mk*
[4] *University "St. Kliment Ohridski", Faculty of economics-Prilep, angeleskimarjan@gmail.com*

The higher education systems in the South-Eastern European countries represent an important factor for generation of essential knowledge and skills that give students advantageous position in the labour market. However, the higher education systems in this region are lacking suitable links between the practical needs of the students and capacities of the real sector. The establishment of university business incubators has been recognised as valuable strategy that would help enhancing the students' entrepreneurial skills and would corroborate with the current state of the economy. In this context, we intend to assess the students' needs, their capacity for generation successful business ideas and the willingness of the potential stakeholders to participate in the process of design and implementation. For this purpose we have carried out a survey on representative samples of students in two universities: "St. Kliment Ohridski" (Macedonia) and "Aleksander Xhuvani" (Albania). Furthermore, a comparative analysis of the results is used in order to draw useful conclusions and recommendations with respect to the types of supporting services and phases of incubation that the model of university business incubator should have to provide. The methodology of analysis includes standard methods for statistical inference and cross tabulation analysis. In our view, the adoption of the model of university business incubator as a standard in the higher education institutions may have large positive impact on the labour markets performance since the increased awareness for self-employment opportunities will stimulate the entrepreneurial climate and induce creation of new jobs.

Keywords
Business incubator, Entrepreneurship, Higher education, Labour market.

1. Introduction

The South-Eastern European countries (SEECs) for more than two decades struggle with depressed labour market conditions that affect all domains of the social life. In particular, they face relatively high unemployment rates coupled with emerging alternative forms of labour market adjustment such as employment in the informal sector, emigration and inactivity. In addition, the SEECs labour markets are affected by striking segmentation, meaning that certain social groups such as: youths, less educated workers, and women, face a much higher risk of unemployment and/or non-participation than the rest of the labour force. The prevailing long-term unemployment has significantly contributed to an erosion of skills and motivation of unemployed workers, making them less employable over time. Due to

the insufficient labour demand and poor employment prospects, a considerable part of unemployed workers called 'discouraged workers' stops looking for jobs and quits the labour force [1].

Under these circumstances the higher education has faced a challenging task to become a generator of competitive and marketable skills for students in order to promote greater employability. During the period of transition we have witnessed a number of reforms in the sphere of the higher education that ultimately aimed at giving the students advantageous position in the labour market. However, the insufficient demand on the SEECs labour market prevents the policy makers from getting relevant feedback of the reforms efficiency. In this context, there exist various strategies for establishing suitable relationship between the practical needs of the students and capacities of the real sector of the economy, among which are the university business incubators (UBI). The role played by universities has been widely recognised in linking research, technology, capital and know-how to leverage entrepreneurial talent, accelerate development of new technology-based firms and speed up the commercialisation of technology [2].

According to our knowledge, the models of UBI have so far received a little attention by academics and policy makers in SEECs as an alternative development strategy that might be valuable in helping to develop local economies, promote technology transfer, create new enterprises and generate jobs [3]. In order to succeed, the UBI have to provide services according to the needs of its clients i.e. the incubatees. Therefore, this paper considers the students' opinions as a basis for building an appropriate model of UBI. For this purpose we have carried out a survey on representative samples of students in two universities: "St. Kliment Ohridski" (Macedonia) and "Aleksander Xhuvani" (Albania). The paper is structured as follows. In section 2 we present the literature review as a theoretical background regarding the types and performance of university business incubators. In section 3 we consider the modalities of the concept of university business incubator in SEECs with respect to the potential stakeholders, supporting services and phases of incubation. The results from the empirical research and the corresponding comparative analyses are presented in section 4. Finally, in section 5 we conclude and present our recommendations regarding the appropriate model of university business incubator in SEECs.

2. Theoretical background

According to the National Business Incubators Association (NBIA), the business incubation is defined as 'business support process that accelerates the successful development of start-up and fledgling companies by providing entrepreneurs with an array of targeted resources and services [4].' However, in the incubator literature we cannot find a consistent definition of the notion of business incubator despite the apparent similarities between different definitions. Critical to the definition of a business incubator is the provision of management guidance, technical assistance and consulting tailored to newly established and growing companies. Having in mind that the business incubator can encompass almost anything from distinct organisations to amorphous structures, in this context we adopt the concept of business incubator as organisation dedicated to the support of emerging ventures [5], [6].

From the historic point of view, the oldest business incubator was created in United States in the 1950s as response to plant closure in Batavia and New York. On the other side, the first university business incubator was established in Europe by the University of Berlin in 1983 aimed at facilitating the transfer of research findings to industry [6]. Business incubators proliferated in developed countries in the early 1980s, whereas in developing countries they are a quite recent phenomenon [7-9]. The earliest incubation programs focused on a variety of technology companies or on a combination of light industrial, technology and service firms

– today referred to as mixed-use incubators. However, in more recent years, new incubators have emerged targeting specific industries.

A business incubator's main goal is to produce successful firms that will leave the programme financially viable and freestanding. Besides this, incubators may have other differing goals, including economic development and generation of new jobs, property venture development, development of export production, diversifying rural economies, providing employment for and increasing wealth of depressed inner cities, fostering entrepreneurship in transition countries and transferring technology from universities and major corporations.

Business incubators vary in the way they deliver their services, in their organisational structure and in the types of clients they serve. The services delivered by the business incubator are normally developed by incubator management and offered both in the business incubator and through its network of contacts. Incubators usually provide clients access to appropriate rental space and flexible leases, shared basic business services and equipment, technology support services and assistance in obtaining the financing necessary for company growth [4]. Some authors intend to consider incubators differently i.e. as a facilitation method such as university programmes which also serve as a training programme for graduate students [10].

Incubators can be differentiated according to several criteria such as: their mandate (for profit or non for profit), the type of sponsorship (private, public or mixed), their focus (mixed use or niche), geographic area (rural, urban, suburban) etc. In this context, the most comprehensive review of different types of incubators is provided by Barbero et al. [11] who despite the heterogeneity distinguish four incubator archetypes: basic research, university, economic development and private incubators.

3. The concept of university business incubator

A university business incubator is a particular type of incubator which has a purpose to bring together various stakeholders in order to offer a variety of services to the students who have potentially successful business ideas and help their start-ups to get established and evolve to the point where they can operate independently. Generally, the university business incubators are viewed as cooperation between the government, local business leaders and entrepreneurial universities in order to promote the development of research/technology based firms in their region [12]. To our knowledge, such type of business incubator in SEECs has still not been established hence, in our effort to develop a suitable model of UBI we address the experiences from similar types of incubators in developed countries and use the best proven practices around the world.

Universities are assumed to have two major dimensions of importance to technology-based firms. First, they are perceived as a source of research and skilled employees and, second, they foster university-technology entrepreneurship linkages as a means of attracting and supporting the development of firms [12]. Moreover, the evidence from the developed countries shows that university link to the incubator reduces the probability of new venture failure [13]. In particular, the UBI should provide a number of support services for students' business projects and assist them toward becoming sustainable business entities. The potentially successful business projects should pass through several phases starting with selection, tenancy, reviewing of graduation and eventually leaving the incubation process.

The incubation process model is often considered as a black box, where the relationship between the input and outcomes might be explained by applying a number of rival theories [14]. In this context, we simplify the theoretical explanation of complex organisational structure and provide a conceptual framework of the UBI as presented on Figure 1.

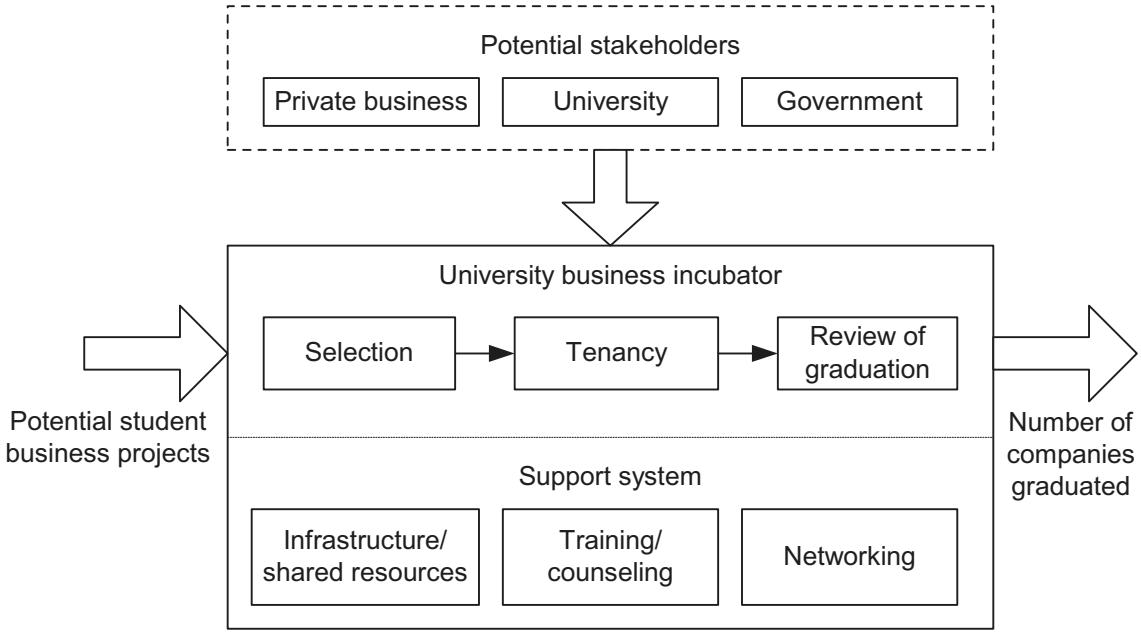


Figure 1 A model of University business incubator

From Figure 1 we can notice that our model of UBI generally consists of three building blocks: potential stakeholders, supporting services and phases of incubation. In what follows we separately analyse each of these elements.

3.1 Potential stakeholders

In the case if incubators are directly affiliated with universities, tenants gain access to the universities' research groups and activities, technology transfer offices, libraries, computing facilities and related educational services [12], [15]. Alongside the universities as potential stakeholders in the university business incubator may appear the government authorities and private businesses. Therefore, in order to meet the interests of all potential stakeholders, we recommend that personnel should have mixed background ranging from academic, local government and business area. The management function should be delegated to a person who has considerable experience in the domain of business advising. The role of the incubator managers is important since he must built high quality relationships with client firms, as well as he needs to initiate network contacts among residents and remove obstacles to enhancing network connections [16, 17]. In this context, UBI would help strengthen interactions between university and industry, promote research commercialisation, and give opportunities for university staff and students to better utilise their capabilities [18].

Particularly susceptible partner in this model of incubation are local government authorities that can contribute to the functioning of the UBI by providing a variety of services such as premises and other logistic support. In return, the benefits of a well-managed UBI for the government can be viewed in the fact that incubators help overcome market failures, promote regional development, generate jobs, incomes and taxes, and demonstrate political commitment to small businesses.

Private businesses may also cooperate with the business incubator in finding potential partners, engage in research-based technology, developing new products etc. In return, businesses can benefit from UBI by developing opportunities for acquiring innovations, supply chain management, and helping them meet their social responsibilities.

3.2 Supporting services

According to experience from several successfully established UBI their main goals include providing variety of services such as office space, shared facilities, business consulting, access to capital, networking and, resources, so that the companies within the incubator learn how to develop and grow their business in order to be competitive in a market economy. Furthermore, the proposed model of UBI may allow two types of incubation i.e. physical and affiliate incubation. Students involved in full incubation would receive physical space, whereas affiliate businesses would receive all of the services except physical space. Students in the affiliate program may not be ready to occupy physical space in the incubator or the nature of the business may not warrant physical space.

Since, all beneficiaries of the UBI will be enrolled full time students, the university may gradually incorporate the UBI activities as an extracurricular programme [10]. Once accepted into the UBI programme, students will be required to participate in variety of activities that we shortly describe. First, as part of the learning process, programme staff needs to be able to review the financials of the company with the student in order to assist in their growth and strategic planning. Second, students have to select and attend relevant seminars to his/her business offered by the university. If the student needs specific course which is not offered, it would be provided by outside consultants. Third, periodically all UBI tenants will meet to hear a guest speaker, network and discuss their ongoing business endeavours. In this way, the incubatees will strengthen social support as a highly valued component of incubator membership [17]. Finally, each tenant will be required to meet with the UBI director individually according to a previously prepared schedule.

3.3 Phases of incubation

Process of incubation consists of several phases starting from selection, tenancy, review of graduation and eventually exit from the incubation and starting post-incubation period. The phase of selection is one of the most sensible parts of the incubation process since it largely determines the outcomes of the incubation and overall incubation performance [14]. In order to make correct selection decision, the process of selection should be done by a competent committee consisting of several experienced members. The applicants should have opportunity to apply on a regular basis once or twice a year, whereas the projects will be evaluated according to a number of indicators.

The period of incubation or tenancy should be limited with or without possibility to be extended after the reviewing of graduation. As successful businesses will be classified those who demonstrate potential ability to operate in a market environment without supporting services from the UBI.

The assessment of the performance of business incubators has been stressed as a critical element to its success [14, 19]. In the literature can be found a number of different performance measures ranging from simple (such as: venture survival rate, employment and sales growth, cost per job etc.) to more complex models for evaluation of an incubator [11]. With an effective assessment the incubator may continually improve its functioning, attending and exceeding the expectancies of all the players involved in the process. For this purpose we propose a set of indicators for the assessment of UBI performance such as: indicators of pre-incubation process, indicators of selection process, indicators of residence period, indicators of the graduate companies and indicators of the management of the incubator.

4. Empirical analysis

In order to build an appropriate model of university business incubators for SEECs we have undertaken needs assessment among students as final UBI beneficiaries. The needs assessment was based on a survey carried out on representative samples of students in two universities: "St. Kliment Ohridski", Macedonia (UKLO) and "Aleksander Xhuvani", Albania (UNAX). These universities are located in neighbouring regions and are involved in a number of cross-border cooperation programmes that promote the economic growth and European integration of both countries. In the university "St. Kliment Ohridski" we have in total interviewed 578 students from six different faculties: Faculty of Economics, Faculty of Education, Faculty of Technical Sciences, Faculty of Administration and management information systems, Faculty of Law and Medical higher school. On the other side, in the university "Aleksander Xhuvani" we have in total interviewed 350 students from four different faculties: Faculty of Economics, Faculty of Education Sciences, Faculty of Natural Sciences and Faculty of Human Sciences. The size and structure of the samples according to various relevant attributes are presented in Table 1.

Table 1 The size and structure of the samples according to various attributes

	University "St. Kliment Ohridski"	University "Aleksander Xhuvani"
Sample size	578	350
Degree of studies		
Undergraduate	516 (89.27%)	295 (84.29%)
Postgraduate	62 (10.73%)	55 (15.71%)
Year of studies		
1	227 (39.27%)	67 (19.14%)
2	91 (15.74%)	64 (18.29%)
3	139 (24.05%)	164 (46.86%)
4	121 (20.93%)	55 (15.71%)
Gender		
Male	218 (37.72%)	123 (35.14%)
Female	360 (62.28%)	227 (64.86%)
Place of living		
Town	454 (78.55%)	259 (74.00%)
Village	124 (21.45%)	91 (26.00%)

Source: Authors' calculations

From Table 1 we can notice that although different in size, the structure of the samples is relatively close with respect to the major attributes such as: degree and year of studies, gender and place of living of the surveyed students.

According to our analysis, respondents in both universities have mixed overall opinion regarding the prevailing business climate. This finding is consistent with the generally perceived economic progress in SEECs that are still lagging behind more developed transition countries. Moreover, the majority of the surveyed students are not familiar with the concept of UBI (about 63% in the university "St. Kliment Ohridski" and 88% in the university "Aleksander Xhuvani"), whereas 24% of the respondents in the university "St. Kliment Ohridski" and only 8% in the university "Aleksander Xhuvani" declared that have heard and know the aim of the UBI. In addition, we have attempted to identify the profile of those respondents who are familiar with the concept of UBI by using cross tabulation analysis. We have revealed that these students manifest more entrepreneurial attitudes compared to those who are not familiar with the concept of UBI. Namely, the majority of them have

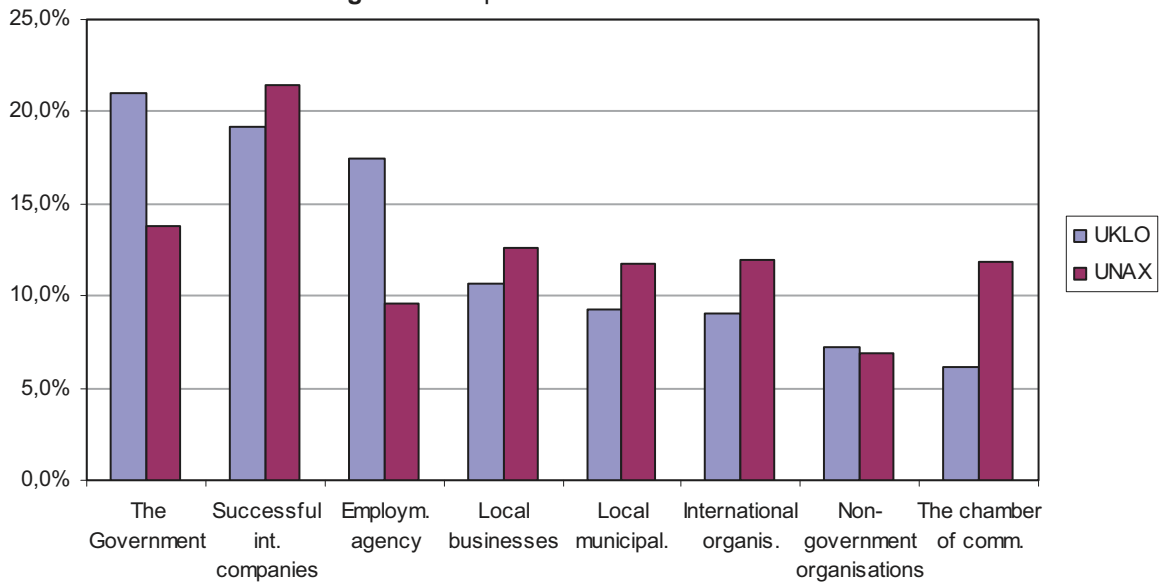
concrete ideas for starting their own businesses; they think that universities create incentives for starting own business; and universities should be linked with the business community. In order to support these hypotheses we have carried out Chi-square tests and in all cases we have rejected the null hypotheses of independence between the rows and the columns at 1% level of significance.

On the other hand, the respondents are generally optimistic with respect to the question whether UBI will contribute to easier implementation of the students' business ideas. For instance, among the surveyed students in the university "St. Kliment Ohridski", 46.5% think that UBI will contribute, 44.1% do not have opinion, and only 8.4% think that will not have impact on the implementation of the students' business ideas. Similarly, in the university "Aleksander Xhuvani", the share of the respondents that demonstrate positive attitude toward the idea of creation of UBI is 67.4%, whereas 32% do not have opinion and only 0.6% of the respondents are not optimistic. We further apply cross tabulation analysis in order to identify the profile of those respondents who think that creation of university business incubator will contribute to easier realisation of the students' business ideas.In this context, we notice that this category of students is characterised with greater entrepreneurial spirit compared to those who are not optimistic with this regard. Similarly as in the previous case, the majority of them have concrete ideas for starting their own businesses; they think that universities create incentives for starting own business; and universities should be linked with the business community. The formal Chi-square tests of independence show that in all cases we have to reject the null hypotheses of independence between the rows and the columns at 1% level of significance.

The cross tabulation between the level of familiarity with the concept of UBI and the level of optimism regarding the successful contribution of the UBI in easier realisation of the students' business ideas shows consistent pattern. Namely, students who are familiar with the concept of UBI manifest pronounced optimism, whereas those who are not familiar are rather indecisive with this regard.

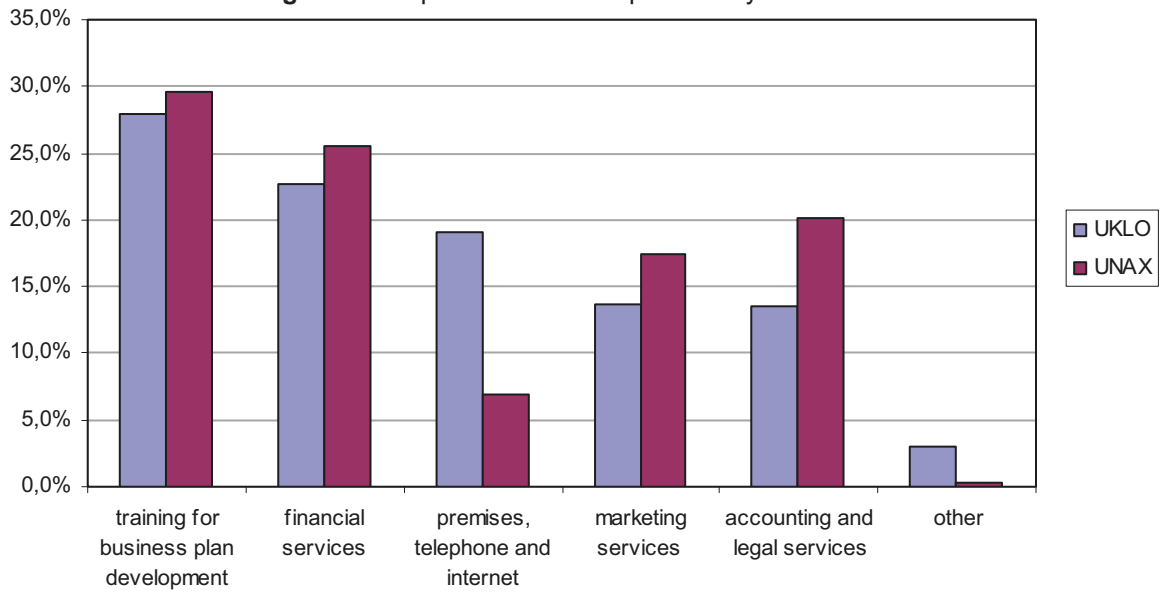
We further consider the students' opinions with respect to the stakeholders in the UBI and the services they think the UBI has to provide to future incubatees. Regarding the potential partners, apart of the university, the government and successful international companies appear to be the most plausible stakeholders according to the respondents in the university "St. Kliment Ohridski". On the other hand, the respondents in the university "Aleksander Xhuvani" give accent to local businesses, municipalities and international organizations. This is graphically presented in Figure 2.

Figure 2 The potential UBI stakeholders



With respect to the potential services that UBI should provide to its incubatees, the majority of the respondents in the university "St. Kliment Ohridski" pointed out the importance of training for business plan development, financial services and premises equipped with telephone and internet. On the other hand, the surveyed students in the university "Aleksander Xhuvani" besides emphasizing training for business plan development and financial services have also appreciated the other services such as: marketing, accounting and legal services. This is graphically presented in Figure 3.

Figure 3 The potential services provided by the UBI



Finally, according to our empirical analysis, we found that about two thirds of the respondents in both universities declare that UBI should be located within the university. Regarding the duration of the incubation process, the majority of the respondents think that

the period of incubation should last at least one before ensuring sustainability of the businesses in the real market surrounding.

5. Conclusions and recommendations

According to NBIA, business incubators have proven to be effective tools for promoting economic growth throughout the world, but not all incubation models are suitable for all communities. In this paper we have made an attempt to assess the needs for university business incubators in SEECs and to formulate recommendations for building appropriate model of such type of business incubator. The incubation can make a number of contributions to the development of high-technology firms, which would not normally be available to non-incubated firms. When provided by the universities, incubators can facilitate the process of transferring know-how from the university to the business community and vice versa.

Having in mind the experience from developed countries and the information gathered from our needs assessment, we can formulate the following recommendations in order to help universities in the South-East European region that would like to develop business incubation programs:

- The UBI needs to be accommodated to the local entrepreneurial climate. Our analysis revealed that there exist positive association between the entrepreneurial attitudes of students and their optimism regarding the contribution of the university business incubators.
- In order to be successful UBI have to match their services to the needs of local entrepreneurs. According to our survey results, an appropriate model of UBI in the South-Eastern European region should, in the first place, provide training for business plan development, but also important are financial, marketing, accounting and legal services to potential incubatees and the businesses they operate with. This preliminary research can help to determine the optimal scope of services embraced by the incubation programme.
- Although the respondents in our study are rather optimistic regarding the success of the UBI, the universities should not expect an incubator to resolve persistent economic problems. UBI can play a vital role in a community's economic development efforts, but hardly can they turn around a local economy independently. Therefore, the university business incubation programmes have to be part of a larger economic development plan.
- The model of UBI as an economic development tool has to be flexible. Nowadays, there exist a number of different types of incubators that might be more effective at sparking economic growth than more traditional incubators such those that serve a variety of manufacturing or service clients. Therefore, when building the model of UBI, the creativity has to be combined with sobering considerations, like the existence of a sufficient market and the support of business, political and civic leaders.
- The real estate has not been proven to be a critical factor that drives the project of implementation of a UBI. The incubator's location is only one of many factors that will determine whether the project will succeed. Our analysis revealed that most suitably and naturally is to locate the UBI within the university, but participation of other stakeholders may help in finding more appropriate solution.
- The implementation of a UBI has to be accompanied with a solid financial plan. Creating an incubation program is not an inexpensive endeavour. From conducting the feasibility study to launching the incubator, the universities must piece together funds from a variety of sources. A well-developed financial plan that identifies the sources of needed

funds for providing incubation services goes a long way in attracting investors and other supporters.

- Finally, the UBI has to be established on realistic goals. Namely, developing a successful incubation program takes time. While it's important to reach out to local leaders and entrepreneurs it should not be realistically to expect to create large numbers of jobs or graduate new firms within months of incubator's opening. The goal of the UBI has to be oriented toward ongoing support of the community and long-term success in promoting young and educated entrepreneurs.

References

1 Nikoloski D. The sustainable rate of unemployment in transition countries – A case study for Macedonia. VDM Verlag, May 2009.
2 Sarfraz M. The University Business Incubator: A Strategy for Developing New Research/ Technology-Based Firms. The Journal of High Technology Management Research Vol.7 No.2. 191-208. 1996.
3 Nikoloski D. Macedonian labour market and the role of university business incubators. Proceedings from the 4th International conference for entrepreneurship, innovation and regional development ICEIRD, Ohrid 5-7 May, 2011;
4 National Business Incubators Association http://www.nbia.org
5 Bergek A. and Norrman C. Incubator best practice, Technovation 28, 20-28, 2008.
6 Aernoudt R. Incubators: Tool for Entrepreneurship, Small Business Economics 23: 127-135, 2004.
7 Scaramuzzi E. Incubators in Developing Countries: Status and Development Perspectives. The World Bank infoDev programme, 2002.
8 Kmetz J. Business Incubators for Central and Eastern Europe. University of Delaware. 2000.
9 Al-Mubaraki H. and Busler M. Business Incubators: Findings from a Worldwide Survey, and Guidance for the GCC States, Global Business Review, 11:1, 1-20, 2010.
10 Erikson T. and Gjellan A. Training programmes as incubators, Journal of European Industrial Training 27/1, 36-40, 2003.
11 Barbero J., Casillas J., Ramos A. and Guitar S. Revisiting incubation performance: How incubator typology affects results, Technological Forecasting & Social Change, 79, 888-902, 2012.
12 Mian S. The university business incubator: A strategy for developing new research/technology based firms, The Journal of High Technology Management Research, Volume 7, Number 2, Pages 191-208, 1996.
13 Rothaermel F. Thursby M. Incubator Firms Failure or Graduation? The Role of University Linkages. Research Policy (34) 1076-1090. 2005.
14 Hackett S. and Dilts D. A Real Options-Driven Theory of Business Incubation, Journal of Technology Transfer 29, 41-54, 2004.
15 Sa C. and Lee H. Science, business and innovation: Understanding networks in technology-based incubators, R&D Management, 42, 3, 2012.
16 Ahmad A. and Ingle S. Relationships matter: case study of a university campus incubator, International Journal of Entrepreneurial Behaviour and Research, Vol.17, No.6, 2011.
17 Cooper C., Hamel S. and Connaughton S. Motivations and obstacles to networking in a university business incubator, Journal of Technology Transfer (2012) 37:433-453.
18 Lalkaka R. 'Best Practices' in Business Incubation: Lessons (yet) to be Learned, International Conference on Business Centers: Actors for Economic and Social Development, 2001.
19 Bizzotto C. The Incubation Process. infoDev Incubator Support Center, 2003.

ELDERLY CARE: COPING WITH LONG-TERM LIGHT-CARE CONDITIONS (LTC); DESCRIBING THE HEALTH NEED, DESIGNING THE EQUITY AUDIT AND DISCUSSING THE HEALTH COMMISSIONING

Evangelos Ergen[1]

[1]*The International Faculty of the University of Sheffield, CITY College,*
ergen@city.academic.gr (http://www.ergen.gr)

The essence of solidarity among societal members has been recognised through time as a major contributor for the sustainability of healthcare systems. Nevertheless, recent socio-economic changes have altered this axiom focusing on new models of healthcare, which are based mainly on mutuality and financing rather than solidarity and reciprocity. As a result, recent global policies impose straight interventions to be implemented in regional healthcare systems, orientated to cost-minimisation and restructuring. On the other side, not far from today, Europe will be obliged to confront with a significant change in populations' age synthesis.

This study deals with longevity and ageing and their impact in society throughout coming years. It seems that both factors are expected to jeopardise social cohesion and to test resilience and health welfare across nations. Increasing longevity in combination with falling fertility rates and the forthcoming retirement of baby boom generation create an explosive mix of non-reversible parameters which may push healthcare systems to their limits and affect social prosperity by directing in repetitive recessional effects. Therefore, new challenges appear in the complex adaptive environment of healthcare. Focusing on the emerging age group of 65+, and scrutinising the unique case of Greece, there is a recommendation to test a new service which will be adapted to elderly care needs and demands with the support of University hospitals which will undertake the responsibility to implement a framework for eliminating any health inequalities and cultivating a smart environment to transform elders into a more active ageing group.

Keywords: Ageing, Equity audit, Healthcare need, Longevity, Resilience

1. INTRODUCTION

Healthcare presupposes the existence of solidarity, as one of the pillars, to secure the provision of health benefits to the population. Solidarity applies as a principle and practice to societies that accommodate wealthy and poor, strong and weak, active and non-active, younger and older populations (generations' inter-coverage). On the other hand, diversification and stratification are core characteristics of living entities which could operate as, sources of progress, innovation and prosperity; the challenge is always the successful integration of such powers.

European Commission in its recent demographic report [1] highlights that fertility rates in EU-27 will remain low for the next 30-40 years. In addition, by 2060, the median age of European population will be 48 years (currently in 41). On the other side, life expectancy, as an average for the region is currently close to 80 years. The part of population which belongs to 65+ counts for 17.7% of the European population. This number, based on recent forecasts is expected to reach 25% till 2030 following an increasing path close to 30% till 2060 [2]. Obviously such statistics reveal low replacement rates in the future active workforce. Besides that, the continuous inventions in medicine with the invaluable help of technology, direct to

life prolongation. It is a paradox that humankind is challenged to finance its survival and this is considered a problem, since there is lack of resources.

Evidence based information used in this study is mostly come from EU-27 reports and other key countries outside Europe. Unfortunately in some of these reports data on Greece are missing. Nevertheless, their combination helps to get clear acknowledgment of the real situation. Although the addressed health need refers to Greece, the model presented could be adopted as well, in every region within Europe.

The next section provides the initial motives of this study which were the basis for researching the literature on the specific age-group. Section 2, incorporates the description of the health need, as identified and according to the specialties of the 65+ age group. Moreover, there is an attempt to perform a health need assessment mainly from the patient's perspective. Section 3 covers the designing of the equity audit including certain stages trying to see it from the equity point of view. The study recommends a new service framework which can be used towards 2030 in order to cope with the increasing healthcare needs of elders. The last section refers to commissioning and especially it tries to discuss the challenges for commissioning this new service. Conclusions of the study highlight the significance of integrating different stakeholders under the same target.

1.1 The motives of the study

According to various researchers [3][4][5], the growing numbers of elderly population impose the need of developing new practices for care provision and for financing healthcare systems. In 2006, it was registered that in OECD countries, the 80% of the 65+ people, experienced long term conditions with obligatory regular medication [6]. In the same year, according to the German Federal Statistics Office, the proportionate of elderly population was uneven to their corresponded medical costs, as part of the whole healthcare expenses in Germany *(Figure 1: Ageing population and healthcare costs* [6]).

The 20% of the population used the 47% of the system's resources, which was more than 100 billion euro. OECD countries have already spent a significant part of their GDP in long-term-conditions care (*Table 1: The share of 65+ experiencing long term conditions and receiving residential care. A comparison on OECD countries* [33]).

The *World Health Organisation [7],* although in one of its recent studies identified the impact of economic recession in healthcare provisions, it had clearly stated that before cutting resources it is suggested to look for opportunities in improving efficiency. An example could be what Whitney [8] asserted; the one of the major future trends for healthcare reform is when patients will undertake more responsibility for their own health, treatment and care. Active workforce which currently states in the age range between 50 and 60 is mainly the group which will be part of the ageing booming up to 2030. The year 2020 could be considered as a major timeline in the ageing evolution *(Table 2: Underlying demographic projections. A comparison on OECD countries* [37])

Nevertheless, not to disregard that this population demonstrates characteristics of a technology-friendly group, accustomed to modern practices and tactics.

Regarding Greece, the fertility rate and life expectancy are close to the EU-27 average *(Table 3: Life expectancy and health life years of elderly persons, 2009 (European Union-27)* [2]). Nevertheless, in medium range, the old-age dependency ratio is projected to rise above EU-27 and OECD averages (*Table 4: Evolution of dependency ratios 1960-2030. A comparison on OECD countries* [33] & *Table 5: Projected old-age dependency ratios. Population aged 65+ in relation to the population aged 15-64 (EU-27)* [2]).

Moreover, Greek population is expected to grow slightly until 2050 [9]. Although the country experiences various reforms in its healthcare system, the 65+ group is expected to form an emerging market providing space for innovation and development of technology-aid practices [10]. Very recently, *European Commission [11]* introduced the European Innovation Partnership Programme on Active and Healthy Ageing. This programme adopts actions which are based on three pillars: (a) prevention screening and early diagnosis, (b) care and

cure, (c) active ageing and independent living. Growing old and living autonomously is crucial and interdependent. Holland and Rodie [12] highlight that the ability to remain functionally independent or need minimal assistance is the fundamental characteristic of having quality of life. This is expected to be the next challenge for the elders and the society and this is the primary motive of this study.

2. Identification and description of the health need

A complex adaptive system incorporates different groups which develop a level of connectedness among them. There is difficulty though to keep them in equilibrium, but if succeed in, this is expected to cultivate the ground for further progress and achievements for the system and the society. Governance defines leadership and the politics to follow, in order to ensure that different players of the system will co-operate effectively in alignment to the same purpose.

Therefore, primary concern for governance is to maintain the equilibrium. At this stage, given the statistics, the 65+ group is expected to be a separate force in the society. As a result, it is crucial not to margin them but to apply quickly practices that will embody them.

The link to this concern is the healthcare provision. If the society succeeds in incorporating and converting this human force into a valuable part, this will produce mutual benefits.

2.1 Problem description

The main concern is that elderly people are treated by the Greek healthcare system as an ordinary age-group ignoring their specific needs. This behaviour reflects current mindsets which have not really assessed yet this part of patients. Nevertheless, current practices demonstrate two major implications. The first is that this group does not receive the appropriate healthcare attention and service. The usual outcome is (a) repetitive uses of the system since they are not satisfied, and (b gradual increase in the final cost per capita. The second implication relates to the service gap that derives from the previous implication. There is no special identification and procedures for light care demands of elders. There is no careful reception and fair distribution according to their real needs. Therefore, they use the main system as any other age-group and spend resources which under circumstances lack from other categories. Obviously, since various statistics have demonstrated the increasing number of elders with long term conditions needing long term light care (*Table 6: Projection of publicly financed long-term care share of GDP. A comparison on OECD countries* [37] & *Table 7: Healthcare expenditure for services, administration and the provision of long-term nursing care (EU-27)* [2]), this by itself, constitutes a market with separate characteristics. Sometimes, this market experiences distortions, in terms of real needs and demands. In addition, this emerging market uses an increasing percentage of GDP in terms of their health expenditures (*Figure 2: Healthcare expenditure and care for the elderly (% of GDP) (EU-27)* [2] & *Table 7*).

This study focuses on light healthcare issues and do not penetrate in morbidity or disability among elderly. The group is the one which demonstrates less frail status; therefore it is less costly to restate them in the community. Moreover, the first 10 years of ageing group (age 65-75) is more possible to be active.

Longevity and ageing are social characteristics which can formulate communities that are diversified from other age-groups. Their members demonstrate different behaviours, demands and needs. Trying to embody them in the regular healthcare system was proved so far, costly and ineffective. The example of Germany (mentioned earlier) clearly coincides with a generalised version of a pareto distribution. Similarly to the axiom that a small percentage of people owns a large number of wealth (the 20/80 principle), in the case of healthcare provisions, elder people use disproportionate healthcare resources. Therefore the challenge

is not only their adaptation in the healthcare system but their successful restatement in activities that will benefit them and the society. This remains closer in the creation of a living service experience rather than a simple healthcare service.

2.2 Health need assessment

According to McKinsey & Company [13] out-of-hospital programs for the elderly population with long-term-conditions (LTC) can yield major savings, in the Greek healthcare system. On the other side, within the next 10 years this nascent domestic industry is expected to demonstrate a continuous growth. By achieving healthy and active ageing this will increase the potential labour force with direct impact on health outcomes and costs [14].

Health needs assessment (HNA) is the process of exploring the relation between needs, resources and outcomes [15]*;* in the figure below (Figure 3), it is intended to specify this relation in real terms. The information used is current but the perspective is to identify this relation in the near future as well. The relations presented reveal the weaknesses and the areas for improvement. This model counts mostly public resources but incorporates also the current low-level private services in primary care. The profile of elders is the basis for their health needs and according to their demands there is the use of health resources which result in the health outcomes.

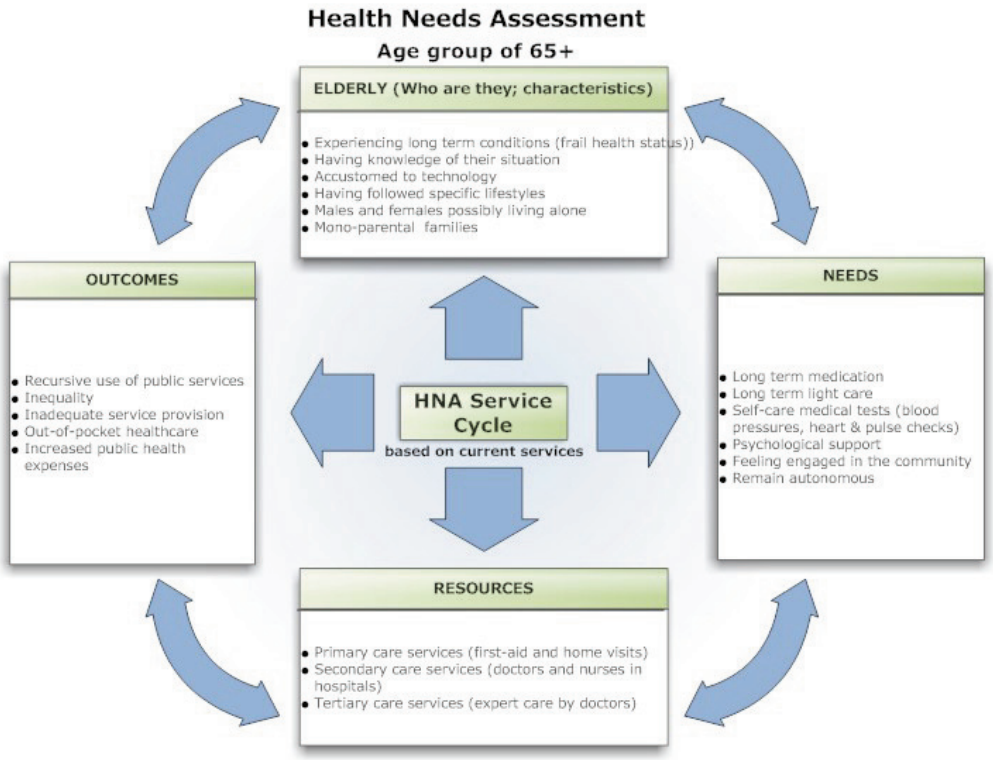


Figure 3 Health Needs Assessment – The 65+ age group.

The relation as presented implies that health outcomes are not equivalent to the patients' profile, needs and resources. Something is going wrong which affects the final service and spends resources with no return benefits. A new resource, or a derivative of a restructured resource, which would monitor better the profile and needs of the elders could probably improve the health outcomes.

3. Designing the equity audit

The main concern of equity audit is to ensure the distributive justice as stemmed from the health service outcomes. The 65+ group is characterised by a number of vulnerabilities mostly related to their loss of autonomy. Long term conditions create gradual devolution of quality of life. Although current social patterns do not provide a healthy framework for coping with the inequalities of elders in the country, this is expected to change. Younger generations, which are accustomed to modern lifestyle patterns and are more technological orientated, will affect the social composition in the coming years. Nevertheless, current trends demonstrate that the distribution of health services in the specific group is unfair. Therefore, the objective is to propose an intervention, which will focus in minimising inequalities trying to use mainly existing resources in a smart way.

3.1 Agree priorities and partners

Health services to elders should be planned according to the following principles:

- to maintain a qualitative provision of health services to ones who need in-house care;
- to integrate and balance care tailored to demand;
- to adopt a more holistic view of their needs and their position in society;
- to identify the significance of the situation on personal basis and provide adequate care service;
- to provide special attention in the group due to its vulnerability;
- to keep them active and prolong their productive contribution to society; (since the age synthesis of global population changes and the tension is the mean to exceed 40 years, it will be a challenge for the prolongation to be accompanied by an active elder workforce);
- to develop ICT solutions to help them stay independent and more active;
- to train them in acquiring self-care knowledge and better manage themselves;
- to create small non-threatening changes in their daily lives;
- to provide a consumption-related experience;

The societal partners in this effort are the government in cooperation primarily with University hospitals, and with pharmaceutical companies, doctors, paramedical staff and local authorities including academia experts (Figure 4). Patients are also a valuable link in the chain of health service.

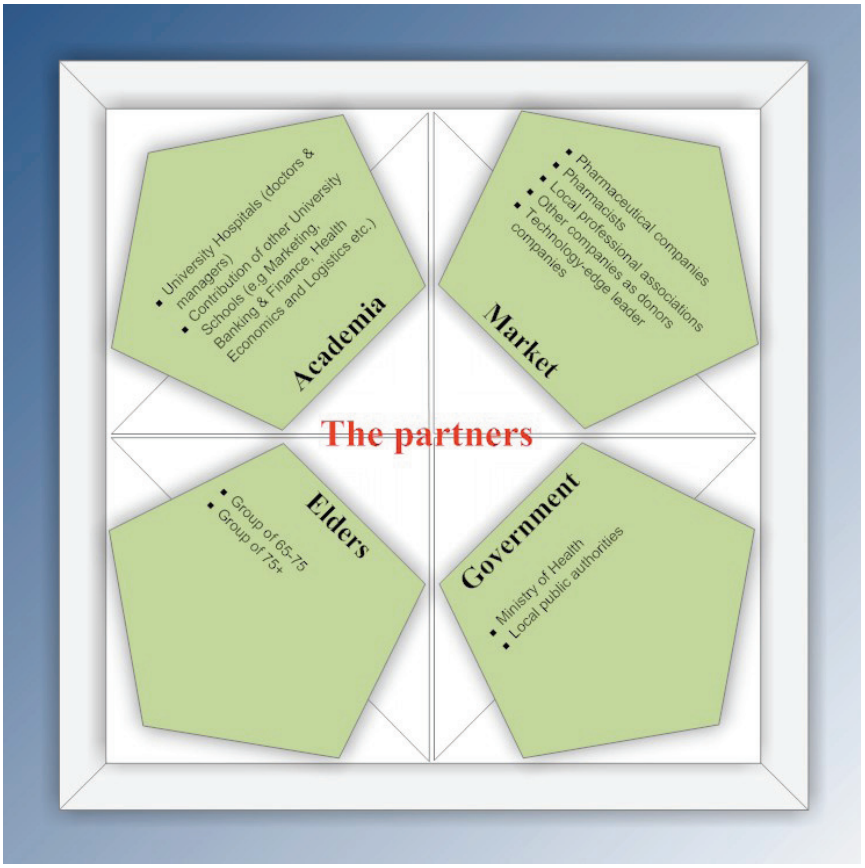


Figure 4 The partners.

3.2 Equity profile

The 65+ group, as discussed earlier, demonstrates vulnerabilities since it tries to cope with a number of difficulties stemmed from long-term conditions, on daily basis. Mediterranean countries still demonstrate a specialty in elderly care which stands through time. There is a significant number of elders who receive light care either from their spouse or from family members (family-based care model). The household status remains a significant parameter affecting their living conditions (*Table 8: Household status of persons aged 65+ (EU-27), 2009* [2]).

Moreover, in contrast to previous years, young people do not leave parental housing early. This, on the one side delays their initiatives to create their own family but, on the other side, guarantees in a sense, the provision of light health care to their parents (medication, simple health care practices, dietary etc.). At this point, it is worth to add that women are the main pillar in the family-based care model in Southern European countries [16]. Also, the recent collapse in the Eastern Bloc generated a big number of immigrants (mainly women) who offered their cheap and flexible nursing services for in-house or even in-hospital healthcare. This practise increased the out-of-pocket expenses for elders, but at least it was an alternative to fill in the public service gap. According to Bonnet et al [17] in coming years, demographic and social changes will increase the continuing burden of family support. In addition, the healthcare sector is expected to experience high pressure of work and shortage of care personnel due to increasing expenditures and financial burdens [18]. The most important consequence of life in this group is their gradual loss of autonomy through longevity.

3.3 Evidence and the possibility of effective regional action

In parallel to the change of age synthesis until 2030, this is expected to be accompanied by the cognitive and perceptual change of people belonging to these age-groups on that

time. Elderly are expected to have higher knowledge acquisition levels as well as be more acute and receptive regarding evolutionary practices. According to Barros et al [19], lifestyle and health attitudes define the health behaviour of people. These two parameters may be or not the causes of health inequalities. Moreover, elders are participants in the system and have equal responsibilities on its effectiveness and progress. The case of not using often the healthcare system may be a target within the desired limits. Using recursively the system deteriorates the quality of the regional human capital and it is an index of non-healthy inhabitants. On the other side, Barros et al [20] concluded that the elders with a greater degree of schooling are significantly more active than those with lower levels and have different mindset towards active ageing. Greece demonstrates both high levels of schooling among medium age people as well as a fairly higher ratio of life expectancy comparing to other European countries.

3.4 The target

Since the country is experiencing major reforms in healthcare sector, it will be a unique opportunity to proactively establish a separate framework for the elderly care, addressing the ones that need primarily light care. As implied earlier, the standardization in treatment might create inequalities. Therefore, the recommendation is to provide a separate additional healthcare service experience to the elders, which will aim to identify their health situation, prioritise their needs and secure that they will receive the necessary treatment according to their status. Elders, who belong to our watch group, will get into a regional health collaborative network which will provide light healthcare in their home environments through the accommodation of information and communication technologies. The intention is to create a smart environment of health provision where all partners will participate and contribute. The aim is to fulfil the priorities as discussed earlier through the use of this network. Actually this recommendation is inspired by the *European Commission's [21]* directive about extending active and independent living through Open and Personalised solutions (European Pillars of Active Ageing and Independent Living).

The practice of collaborative networks and assistive technologies is increasingly adopted especially when this refers to health issues [22][23][24][25][26]. Although this implies the use of tele-care platforms this service is not only this.

Since, it is expensive for the healthcare system to be used repetitively then the creation of regional smart environments in the country could be a solution in monitoring the priorities just described earlier. This could be achieved by reducing the demand for professional nursing and similar services through the use of smart environments. There are already used a number of different digital services in healthcare such as mobile web services, digital health in-house equipment [27].

The new service will operate within University hospitals. The University hospital will accommodate the "Office of Elderly Care" with the following responsibilities:

- to create a patient's registry starting from their data from their hospitals' visits;
- to cooperate with a network of public and private doctors and paramedical staff for exchanging information on elders;
- to define and upgrade the scope of services offered to the elders;
- to critically assess and supervise the services offered through certain feedback from the partners including the patients;
- to establish quality standards;
- to create a performance and appraisal internal system for the cooperative players;
- to keep elders active and productive through digital home programmes;
- to cooperate with a number of medical equipment suppliers;
- to create a mobile network using latest technology in order to keep mobile contact with all patients registered in their database;

- to classify elders according to their needs and living status and monitor them through the mobile network;
- to keep contact with elders' families and close persons (if any);

This service experience will work under the supervision of the government. It could be part of the public healthcare system but operating in a separate manner aiming to bring together the needs and the services. Government will act mainly as an agent. The supervision will be delegated to the University hospitals and to their management. The new framework does not intend to create inequalities of privileged services for the elders. On the contrary, it aims to exploit synergies and economies of scale.

Academia is expected to cope with this project in a professional manner and this could be a great opportunity to link theory with practice. The operation of such offices will be financed from the local authorities budgetary planning, as well as the hospitals and universities annual budgets. It will be a big challenge to attract external funds from companies and donors who will support this effort in exchange of extracting research results that will help the market.

3.5 The service delivery and its resources

Local initiatives in healthcare are helpful and may result as new paradigms for further replication. Given that currently Greece experiences structural reforms, any peripheral actions, in a decentralised and independently operational way is less risky, needs less money and could be implemented more easily providing quick effective results.

In Figure 5 is given the service delivery process which illustrates the flow of operations and the interrelation among participants. There will be a central data based system which will mainly administer and evaluate the data related to the lifestyle and medical needs of patients, who are members of the smart environment. This system will be in continuous interaction with the partners through an open connection (e.g. Community of Practice using cloud computing), using a private social interacting tool for exchanging and sharing information, knowledge and experience. The aim of this community will be to create a knowledge infrastructure for achieving the following targets:

- to help elders improving their lifestyles through nutrition control, physical activity, anti-smoke and anti-alcohol practices;
- to plan regular visits in their environments to ensure reducing of injuries and avoidance of other risks;
- to provide support for maintaining their mental health (mostly coping with depression and the derived disorders (violence-suicide) through social inclusion programs, development of social media for elderly, increased communication and bringing together the social capital of the elderly);
- to increase the in-house use of information and communication technologies (ICT);
- to encourage the idea of self-care;
- to pay special attention to elderly with chronic conditions (e.g. diabetes, cancer, other chronic diseases);
- to apply preventive practices in order to keep their healthy conditions;

A number of tools through the help of the research academia will be employed. Latest technologies such as robotics, near field communication (NFC) and radio frequency identification (RFID) are some of the developments which constitute the assistive technology used for elderly care. Technology at this stage could be used for collecting lifestyle pattern data towards the successful implementation of a health assessment [28]. Moreover, it provides a framework to create positive effects among elders since the benefits are increased. For example companion type robots help elders to cope with loneliness [29] and create a community environment through which they socially interact with others.

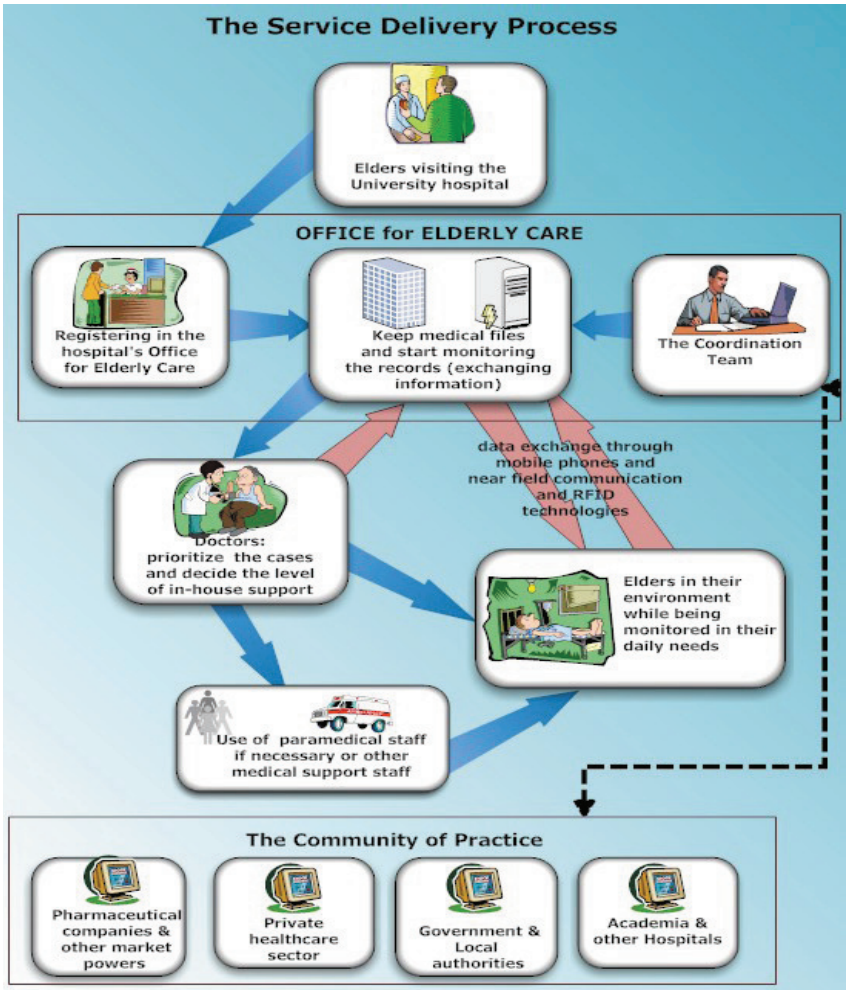


Figure 5 The Service Delivery Process – The Smart Environment.

Public intervention is necessary at this stage in the country, in order to establish this separate framework. As discussed earlier, although the initiative will act locally, the primary concern for establishing this framework is on government's side. Moreover, trying to integrate what above have been highlighted, the effort is suggested to incorporate a certain number of components and practices (Figure 6).

The government is almost certain that has to cope with the components of Economy-Society-HealthCare in terms of providing a secure framework for the specific social group. The 4-indoor-practices are suggested to be the main ground for further endorsement and implementation. The new service intends to be part of this broader framework.

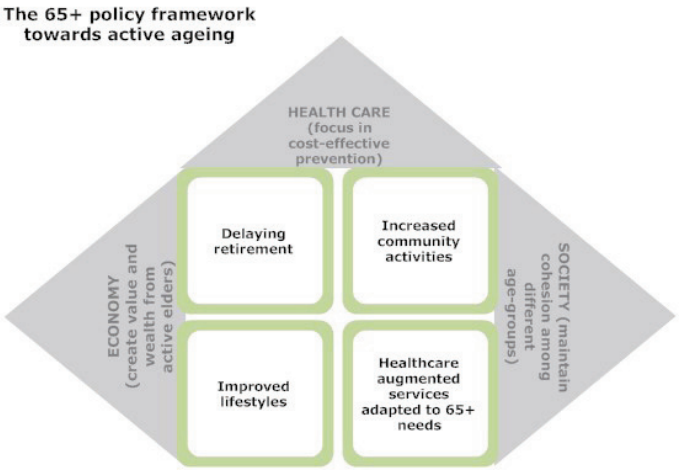


Figure 6 The Policy framework towards active ageing.

The new service needs a combination of existed resources and new investment. To be more precise, there is an attempt to register below the backbone resources required in order for the service to operate. In the next section on commissioning, there are some recommendations on how to fund the operation of this service.

Table 9 The backbone resources.

Resource	
Communities of Practice as a knowledge tool	Office & furniture
Doctors	Software
Paramedics	Ambulance/medical cars
Administrators	Medical equipment (technology orientated)
Managers	Mobile medical devices
Technology experts	Patients
PC Equipment	Family members of patients
Leased lines	

4. Challenges to commissioning the service

Probably the main challenge for the commissioning is to find the capacity and capability to turn competencies of the new service to excellence. But, to do that, first it is necessary to articulate the full range of commissioning activities. Therefore, it is recommended the commissioning to be supervised by the Hospitals' management team. They will be responsible to identify the priorities and elements for commissioning, as well as to have the full responsibility for the implementation and progress of the service.

The management team as commissioners would have to confront with the following additional challenges which are actually inspired from the *NHS World Class Commissioning Competencies Framework [30].*

- **Challenge (1) Communication:** to achieve effective communication among partners and to ensure the consensus in terms of mutual feedback in the operation of the new service.
- **Challenge (2) Process and Knowledge requirements:** to monitor process and knowledge requirements in order for the service to guarantee maximum health outcomes for the community.

- **Challenge (3) Stakeholders' Engagement:** to engage with public and patients in order to keep track of any changes in demands and needs and maintain continuous links with the healthcare base of the service.
- **Challenge (4) Collaboration:** to increase collaboration with medical society and staff in order to scrutiny service design and maintain clinical excellence in the service outcome.
- **Challenge (5) Knowledge Management & HNA:** according to World Class Commissioning Framework Competency 5 [31], the linking ingredients of commissioning are the management of knowledge and the health needs assessment in the right timing. Assessing the needs effectively directs in a successful commissioning framework which protects both patients and other healthcare partners *(Figure 7)*.

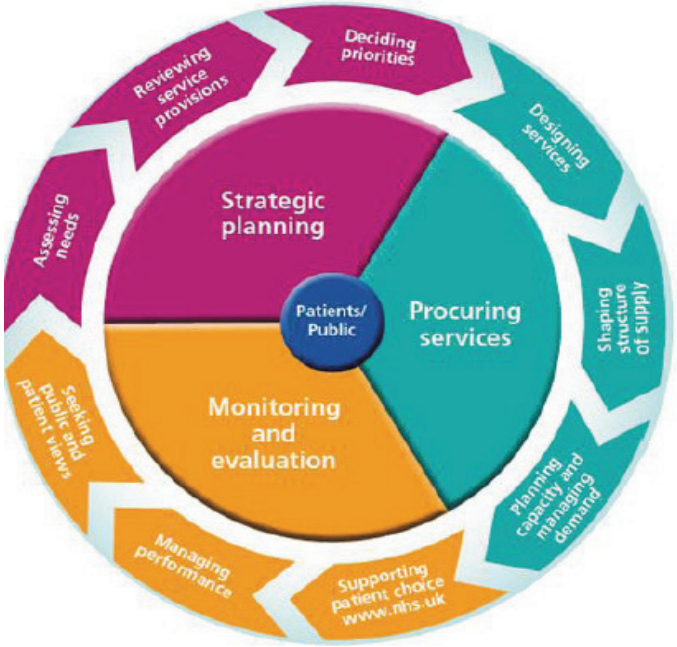


Figure 7 World Class Commissioning Framework Competency 5. [31]

- **Challenge (6) Investment plans:** to emphasize on investment plans; this will focus in maintaining the service levels high and the health outcomes excellent. To achieve this, it is recommended to establish an internal office of health economists, who will quantify, costing and measuring the demands. Also they will monitor risks, ratios and budgeting. In addition another primary concern of this office should be to find funds and financing. For example some possible sources of fund for the service could be through:

    1. the savings of social security funds
    2. the out-of-pocket spending
    3. the medical tourism
    4. the stock exchange (see the 65+ group as a high-promising emerging industry and capitalise on their trading assets)
    5. the donations which will be tax-free

- **Challenge (7) Interaction & stimulation of the market:** to increase the interaction with the health market, stimulating attitudes, culture and behaviours, enabling the participants to reveal their weaknesses and demonstrate their strengths. This will

serve as a measure to ensure that standards are met and outcomes are at the desired levels.

- **Challenge (8) Improvements and Innovative practices:** to achieve continuous improvements and use of innovative practices. The use of best practices through collaborative networks may help in adopting new technological tools.
- **Challenge (9) Procurement & Contracting:** to maintain procurement standards and ensure viable contracts. Use of risk is necessary as well as thorough investigation of time and value (timely contracts and service level contracts). Adopt the healthcare logistics mindset. Moreover compliance and accountability are two more concerns.
- **Challenge (10) Adjustment to the broader healthcare system:** to ensure cooperation of the new service with the existed healthcare system and to achieve incorporation of the new entity "Office of Elderly Care" in the broader health provision.

Nevertheless, as Ham [32] highlighted there are various difficulties in healthcare commissioning since healthcare is complicated by itself. Due to their nature health services are complex therefore it is difficult to contract on them.

5. Conclusions

It is a challenge to integrate economy into society. The increased life expectancy, unavoidably meets extending working lives [33][34]. Modern lifestyles and technology could be proved significant allies in the effort of designing an increased quality healthcare experience. Healthy ageing may direct to delayed retirement which in extent will raise the GDP of the country. A raised GDP is related to value and competitiveness which is expected to create wealth. A wealth society can spend more in healthcare since it owns adequate funds for social programmes. On the other hand, through the recommended service there is an attempt to minimise costs by using less the main healthcare system and move this demand to smart environments where elders will continue to receive care through interaction with experts.

Nevertheless, it is questioned if reforms and restructures in times of crisis direct to desired results. The challenge of internal devaluation that societies are trying to cope with, is testing their cohesion and limits of resilience. However, it is true that OECD, World Health Organization and other global organizations reinforce individual health programs within broader policy frameworks; they expect this to bring together different powers and practices in order to provide a certain service mutually benefited for elders and the society [35].

A cohesive society should periodically assess its dependency ratios on ageing as well as the future trends in ageing (*Figure 8: Old-age dependency ratio, Population aged 65+ in relation to the population aged 15-64; Projections 2015-2060, (EU-27)* [2], Figure 9: *Future trends in ageing, (2010 estimates), (European Union-27)* [2] & Figure 10: *Greece, Country's profile on demography and ageing* [1])

Their timely monitoring raises alerts and gives space for any future plans; thus, activate thoughts for new strategies that could be implemented quickly and effectively. Multi-morbidity and mortality as related to longevity and fertility are significant components of a well-balanced society which aims to ensure prosperity for its citizens. On the other hand, the unbalanced synthesis of age-groups in the society encompasses increased heterogeneity of its socioeconomic contexts. The proposed service framework has to fight with four obstacles in the same way that Holland and Rodie [36] identified in their study on perceptions on preventive health services. These are: (a) awareness, (b) social barriers, (c) psychological barriers, and (d) financial barriers.

This study intends to bring forth issues based on evidences and literature. Moreover, it aims to raise queries that exist behind governance principles. Current strategies and tools may be proven inadequate to confront with future challenges. Longevity and ageing are facts that neither could be neglected nor could be confronted as problems for the society through

the narrow lens of financing and cost management. Not far in time from now, mankind would have to face the new age synthesis which is expected to generate new shocks. Each crisis has its own characteristics. The recommended intervention does not aim to provide ready-made solutions rather than trigger new mindsets and infuse practices outside the box.

REFERENCES

1. Eurostat, (2010) *Demography Report 2010: Older, more numerous and diverse Europeans*. Commission Staff Working Document.
2. Eurostat, (2012) *Active Ageing and solidarity between generations: A statistical portrait of the European Union 2012*. Eurostat Statistical Books.
3. Mayhew, Leslie (2000) *Health and Elderly Care: Expenditure in an Ageing World.* International Institute for Applied Systems Analysis, Laxenburg, Austria.
4. Camarinha-Matos, M Luis and Afsarmanesh, Hamideh (2005) Infrastructures for collaborative networks – An application in elderly care. *SAINT'05 Symposium on Applications and the Internet,* IEEE Computer Society Press, p. 94-101.
5. Keck, Wolfgang and Saraceno, Chiara (2009) Balancing elderly care and employment in Germany. *Discussion Paper, Social Science Research Centre Berlin*, No. SP I 2009-401, p. 1-54.
6. McKinsey & Company (2012) Greece 10 Years Ahead: Defining Greece's new growth model and strategy. *Executive Report*, p. 1-72 (available at: http://www.mckinsey.com/locations/athens/GreeceExecutiveSummary_new/pdfs/Executive_summary_English.pdf (accessed on 09 April 2012).
7. World Health Organisation, (2010) Health Systems Financing: the path to universal coverage. *The World Health Report*.
8. Whitney, David (2012) Contemporary Issues in Healthcare Management: Clinical Governance. *The University of Sheffield module material*, MBA in Healthcare Management.
9. Eurostat, (2010) *Demography Report 2010: Older, more numerous and diverse Europeans*. Commission Staff Working Document.
10. McKinsey & Company (2012) Greece 10 Years Ahead: Defining Greece's new growth model and strategy. *Executive Report*, p. 1-72 (available at: http://www.mckinsey.com/locations/athens/GreeceExecutiveSummary_new/pdfs/Executive_summary_English.pdf (accessed on 09 April 2012).
11. European Commission, (2012) Taking forward the Strategic Implementation Plan of the European Innovation Partnership on Active and Healthy Ageing. *Communication from the Commission to the European Parliament and the Council,* COM(2012) 83 final, p. 1-15.
12. Holland, Jonna and Rodie, Amy Risch (2011) Growing old and living alone: perceptions of preventive health services. *Journal of Management & Marketing in Healthcare*, 4(2), p. 113-121.
13. McKinsey & Company (2012) Greece 10 Years Ahead: Defining Greece's new growth model and strategy. *Executive Report*, p. 1-72 (available at: http://www.mckinsey.com/locations/athens/GreeceExecutiveSummary_new/pdfs/Executive_summary_English.pdf (accessed on 09 April 2012).
14. Oxley, Howard (2009) Policies for Healthy Ageing: An Overview. *OECD Health Working Papers No. 42*, DELSA/HEA/WD/HWP(2009)1, p. 1-32.
15. Harris, Janet (2012) Contemporary Issues in Healthcare Management: Health needs assessment and commissioning. *The University of Sheffield module material*, MBA in Healthcare Management.
16. Bettio, Francesca et al (2006) Change in care regimes and female migration: the care drain in the Mediterranean. *Journal of European Social Policy*, 16(3), p. 271-285.
17. Bonnett, Carole et al (2011) Elder care and dependence: no longer just a women's concern? *Journal of Population & Societies*, 483, p. 1-4.
18. Verleye, Katrien and Gemmel, Paul (2011) Innovation in the elderly care sector – at the edge of chaos. *Journal of Management & Marketing in Healthcare*, 4(2), p. 122-128.
19. Barros, Marilisa Berti de Azevedo et al (2011) Social inequalities in health among the elderly. *Cad. Saude Publica,* Rio de Janeiro, 27 Sup 2: S198-S208.
20. Barros, Marilisa Berti de Azevedo et al (2011) Social inequalities in health among the elderly. *Cad. Saude Publica,* Rio de Janeiro, 27 Sup 2: S198-S208.

21. European Commission, (2012) Taking forward the Strategic Implementation Plan of the European Innovation Partnership on Active and Healthy Ageing. *Communication from the Commission to the European Parliament and the Council,* COM(2012) 83 final, p. 1-15.
22. Camarinha-Matos, M Luis and Afsarmanesh, Hamideh (2001) Virtual Communities and Elderly Support. *Advances in Automation, Multimedia and Video Systems, and Modern Computer Science,* p. 279-284.
23. Miskelly, G Frank (2001) Assistive Technology in elderly care. *Journal of Age and Ageing*, British Geriatrics Society, 30, p. 455-458.
24. Hori, Toshio et al (2004) Sensor Network for Supporting Elderly Care Home. IEEE Publications, p. 575-578.
25. Camarinha-Matos, M Luis and Afsarmanesh, Hamideh (2005) Infrastructures for collaborative networks – An application in elderly care. *SAINT'05 Symposium on Applications and the Internet,* IEEE Computer Society Press, p. 94-101.
26. Broekens, Joost et al (2009) Assistive social robots in elderly care: a review. *Journal of Gerontechnology*, 8(2), p. 94-103.
27. Jih, Wang-rong et al (2006) Context-Aware Service Integration for Elderly Care in A Smart Environment. *American Association for Artificial Intelligence*.
28. Miskelly, G Frank (2001) Assistive Technology in elderly care. *Journal of Age and Ageing*, British Geriatrics Society, 30, p. 455-458.
29. Broekens, Joost et al (2009) Assistive social robots in elderly care: a review. *Journal of Gerontechnology*, 8(2), p. 94-103.
30. NHS, (2007) *World Class Commissioning Competencies Framework*. Best Practice Guidance, UK Department of Health, Gateway Reference 8754.
31. Harris, Janet (2012) Contemporary Issues in Healthcare Management: Health needs assessment and commissioning. *The University of Sheffield module material*, MBA in Healthcare Management.
32. Ham, Chris (2011) Health Care Commissioning in the International Context: Lessons from Experience and Evidence. *Report of Health Services Management Centre*, University of Birmingham, http://www.hsmc.bham.ac.uk/news/TowardsCommissioningCompetency.pdf *(accessed on 05 June 2012).*
33. Jacobzone, S. (1999) Ageing and Care for Frail Elderly Persons: An Overview of International Perspectives. *OECD Labour Market and Social Policy Occasional Papers No. 38*, OECD Publishing.
34. Oxley, Howard (2009) Policies for Healthy Ageing: An Overview. *OECD Health Working Papers No. 42*, DELSA/HEA/WD/HWP(2009)1, p. 1-32.
35. Oxley, Howard (2009) Policies for Healthy Ageing: An Overview. *OECD Health Working Papers No. 42*, DELSA/HEA/WD/HWP(2009)1, p. 1-32.
36. Holland, Jonna and Rodie, Amy Risch (2011) Growing old and living alone: perceptions of preventive health services. *Journal of Management & Marketing in Healthcare*, 4(2), p. 113-121.
37. Jacobzone, S. et al (1999) The Health of older persons in OECD countries: Is it improving fast enough to compensate for population ageing?. *OECD Labour Market and Social Policy Occasional Papers No. 37*, OECD Publishing.

(Full tables and figures of the paper could be found at:
http://www.ergen.gr/files/ICEIRD2013_EvangelosErgen_ElderlyCareCopingWithLTC.pdf**)**

THE ROLE OF ACADEMIA IN THE DEVELOPMENT OF REGIONAL INNOVATION SYSTEMS: A COMPARATIVE STUDY OF THE ØRESUND AND MOSCOW REGIONS

Peter Kiryushin[1], Bala Mulloth[2], Tatiana Iakovleva[3], Vladimir Solodov[4]
[1]*Department of Economics, Moscow State University, Moscow, Russia*
[2]*CEU Business School, Central European University, Budapest, Hungary*
[3]*Stavanger Business School, University of Stavanger, Stavanger, Norway*
[4]*School of Public Administration, Moscow State University, Moscow, Russia*

Academia as a source of research-based innovations and entrepreneurial education plays one of the key roles in regional innovations systems (RIS). Nevertheless, opportunities and limitations for realization of the potential of academia could significantly vary in different regions. In this study we attempt to analyze academia's role in two regions: Øresund, Swedish-Danish cross-border region, and Moscow region of Russia. The comparative study is based on 24 interviews that were conducted with stakeholders from academia, public and private sector in these regions. Øresund and Moscow RISs have proven capacities for research-based innovations. However, it can be stated that although the entrepreneurial capacities in the both regions have increased over the last decade, the RISs still do not seem to be very successful in commercialization of innovations invented in academia (university spin-offs) and achieving the overall impact of educational institutions on the regional development. This trend seems to be even weaker in the Moscow regional development context as compared to the Øresund RIS. This study identifies and uncovers some of the reasons for this relative lack of success in developing regional innovations. It includes: entrepreneurial culture, weak institutions, risk attitudes, economic policies and traditions in academia.

Keywords
Academic entrepreneurship, regional innovation system, Russia, Øresund, cleantech

1. Introduction

The traditional role of universities in education, basic research and science has been well documented and researched. In the past 2-3 decades, however, universities have taken on rapidly expanding and new functions such as knowledge dissemination and technology transfer, the commercialization of research based ideas, the emphasize and active role in national and regional innovation systems (NIS and RIS), among others. Innovation systems are networks of firms and organizations influencing the innovation process in a particular area through their interaction [1,2] Regional innovation systems (RIS) and their roots are a widely debated topic in the academic literature [3]. RIS could be described as "a set of interacting private and public interests, formal institutions and other organizations that function according to organizational and institutional arrangements and relationships conducive to the generation, use and dissemination of knowledge [in the region]" [4].

Academia has potentially a pivotal role to play in the social and economic development of regions. They are a critical asset of the region; even more so in less favoured regions where the private sector may be weak or relatively small, with low levels of research and development activity. Successful mobilisation of the resources of the university can have a disproportionately positive effect on the regional economies and achievement of comprehensive regional strategies. Further, in meeting major societal challenges, which have both a global and local dimension, universities and other higher education institutions have a key role to play in knowledge creation and its translation into entrepreneurial activities as well as public and private services, a process that can engage various disparate aspects of academia.

In this study, we aim to analyze the role of academia in the development of RIS. We do so by focusing on the cleantech sector. Cleantech, which stands for clean technology, could be defined as "energy and environment-related technologies developed with the objective of reducing harmful effects on the environment" [5]. Implementation of cleantech usually assumes an improvement of environmental performance at a lower cost, higher productivity and responsible use of the natural resources [5]. Thus, presence of a strong cleantech industry in the RIS could significantly contribute to regional sustainable development. Specifically, in this paper we address the following research question: "*What is the role of academia in the building of regional innovation systems and the development of cleantech innovations*?"

We analyze two separate regions, one is the Øresund, Danish-Swedish cross-border region. The other is the Moscow region, which consists of Moscow together with the Moscow Oblast', administrative unit around the city. There are several reasons behind this choice, including: similar intensity of higher education and research institutions, high level of economic development as well as the presence of similar universities in both regions, Lund University and Moscow State University, which were taken as the central objects in the RISs. The paper is structured as follows. First, we present our theoretical framework. Second, we describe our research methodology. Third, our findings for the two regions—Øresund and Moscow— will be presented based on our literature analysis as well as from the interview data collected. Finally, we have a section that discusses the challenges academia experience in implementing the triple-helix approach and we draw certain theoretical and practical conclusions.

2. Theoretical framework

The RIS approach studies the social interaction of economic actors in a region within localized innovation networks and considers how institutional evolution can produce "constructed advantage": creating regional capacity for improved innovation and economic performance. RIS is most directly concerned with uneven geographies of innovation [6]. In comparison with the national innovation systems approach, the RIS approach is more specific in analysing the spatial organization of innovation processes between firms, policy institutions, research organizations and intermediary institutions. In spite of globalization, regional innovation is indeed enhanced by various kinds of agglomeration economies between co-located firms in similar or related sectors alongside innovation support by regional knowledge producers, such as universities.

The core concepts of regional innovation systems are rooted in the theory of innovation and, in particular, in the theories of economist Joseph Schumpeter. His views on innovation-

related technological changes and entrepreneurship as drivers for economic growth became the basis for innovation policy in many regions [7]. Schumpeter also saw a special and important role for entrepreneurs. In his opinion innovations resulted not from rational thinking, but from creative pioneering process [8]. This signals the importance of entrepreneurial efforts to bring research-based innovations into the market. Academic spin-offs are one possible dimension that might enhance the entrepreneurial capabilities in RIS. The RIS framework is considered to be appropriate to study innovation and knowledge flows in cross-border regions [9].

Guided by Trippl's [10] study, as depicted in Figure 1 below, we suggest exploring entrepreneur activities in RIS through 5 major sub-systems. **The Knowledge generation and diffusion subsystem** is associated with public research institutions, technology mediating organizations, educational bodies and workforce mediating organizations. **Knowledge application and exploitation subsystem** is connected with activities of the companies, clients, suppliers and competitors and industrial cooperation. **Regional policy subsystem** includes regional authorities, public authorities and development agencies. The efficiency of innovation development is dependent on **local interactions** between subsystems and the regional innovation system as a whole is influenced by **socio-institutional factors**, including laws, regulations, values, practices, routines and others. Since cleantech is the context of our study all elements in the above mentioned system should be seen in relation to the development of this particular industry.

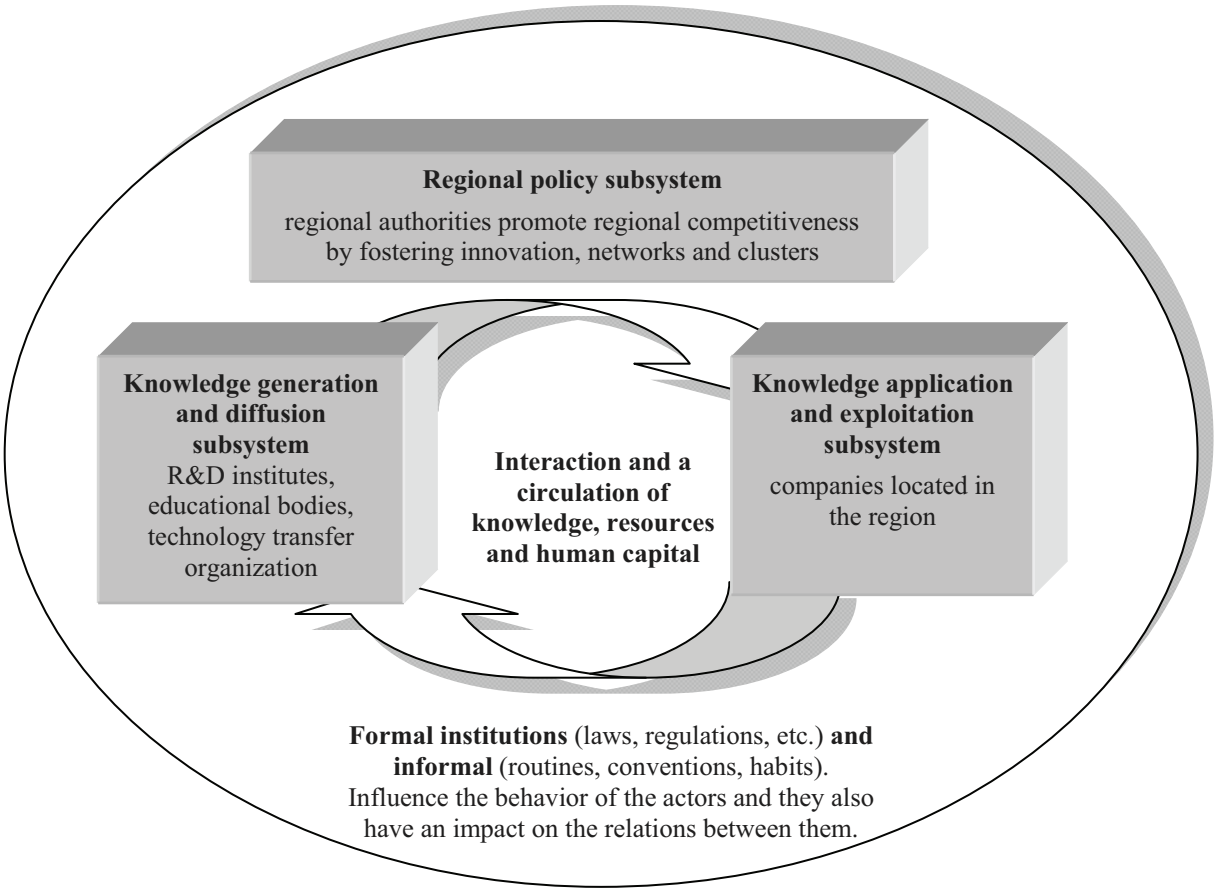


Figure 1 Regional innovation system and its subsystem (Source: adapted from Trippl 2006)

3. Method

To understand the dynamic and contextual nature of RIS, we chose to combine an overview of available secondary data with in-depth interviews conducted with universities, support infrastructure representatives, entrepreneurs and politicians. Twenty-four interviews were conducted in the Øresund and Moscow regions between November 2011 and February 2013. We interviewed regional stakeholders in order to understand their thinking and vision on the role of academia, triple helix collaboration and cleantech innovations. Using the case-study methodology [11], we applied such methods as in-depth individual, semi-structured interviews. The interviews lasted for one hour on average and varied from between 8 to 20 pages in length when transcribed. Guided by the research question, two of authors independently read the transcripts, sorted and coded the data. This process was performed with each interview. Finally, we used intuitive and critical reflection for the interpretation of the data. Also, an analysis of key activities of the innovation system was performed in order to develop preliminary lessons that could be relevant to other regions, with regard to cleantech entrepreneurial capacity as well as cross-border cooperation.

4. Findings

In this section we present the key findings from our interviews along with a historical overview of the development of innovations and role of academia in the two respective regions in relation to each of the five elements of our theoretical model – knowledge generation, knowledge application, regional policy as well as socio-institutional factors. Because it is often difficult to crystallize each of these elements due to their inter-relationships, we chose a narrative way for describing RIS in the two regions.

4.1 Øresund Region

An active cooperation between the Swedish and Danish sides of Øresund in the field of innovations began in the 1990's. The grounds for the cooperation was corroborated by high intensity of talented individuals and institutions, relatively equal level of economic development, social and cultural similarities as well as physical proximity. The specific industry niche for Øresund development was identified at that time as the biotech and pharmaceuticals sector. It was based on regional competiveness factors such as the intensity of scientists and research organizations and due to the physical presence of 60% of the pharmaceutical companies in the region. Creation of collaborative networks between administration, higher education institutions, research institutions and industry also helped increase cooperation. Of late, low-carbon and cleantech are among the key priorities for the development of the Øresund. Moreover, according to several studies, Øresund is one of the leading regions for the creation of entrepreneurial cleantech start-up companies and commercialization of clean technology innovations.

Triple helix collaboration and cluster initiatives were seen as fairly effective by some of the interviewees for the development of innovations in the region. The potential for the development of research-based innovations in the Øresund RIS is associated with the collaboration between academia, industry and the regional authorities. Scientific individual talents are considered to be one of the most valuable assets for Øresund RIS. The triple helix model is utilized by the Medicon Valley Alliance (MVA), the interregional cluster project seeking the development of life-science innovations in the region. Initially MVA was funded by European Union as an Interreg initiative, but later on it became an independent project and is considered as the most successful project so far. On the other hand, some of the

interregional networking initiatives as well as the general level of awareness about these initiatives do not seem to be as high as they were before. Further, It seems that the lack of a robust business tradition and understanding of university-industry collaboration, could be a major barrier for the development of technology transfer solutions in Øresund. Therefore, it is important that technology transfer offices such as Lund University Innovation System at Lund University proactively promote themselves among the various stakeholders in the region.

The entrepreneurial capital has been generally seen to be increasing in the Øresund during the last decade. Ten years ago graduates in Sweden were more interested to become business consultants than to be entrepreneurs and in Denmark entrepreneurship was seen as a thing for "daredevils". At the same time, both sides have high levels of social security and perception of high risk for failure, both of which are important barriers for practicing entrepreneurship. However, it seems that nowadays, university students and researchers are becoming increasingly interested in studying entrepreneurship, launching their own ventures or becoming corporate entrepreneurs.

The measures that improve the entrepreneurial capacity of academia could also contribute towards the dissemination of cleantech innovations. The most prominent endeavour to increase entrepreneurial capital on the interregional level in Øresund was the Øresund Entrepreneurship Academy (active from 2006 – 2010). The Academy supported educators in the development of specialized courses and facilitated cooperation between academia and business organizations. The Academy became an important step for the development of entrepreneurial spirit in the region. Surprisingly, the project was abruptly halted in 2010. The reason given for this was the apparent lack of interest from the Swedish side of the Øresund to continue to develop the entrepreneurial capacity and cooperation

There appears to be a trend towards an increasing number of research-based innovations that are not related to natural science, but related to social sciences. This trend significantly extends the magnitude and possibility to involve academia and students to promote research-based cleantech innovations. Such innovations are not always associated with new technological findings, but rather with its effective dissemination, which requires new solutions from social science such as business strategies and policy measures. On the other hand, interdisciplinary research centers, which consists of natural and social scientists as well as industry business advisors and investors, seem to have a much greater potential for the identification and development of new technologies compared to their mono-disciplinary counterparts. This is primarily because such centers have more "stimulating environments". At the same time, it is not always clear on how to encourage interaction between academic researchers and businesspersons in order to increase knowledge generation. Further, it can be stated that sometimes students seem to be more entrepreneurial than faculty, in particular, because they more willing to take more risks. In Sweden, the SKJ Center for Entrepreneurship at Lund University has been promoting entrepreneurial education since 2011. The Center provides specialized courses on entrepreneurship and has also developed a new Masters program that focuses on building new business ventures based on the research based ideas coming out of the University.

Low-carbon transition and cleantech development in Øresund, could be related to new technological findings, its practical implementation and commercialization of cleantech knowledge. Further, the application of current clean technologies could play an important role in these processes. It is also suggested that cleantech development could be based on the cooperation with the existing non-cleantech industries. Moreover, it seems that social and sustainability innovations seem to have strong potential for growth in Øresund RIS.

Additionally, strategies for collaboration between cleantech startups and mature industries were provided. For instance, the Teknopol business advisory has two cleantech related initiatives i.e "Customer Financed Development" and "Verification and Innovation Purchasing". In the first case, an already existing company established a fund to help cleantech start-ups develop their technology to a point where they could possibly buy it. In the second case, Teknopol helped to translate the sustainability needs of large companies to a concrete demand, which could then be met by start-ups.

Cluster organizations such as Copenhagen Cleantech Cluster and the Sustainable Business Hub on the Danish and Swedish sides respectively, seems to be important actors for cleantech development since they have both proved to be effective for dissemination of new technologies. They encourage local actors and promote solutions internationally. Exchange and export of clean technologies is usually seen as an important or even the most important factor for development of cleantech on both sides of the Øresund border. The total Danish cleantech export market value in 2010 was about 12 Billion Euros and it is expected to quadruple by 2015. At the same time, 51% of Swedish export is related to clean energy solutions such as biofuels, solar, wind, hydro, sustainable buildings and energy efficiency technology.

There is also a degree of skepticism about the future of transnational collaboration due to unequal distribution of benefits between the Danish and Swedish sides. An indirect evidence for that statement is that the interviewees were more interested to talk about the innovation systems of their countries, rather than transnational innovation system of Øresund. Moreover, as it was portrayed, some of the initiatives has *intra*regional rather than interregional focus. Some of the most prominent integration achievements so far are related to creation of favorable legislations for cross-border citizenship, employment opportunities as well as economic and social benefits that result from different and complimentary competences of the two sides.

4.2 Moscow Region

Moscow region, which includes city of Moscow and Moscow Oblast', an administration unit around the city, is considered to be a main economic and political area as well as one of the main innovation and entrepreneurship areas in Russia. There are some significant innovation-related projects that have been started in the Moscow region during the past 10 years, e.g Skolkovo Innovation Center, an ambitious project launched by Dmitriy Medvedev while he was President of Russia. Nevertheless, the innovation capacity of the region is mostly associated with the achievements of the soviet period. There are a number of prominent higher education and research institutions such as Moscow State University, Moscow State Technical University, Moscow Aviation Institute where radical innovations were developed. During the Soviet times, these universities were not necessarily part of the regional innovation system, but rather had strong interconnections with different regions of the country, where fundamental innovations were implemented. Therefore, the innovation system associated with the regional academia was not limited to the geographical borders of Moscow region. Although the importance of environmental and energy efficiency agendas has been increasing recently, the development of cleantech does not seem as priority neither for the state, nor for Moscow's regional development.

Before 1990, during the Soviet time, in Russia, government and state's enterprises procurement was the key policy instrument for the development of innovations. Science,

research and development, innovations were part of the centralized planned economy, and thus main innovation areas of that time were heavy industry and military sectors. Together with domestic economy, economies of third-world communist countries were also an important "market" for innovative knowledge-based production from the Soviet Russia. Work at universities was very prestigious and gainful and work at technical universities as an R&D professional was even more gainful. It was connected with the opportunities to be involved in the R&D projects for the government. At the same time, entrepreneurship was an outlaw activity and there was no modern product-oriented «innovative thinking» in the Soviet time since there was no market economy. Additionally, the social and legal environment in USSR was discouraging for any entrepreneurial intentions.

After the collapse of the Soviet Union in 1990, the production and technological chains were broken, military procurement reduced many times, state's demand for innovations significantly reduced as well. In academia salary of the scientists and researchers became much less than before and scientists suddenly turned from the privileged class to the poor. Since the 2000s the situation with the development of innovation and entrepreneurship slowly started to become better in general. According to the official documents and literature reviews, creating university start-ups and involvement of students began to be considered as an important factor of connecting academic institutions with real sector of economy and the labor market demands. The purpose of the recent governmental initiatives is the development of cooperation of Russian higher educational institutions and industrial enterprises, the development of scientific and educational activities in the Russian universities, promoting the use of higher education institutions potential in enterprises to develop high-tech industry and innovation in the Russian economy.

For example, there is an initiative that provides the opportunity for manufacturing companies to get a subsidy to fund projects for the development of high-tech production in conjunction with universities. The key feature of this initiative is the focus on creating a network of cooperation between scientific institutions of the education sector and the real sector enterprises. There are also a number of initiatives, which aimed at transforming leading universities in core elements of the innovation system, and creating the so-called innovation zones around them, developing various forms of networking in the framework of the implementation of innovative projects. In 2009 to promote such start-ups based on the universities' infrastructure Russian Government issued the Federal Law that gives significant benefits for student entrepreneurship initiatives.

Universities today play an important role in dissemination of new technologies. For example, Moscow State University (MSU), as one of the largest and most prominent universities in Russia, has an important role to play in promoting innovation activities across the Moscow region. There are some centers for education and research on innovation and entrepreneurship at MSU with education for department of economics, and special MA programs. There is also a science-park, incubator that is relatively new – about two years old. And there are some innovation laboratories that do research in the field of innovation and also related to cleantech. It is considered that MSU is a good place for developing innovations due to the interdisciplinary research and education field According to one of respondents, there are also many innovation projects in MSU, which look purely scientific rather than real business cases Students don't usually think about entrepreneurship as a career opportunity. On the other hand, in fact, there are significant administrative barriers that prevent the development of innovations and entrepreneurship and there are some people who are teaching entrepreneurship without having real experience.

Despite the efforts to promote innovation development, it seems that current economic systems resist innovations and the state policy does not provide necessary support for the shift in economic paradigm. In particular, state's regulation of innovation development is considered as "inconsistent and belated". Moreover, it seems that the government in some cases could be counterproductive for innovation development, and could significantly influence current economic patterns in favour of some individual interests. Additionally, it seems that there is a lot of "buzz" or brainwashing about innovations in Russia as well as "window dressing". On the other hand, enterprises "could 'fake' the 'innovations' in their reports". The key reason behind such patterns is the abundance of natural resources and resource export-oriented economy of Russia. Therefore, until the government will become an efficient player and starts generating real demand for innovations, it might be difficult for the innovation system to get any better. There is also another task for the state, which should play an important role in developing interactions between researchers, managers and investors. In order, for example, to avoid the opportunistic behaviour of the investor or to insure the risk of the enterprises that develop innovations.

On the other hand, it seems that there is no "magic" in promotion of entrepreneurship and innovations in academia Russia. It is also important to teach researchers to get new skills and market-oriented understanding in order to develop market-oriented innovations. On the other hand, it seems that there is no need to force researchers in academia to become market-oriented innovators and entrepreneurs – since they have different roles: researcher "does what he wants" and innovator "does what market wants". The question – how to develop appropriate policies? Additionally, it seems that there is enough state's funding for the research nowadays, but there is the problem of corruption and administrative barriers. Another challenge is the existing mistrust between both sides of the innovation process – scientists and innovators.

It could be suggested that there is a significant potential for the development and implementation of cleantech innovations in Russia and in Moscow Region, connected to increasing of energy efficiency. According to the World Bank research Russia, including Moscow, is one of the world "leaders" by the energy intensity of GDP (World Bank 2008). It presents a threat for the future development, but could become the opportunity for cleantech, on the other hand. It seems that there are some recent political incentives that could support development cleantech in Russia and Moscow (related to Energy efficiency, for example). Some interviewees, especially those who have entrepreneurial experience, consider it as a trend and see the potential for this sector. At the same time, the macroeconomic and political perspective do not seem to very bright if there is going to be business-as-usual model of economic development associated with extraction and export of natural resources in Russia. But there are some potential niches for cleantech development, such as green building that could work in Russia.

5. Discussion

We used the approach of Trippl [11] in order to analyze the role of academia in the development of regional innovation systems in Øresund and Moscow Regions. The results of our research shows that there is no strong interconnections between innovation and entrepreneurial activities in Øresund and Moscow Regions within the regions: in case of Øresund there is a cross-border Danish-Swedish "semi-integrated" innovation system that consists of two RISs and Moscow RIS could have stronger interconnections with the other regions of Russia.

Nevertheless, regional innovation system as a research framework proved to be useful to study the role of academia in the development of innovations and entrepreneurship within the regions. First, it allowed analyzing the context of the innovation and entrepreneurship process. We studied the process – knowledge generation, dissemination, application and exploitation as well as learned about the regional policy subsystems, interactions of these subsystems and socio-institutional factors. Second, interviewing the different RIS stakeholders and analyzing their experiences helped to get concrete understanding of the role of the academia, specifically, on the examples of two universities – Lund University in Øresund and Moscow State University in Moscow Region. Finally, it helped to study the development of cleantech as an innovation and entrepreneurship field.

The key differences in the Moscow and Øresund RISs are rooted in the history of the RISs development. During the Soviet time in Moscow region there was no market-oriented innovations, and entrepreneurship was illegal. The demand for innovation was dependent on the state's policy and export to the third-world countries. Nevertheless, some sectors such as military, space and heavy industry were quite effective for the utilization of research-based innovations. The situation is drastically changed during the economy crisis in 1990's, but since the 2000s the state interest for innovations and entrepreneurship together and market demand was renewed. The integration of Danish and Swedish RISs on the both sides of Øresund was connected with the intensity of higher education and research institutions, talents, presence of biotech companies as well as the national, regional, municipal and EU interest to promote the cross-border collaboration. Triple-helix collaboration and networking were key instruments for development of interactions between administrations, academia and businesses on both sides.

Lack of entrepreneurial capacity and culture seems to be a common barrier for development of innovations in both Øresund and Moscow regions. The reason – is the traditional mindset together with the high level of social security in Denmark and Sweden and (the perception of) the risks and administrative barriers in Moscow. Nevertheless, changes in academia towards promotion of entrepreneurship culture and developing innovation infrastructure could significantly contribute to the changing of this path-dependence. There is also seems to be some achievements in the field during the last years, in particular, in Moscow and Øresund. The promotion of entrepreneurship should be fruitful not only for the RISs, but for the development of self-dependent, rather than state or big business-dependent personalities. That is also beneficial for society and economy. It is also important to increase interdisciplinary collaboration in universities in order to develop new innovations. At the same time there no need to go too far and force researchers to become innovators – since it could damage the capacity of academia.

It seems that a clear cleantech agenda could help renew the process of integration of the Danish and Swedish sides of the Øresund RIS. There is a potential for having mutual benefits of regional branding as one entity and promotion and exporting of the complementary clean technologies. Contrary to the national authorities of Denmark and Sweden, Russian authorities now seems to be less interested in promotion of cleantech. Nevertheless, there are recent political incentives that create the ground for development of cleantech. But due to the role of private interest, administrative barriers and inefficiency of regulation, there could be only certain sectors for cleantech and it would not be based on the achievement of the academia. On the other hand, if the current trend of resource-based export-oriented economic development will be changed, cleantech should be at the forefront

of the innovation development and the governmental order could play the same role as it was during the soviet times.

6. Conclusion

The objective of the paper was to answer the following research question: "*What is the role of academia in the building of regional innovation systems and the development of cleantech innovations*?" using the example of two different, yet comparable regions. We can conclude that academia today serves as more of a provider of classical educational services, and to a lesser degree contributes to the direct knowledge transfer in the form of academic spin-offs. That is, while its role in knowledge generation is well established when it comes to knowledge application it seems that academia need to be supported in it's spillover efforts. Regional policy subsystems formally proclaim fostering of innovations as their priority goal. In practice, however, we observed rather weak ties between academia and business, and socio-institutional factors such as laws and regulations, do not directly support the knowledge application processes. One of the general reasons for this disconnect, which could explain lack of the cooperation is the cultural norms and values, where business and academia are often perceived as two parallel rather than overlapping worlds.

7. Further research

Our research is not without limitations. Based on a limited number of informants, we have only a preliminary view of the opportunities and challenges for academia development in the cleantech industry. Our findings indicate that interactions between practical and academic worlds are where the main challenge for promoting innovation in RIS are situated. Future research should address in more depth the dynamics of such interrelations. The issues of human mobility as well as issues of shared network and acting space where academics can meet real world challenges and present their scientific findings to the business world deserves more focused attention.

Acknowledgements

We want to thank the Russian Foundation for Basic Research that partially supported the research (project No. 12-06-33030□).

References

1. Lundvall B-Å. National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning, London: Pinter; 1992.
2. Edquist C. Systems of Innovation: Technologies, Institutions and Organizations. London: Pinter/Cassell; 1997.
3. Asheim BT, Boschma R, Cooke P. Constructing Regional Advantage: Platform Policies Based on Related Variety and Differentiated Knowledge Bases. Regional Innovation Systems: Theory, Empirics and Policy. 2011; 45 (7): 893-904.
4. Doloreux D, Parto, S. Regional innovation systems: a critical review. Université libre de Bruxelles. [cited 2012 Nov 25]. Available from: http://www.ulb.ac.be/soco/asrdlf/documents/RIS_Doloreux-Parto_000.pdf.
5. Swedish Energy Agency. Swedish Cleantech Opportunities. A Market Overview from the Swedish Energy Agency. Intellecta Publicisterna, Bromma; 2010.

6. Asheim BT, Boschma R, Cooke P. Constructing regional advantage: platform policies based on related variety and differentiated knowledge bases. Regional Studies. 2011; 45(7): 893-904.
7. Schumpeter JA. Capitalism, Socialism and Democracy. London: Allen and Unwin (originally published in the USA in 1942); reprinted by Routledge: London; 1994.
8. Hospers GJ. Joseph Schumpeter and his legacy in innovation studies, Knowledge, Technology & Policy. 2005; 18 (3): 20 - 37.
9. Lundquist KJ. Trippl M. Towards cross-border innovation spaces: A theoretical analysis and empirical comparison of Øresund region and the Centrope Area. SRE-Discussion ePubWU Institutional Repository. 2009 [cited 27 November 2012]; 5. Available from: http://epub.wu.ac.at/610/
10. Trippl M. Cross-border regional innovation systems. SRE - Discussion Papers. Institut für Regional - und Umweltwirtschaft, WU Vienna University of Economics and Business, Vienna. 2006 [cited 2006 Nov 27]; 05. Available from: http://epub.wu.ac.at/.
11. Yin RK. Case study research: Design and methods (3rd ed.), Thousand Oaks, CA: Sage; 2003.

DEVELOPING SYSTEM OF ENTREPRENEURSHIP EDUCATION IN THE REPUBLIC OF MACEDONIA

Radmil Polenakovik[1], Bojan Jovanovski[1], Trajce Velkovski[1]

[1] Business Start-up Centre, Faculty of Mechanical Engineering, Ss. Cyril and Methodius University in Skopje, Macedonia (www.bsc.ukim.edu.mk)

This paper analyzes the current status with entrepreneurship education in primary and secondary schools in the Republic of Macedonia for period 2009 - 2013. Authors of this paper during the end of 2011 conducted investigation of the status-quo of entrepreneurship education in the country. On-site research includes survey of 1800 students and 780 professors/teachers and administrative staff of primary and secondary schools about entrepreneurial attitudes among young population and readiness of the educational system to develop entrepreneurial mindset. Main recommendations of the survey were submitted to the Bureau for Development of Education and Ministry of education and science of the Republic of Macedonia. As a next step, the Government of the Republic of Macedonia from September 2012 introduced in 1st, 2nd and 3rd year of secondary schools new course "Innovation and Entrepreneurship", while current subject "Business and Entrepreneurship" in 4th year was redesigned and updated. From 2013 course "Innovation and Entrepreneurship" will be introduced for students of 8th and 9th grade in primary schools. In addition, in the last year the Government is implementing wide promotional campaign for increasing awareness about entrepreneurship and innovativeness among wider population. This paper, summaries whole process of development of new entrepreneurial agenda in the Republic of Macedonia that will end in second part of 2013 with adoption of National Strategy for Entrepreneurship Education 2014-2020

Keywords

Entrepreneurship education, innovation, primary schools, secondary schools, Republic of Macedonia

1. Introduction

Since the end of the 1990's, the EU countries are intensifying the focus towards SMEs, entrepreneurship and entrepreneurship education. One of the strategic goals of the EU policies, the policies of its member states, as well as the policies of the countries in the pre-accession phase (including Republic of Macedonia) is the development of the entrepreneurial learning. Additionally, the European commission have directly identified the education systems and life-long learning as key factors for development of entrepreneurial behaviour and innovative thinking. [1]

Young people all around the world have the right of entrepreneurship education. Each individual has the right to get to know the concepts of ownership, opportunities to hold possession and the way of thinking for creation of wealth. Those rights are based on the right of an individual for the ownership of its personality, labor, time and ideas. [2]

In this regard, the educational system needs to be restructured so the young people can release their entrepreneurial skills and learn how to become "the masters of their own

destiny". Many recent documents all over the world, and especially EU policy level research and strategic documents supported promotion of entrepreneurship education. [3] [4] [5]

It is more than obvious that the development and promotion of the entrepreneurship are strategic goals of the European Union. [6] Education and training are key guidelines in this process. One of the postulates on which the strategy for sustainable development of EU 2020 is based on, relies on the principle that "all pupils/students should have access to entrepreneurship education, which should be offered in all its shapes, on all levels of education…"

Member counties of EU have received suggestions from the European commission for developing a multi-dimensional systematic approach for development and adoption of policies and practices for entrepreneurship education, as well as to develop action plans for inclusion of the entrepreneurial policies in the national and regional policies. It is expected that by implementing this kind of strategies for entrepreneurship education entrepreneurial competences will be developed for the entire pupil and student population, as well as for the adult population with compatible entrepreneurially oriented trainings.

In addition, insuring development of general competences, such as self-confidence, flexibility, risk assessment, creativity, etc. as well as specific business skills and knowledge are the goals and tasks of the entrepreneurship education. In this direction, many countries already adopted their entrepreneurship education strategies.

This paper analyzes the current status with entrepreneurship education in the Republic of Macedonia, with special focus derived from the research conducted among 1800 students and 780 professors/teachers and administrative staff from primary and secondary schools.

2. Research methodology

In order to analyze the readiness for strengthening entrepreneurship education in the Republic of Macedonia, the National Centre for Development of Innovation and Entrepreneurial Learning (NCDIEL) in cooperation with the Bureau for Development of Education (BRO) in the period November - December 2011 conducted extensive survey in primary and secondary school. The research was structured in several phases:

Phase 1: Analysis of the entrepreneurship education experiences in the world

In the analysis, the experiences and recommendations of the European Commission, as well as the ones from the developed world economies are dominating. Key documents that were analyzed to perceive the experiences in the world for implementation of the entrepreneurship education and the actions taken for promotion of entrepreneurial culture are based on the following resources: European commission, selected member countries of the European Union, World Bank, World Economic Forum, United Nations, South-east European Centre for Entrepreneurial Learning, Global Entrepreneurship Monitor and number of donor driven projects in the Republic of Macedonia [USAID (United States Agency for International Development), UNICEF (United Nations Children's Fund), ADA (Austrian Development Agency), UNDP (United Nations Development Program) etc.]. Dozens of best cases on entrepreneurship education are presented in the final report.

Phase 2: Preparation of the survey questionnaire

As a tool for collection of the required data for the analysis of the current condition in the Republic of Macedonia, a questionnaire was prepared. In order to reflect the current positions, opinions and behavior of the student population on-site survey was conducted

among pupils from sixth and seventh grade from the primary nine-year education, and among students in first and fourth grade in the secondary education. The survey tried to find out which options are taken in consideration by the young people for their future career development, their aspirations for the desirable work positions, the ideas of "working for someone else" as opposed to "self-employment", the expectations from the business world, the presumptions for the work obligations etc. In parallel, with the survey for the students, the questionnaire for the focus groups was developed and interviews included the school principles, administration staff and the teachers from the primary and secondary schools in the Republic of Macedonia.

Phase 3: Selection of research sample

In order to cover at least 1% of the country student population the research was done in 53 primary and secondary schools in twelve cities and towns (and their surrounding urban and rural areas) in the Republic of Macedonia (Skopje, Tetovo, Kichevo, Ohrid, Struga, Bitola, Prilep, Kavadarci, Shtip, Kumanovo, Gostivar and Strumica). Field research covered **32 primary schools and 21 secondary schools** in the Republic of Macedonia. The total number of valid survey questionnaire for the **primary schools** was **798**, and **1027 for the secondary schools** (i.e. **overall number of 1825 students**). A total number of **744 staff members, 397 of which were from the primary schools and 347 from the secondary schools**, were included in the analysis of the focus groups (headmasters, administration staff and teachers/professors).
In the research, a balanced representation of the participants from different regions (urban-rural) was maintained. The language in which the lessons are performed was also taken in consideration, plus gender equality and nationality were respected. The selection of the research sample was made in coordination with representatives from the BDE.

Phase 4: Realization of the research in the schools

- **Survey of students**

In accordance with the prepared sample of primary and secondary schools, the survey coordinated by the Bureau for Education Development was realized with serious support by the headmasters and professional service in the schools. The materials provided for the schools, after realization of the research were given back for analysis within 4 to 7 days.

- **Focus groups**

Part of the research was also concerning the analysis of the subject through the focus groups which included the school principles, administration staff and the teachers in the primary and secondary schools. The goal of this research was to locate the possibilities for introducing new subjects (innovations and entrepreneurship) in the primary and secondary schools in the Republic of Macedonia, as well as to consider the options for professional staff which would be teaching the subjects, the needs for training, interaction with other subjects in order to prevent overlapping of some fields/topics, etc.

Phase 5: Comparative analysis of the obtained data

The results obtained from the research "on the field" were analyzed by basic statistical analysis tools which led to conclusions and suggestions for future actions. Comparative analysis with world-wide best practices in entrepreneurship education w□s conducted in order to compare obtained data from the survey with already available practices in entrepreneurship education.

Phase 6: Preparation of a final report with recommendations for future actions

All findings from the research (the theoretical and practical) are included in the final report [7], as well as the suggestions for future actions for intensifying the entrepreneurship education in the primary and secondary education in the Republic of Macedonia, so that preparation of suitable educational plans and programs can be started in 2012.

3. Current Entrepreneurship Education related activities in the country

Republic of Macedonia has not introduced a strategy for entrepreneurship education yet, but has made significant steps in the development of elements for it through multiple activities:

- The course “Business and entrepreneurship” was introduced as a compulsory subject in the high schools (2007/2008), [8],
- Declaration for entrepreneurial learning was signed by the Minister of education and science and the Minister of economy (June, 2009) [9],
- There is a competition for the best business plan, organized annually for the secondary schools and the art schools (from 2007) by the BDE and the NCDIEL; in 2011 the President of the Republic of Macedonia was a patron of the competition, from the school year 2011-2012 the competition became a National competition for all secondary schools in the Republic of Macedonia including the vocational schools, in 2012 the President of the Government was the patron of the competition [10],
- NCDIEL team was also responsible for National most innovative business plan competition for students and recent graduates (2007 – 2012) where more than 50 start-ups were established (financially supported by Austrian Development Agency),
- Through USAID and Kulturkontakt - Austria projects, virtual and real companies were initialized in the vocational schools and also there were fairs organized for these companies [11],
- USAID has a component for entrepreneurship in the primary and secondary schools within the Primary Education Project (PEP) [12],
- USAID has also supported the establishment of a significant number of career centers in the secondary schools in the country,
- “Be your own boss”, project realized was by The Youth Council and Vision Contact,
- “Promotion of the entrepreneurship among young people”, project was realized by The Centre for Regional development of the southeast region, the Municipality of Strumica and GIZ,
- State competition for entrepreneurship (skills for employment) project was supported by the British council,
- Project for cross-border cooperation, Project for cooperation with schools from other countries, Leonardo Da Vinci – lifetime learning,
- Preparing a marketing plan through the Youth association of the secondary vocational schools in Macedonia (MASSUM) supported by USAID [13],
- The program Junior Achievement has been active in the country for about fifteen years now, offering training for education in the field of economy according to its own program (the trainings include the teachers as well as the students) [14], the program Junior

Achievement, a few years back, organizes business plan competitions in selected schools in the country,

- There are a certain number of non-governmental organizations, foundations, project units which offer additional entrepreneurship education, such as Business start-up centers in Skopje [15] and Bitola [16], YES incubator in Skopje [17], CEED (Center for Entrepreneurship and Executive Development) [18], MATA etc.
- Part of the projects (supported by ADA, USAID, UNICEF and other donors) also provide training for the teachers i.e. directly contribute for the development of the capacities of the teaching staff, encouraging the modernization of the educational system etc.
- Through the SEECEL (Southeast European Centre for Entrepreneurial Learning) project, a program for introduction of the entrepreneurial skills in the primary schools' existing subjects was realized, in 4 pilot primary schools in the country [19],
- The Government of the Republic of Macedonia since October 2011 intensively promotes the entrepreneurship in all media and thus stimulates the entrepreneurial spirit in the entire population (campaign DARE TO),
- Professors and assistants from the universities and teaching staff from the secondary schools in the Republic of Macedonia which teach the subject Business and entrepreneurship are members of the National Entrepreneurial Education Network which was established by the NCDIEL, under the auspice of the President of the Republic of Macedonia and in the presence of the Minister of education and sciences and the Minister of Economy in November 2011,
- Years back, events are organized to contribute for the promotion of the entrepreneurship in which numerous stakeholders (foundations, ministries, banks, NGOs, educational institutions etc.) are included: European week of small and middle enterprises, Global week of entrepreneurship, Start-up weekend, European day of the entrepreneur, World day of the entrepreneur, Entrepreneur of the year, Macedonian business leader, Patent of the year, Makinova etc.

3.1. Results from the on-site research

Having all above in mind the BDE decided to conduct a study for perceiving the possibilities for implementation of the entrepreneurship education in the primary and secondary education. Key findings from the research were:

For Primary Schools:

- Only two out of five primary school pupils have came across with the word entrepreneurship, or think that they know what this means.
- The link between the industry and the primary schools is very, very weak, based on personal contacts of few teachers (almost no visits to companies or guest lecturers). Only few projects regarding entrepreneurship have been conducted, even the cooperation with the municipalities and NGOs is only slightly better and mainly based on ecology or humanitarian actions.
- Only 15% have stated that they would like to be company owners when they will grow up
- The parents are not showing significant interest in cooperation.

- The teaching and management staff mainly stressed that the creation of entrepreneurial spirit is essential to be fostered since very young age, but because of the lack of entrepreneurship-related experience among teachers, specialized training is needed. For the better effect and to avoid additional burden on the pupils, entrepreneurial skills need to be taught through all subject rather than a specialized subject. In this regard, the curricula for various subjects will be revised.
- Although, the main outcome of the focus group is the common acceptance for introduction of entrepreneurship education in primary schools, most of the participants do not understand the concept of entrepreneurial learning.

For high schools:

- Three out of five secondary school students are familiar with the term entrepreneurship, but it is uncertain if they understand the meaning.
- The most concerning fact is that only 14% of the surveyed students have stated that during a visit of a company, they have identified something learned at school. Additional confirmation of the small relation of the curricula and the real world is the fact that only 6% of the surveyed had guest lecturer in their school.
- Very positive is the fact that half of the surveyed (52%) have stated that after finishing of their education, would like to work in own company, i.e. to manage own business. Additionally, only 30% of the surveyed would like to work in the public sector.
- 73% from the surveyed have stated that they would like to graduate from university.
- Most of the high schools were part of a project / programme related to business and entrepreneurship. It has been noted by the teachers, that a development of a system for transfer of the methods and tools learned through these projects to the teaching training and evaluation process, would be very useful.
- Compared to the primary schools, the number of project activities and cooperation with municipalities and NGOs including eco, humanitarian, social and other events is much higher.
- According to the focus groups, the main reason why a small portion of the high-schools are organizing visits to companies is the lack of interest for this kind of cooperation in the business sector. It was also presumed that the parents could not play important role for establishing cooperation.
- Furthermore, it was concluded that the practical knowledge is crucial for development of the entrepreneurship competence.
- The teachers had different views on the structure of the entrepreneurship education, but they all support the initiative for introduction of entrepreneurship education. They are even ready to have training and invest time in adaptation of their teaching methods, all because the new age is requiring that efforts from the teachers.

4. Developing strategic frame for entrepreneurship education in the Republic Macedonia

The above mentioned activities in EE related activities and survey results show that in the Republic of Macedonia there is enough quanta of knowledge and capacity in the key stakeholders in order for them to take part in the **creation of the national strategy for the entrepreneurship education and the action plan for implementation of the strategy**. The tools (measures) for supporting the entrepreneurship education which are already implemented by part of the mentioned activities / projects play an enormous role in the process for development of such a strategy.

Based on the desk research of the best practices in entrepreneurship education, current and past activities related to entrepreneurship education in the country and on-site research authors presented several recommendations towards strengthening the entrepreneurship education in the country:

1. Introduction of curriculum content which refer to innovative thinking and entrepreneurship in the curriculum for all levels (primary, secondary and tertiary) – within the regular curriculum, in different subjects such as mathematics, informatics or groups of subjects from the natural sciences, which focus on general competences such as creativity, initiative, generating ideas, adoptability, risk assessment, self-confidence, team work etc.
2. Introduction of special subject:
   a. "*Entrepreneurship and innovation*" in the primary education, as a facultative subject (or project activity) in the eighth and ninth grade, starting with one or two classes per week,
      - the focus in the primary education should be based on experiential learning where the curriculum would be more interactive, including company visits or visits by the employers, successful businessmen as a guest speakers in the schools (minimum of 3 visits a year would be recommended). This kind of interaction provides the students with easier access to, i.e. understanding of "the world of work". In addition, experiential learning is one of the strongest tools which provide significant contribution for the students and provides direction when choosing where to continue their education in the higher levels.

   b. In the secondary education:
      - by renaming the subject which is currently studied in the fourth year of the secondary school "Business and entrepreneurship", into "Entrepreneurship" with complete change of the curriculum, which would then focus on learning skills and knowledge for starting and leading a business
      - "Entrepreneurship and innovation" in first, second and third year of the secondary school in general as well as vocational schools, where focus would be more on strengthening the general competences: creativity, initiative, generating ideas, adoptability, risk assessment, self-confidence, team work etc., but also developing specific competences which are needed for starting and leading a business such as marketing, financial literacy, development of new products and services etc. This subject could be taught once a week as a compulsory subject (better option), or it could be realized as additional – facultative project activity. Active, research and practical work should be in the focus of the classes from pedagogical point of view.

   c. "Entrepreneurship" in the higher education:

- at whichever university it is possible to make it into a compulsory subject in the curriculum and facultative subject at all other universities so that every student would have the opportunity to study it.
- additional development of university based special centers which would provide advanced entrepreneurship training (for students and teaching staff), would provide opportunities for incubation of start-up companies, mentoring and coaching and could financially support young entrepreneurs with initial capital (start-up center, business incubator, center for entrepreneurship etc.).

3. Continuous training and development of the teaching staff for all levels of education (primary, secondary and tertiary) in the field of entrepreneurship and innovative thinking.

These approaches are not mutually exclusive i.e. it is possible to implement all of them in practice at the same time. Everything depends on the good will of the available stakeholders, resources and the time framework of the expected results. However, besides these approaches, it is necessary to have a complete reform and growth of the eco-system where entrepreneurship education would be developed. The following recommendations are essential for strengthening the eco-system for the entrepreneurship education:

1. Continuous media propaganda for promotion of the entrepreneurship education:
   - Commercials and advertisements
   - Popular shows about famous entrepreneurs (domestic and foreign)
   - Educational shows about entrepreneurship and starting and leading of business
   - Quizzes
   - Reality shows related to starting own business
   - Strong media coverage of the key events which support the entrepreneurship and innovation: European week of the small and medium enterprises, Global week of entrepreneurship, Start-up weekend, European day of the entrepreneur, World day of the entrepreneur, Entrepreneur of the year, Macedonian business leader, Patent of the year, Makinova, etc.
   - Usage of the internet and the contemporary social network media Facebook, Twitter etc. for promotion of entrepreneurship.
2. Strengthening of the National Entrepreneurial Education Network (NEEN):
   - Serious selection of teaching staff which would teach the new subjects related to entrepreneurship
   - Organizing continuous training for the teaching staff
   - Supporting of the career development of the teaching staff which teaches entrepreneurship and similar contents
   - Providing support for the international mobility and exchange of teachers and researchers from the field of entrepreneurship
   - Development of e-content for entrepreneurship
   - Development of additional tools and methods of teaching (interactive content, games, quizzes, tests, etc.) entrepreneurship
   - Supporting the National contest for best business plan in the secondary schools
   - Supporting the National contest for most innovative business plan at university level
   - Organizing contests in the primary education as well
   - Introducing prizes such as “Entrepreneurial teacher of the year”, “Most entrepreneurial school of the year”, “Entrepreneurial team of the year” etc.

3. Creating close cooperation between the formal and informal entrepreneurship education by:
   - Preparing accredited curriculum
   - Working out additional materials, techniques and methods of teaching
   - Using contemporary methods of teaching such as: “learning by doing” based on studying through projects, practice and consultation, using case studies for learning based on discussion etc.
   - Introducing certification of the teaching and consulting staff which teaches entrepreneurship
   - Preparing a base of companies ready for cooperation, visiting lecturers and successful entrepreneurs
4. Strengthening of the connection between the schools and the local community, the business sector and the pupils’ / students’ families
   - Organizing larger number of visits to the companies and providing numerous visiting lecturers from the business sector
   - Creating parents’ clubs composed by successful entrepreneurs who will present their stories
   - Including the schools in social activities etc.
5. Providing funds for implementation of planned activities from:
   - The state budget
   - Own funds of the schools
   - Local government
   - Donor community
   - European funds
   - Business
   - Non-governmental sector etc.
6. Providing an effective system for monitoring and evaluation of the strategy for entrepreneurship education:
   - Even worldwide there are no sufficient evidence yet, saying which system or approach to the entrepreneurial education is the most effective and how much are the established indicators for progress satisfied
   - The monitoring system should be focused on the needs of the local market
   - Creation of board composed of representatives from all stakeholders which should monitor the implementation of the strategy for entrepreneurial learning
   - Continuous revision and improvement of the strategy for entrepreneurial education every 3-4 years

Above mentioned suggestions are focused on the next step – the creation of Macedonian Strategy for Entrepreneurship Education 2014 - 2020. According to the latest information from the Ministry of Education and Science (late February 2013) in April 2013 with support of the European Training Foundation [20] a project for development of national strategy will start.

5. Conclusion

Based on the findings in the adopted final report from the survey, the Government of the Republic of Macedonia has decided, starting from September 2012, the course "Innovation and Entrepreneurship" to be introduced in the 1st, 2nd and 3rd year of secondary schools with one teaching hour per week.

Immediately in April 2012 curriculum for new courses was developed, while in summer 2012 new textbooks for the courses was published. In June and September 2012 more than 1300 high school professors passed 2-days intensive training on the topic "Innovation and Entrepreneurship". Since 1st of September 2012 the new course have been taught in all Macedonian high schools.

In addition the Macedonian government also decided to introduce the course "Innovation and Entrepreneurship" in 8th and 9th grade of primary education since September 2013. In the moment of writing of this paper the curriculum for new course is under preparation. The courses will be with 2 hours per week. Intensive training of teachers will follow in June 2013.

With the latest changes of the Law for Higher education, courses related to Innovation and Entrepreneurship is suggested to be offered and make available to all university students.

All above mentioned activities will be summarized and upgraded with national entrepreneurship education strategy that is expected to be adopted until the end of the 2013.

References

1 http://ec.europa.eu/enterprise/policies/sme/documents/charter/index_en.htm
2 Mariotti, S. "Opening the Door of Entrepreneurial Possibility". Kauffman Thoughtbook 2005. Ewing Marion Kauffman Foundation
3 http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/files/education/effects_impact_high_edu_final_report_en.pdf
4 http://eacea.ec.europa.eu/education/eurydice/documents/thematic_reports/135EN.pdf
5 http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/files/education/teacher_education_for_entrepreneurship_final_report_en.pdf
6 http://ec.europa.eu/europe2020/index_en.htm
7 Polenakovik R., Jovanovski B., Velkovski B.: "Background study for evaluation of the current trends with entrepreneurship education world-wide and development of recommendations for introducing course "Innovation and Entrepreneurship" in 8th and 9th grade of primary schools, and 1st, 2nd and 3rd year of secondary schools", NCDIEL print, December 2011, Skopje
8 http://bro.gov.mk/docs/biznis/Nastavna%20programa%20Biznis%20i%20pretpriemnistvo%20IV%20___%2001.03.2012%20Finalno.pdf
9 http://gemconsortium.org/article.aspx?id=112
10 http://ncdiel.mk
11 http://www.kulturkontakt.or.at/
12 http://www.pep.org.mk/
13 http://macedonia.usaid.gov/en/sectors/education/sea.html
14 http://www.ja.org/jaworldwide/near/members/macedonia.shtml
15 http://www,bsc,ukim.edu.mk
16 http://www.bscbitola.org/
17 http://www.yesincubator.org.mk
18 http://www.ceed-macedonia.org
19 http://www.seecel.hr/UserDocsImages/Documents/Documents%20Section/SEECEL%20-%20Entrepreneurial%20Learning%20ISCED%20Level%202.pdf
20 http://www.etf.europa.eu

LINKING UNIVERSITY AND INDUSTRY: EXPERIENCE OF TURKEY AND CHALLENGES IN KAZAKHSTAN

Alibekova Gulnaz, Tunç D. Medeni

Kazakh Economic University of Ryskulov, Almaty, Kazakhstan, 050035, Zhandossov Street, 55, g_alibekova@mail.ru

Middle East Technical University, Turkey, 06531, Ankara, tuncmedeni@gmail.com

Abstract

This research is conducted to show the gap between Kazakhstan and other countries (in particular, Turkey) in linking university and industry mechanisms. Research methodology includes analyzing GCI, KEI and other relevant indicators and review of foreign and Kazakh universities mechanisms of linking with industry according their web-site information. Also their effectiveness is measured by their knowledge/technology transfer profitability. Revealed mechanisms are correlated to their effectiveness indicators and most effective mechanisms are defined.
Originality of the research is in first comparative analysis of Turkey and Kazakh universities industry linking mechanisms.

Key words: industry links, university, knowledge, technology transfer

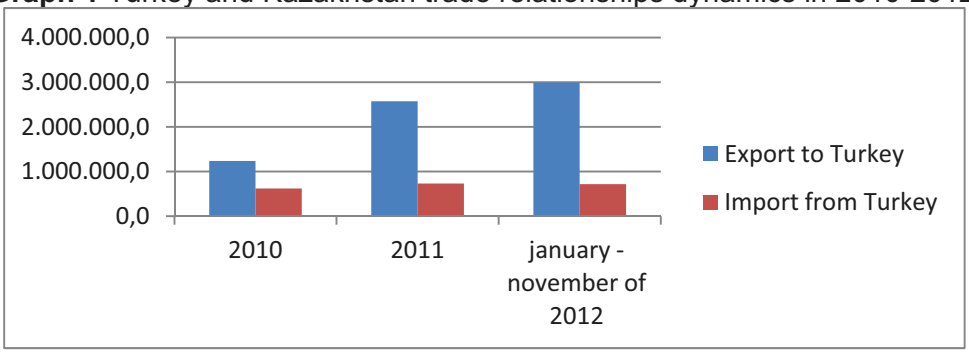
Abbreviations

GCI- Global Competitiveness Index
KEI- Knowledge Economy Index
GERD – Gross expenditures for research and development
R&D – Research and Development
GDP – Gross Domestic Product
TTGV- Technology Development Foundation of Turkey
WoS- Web of Science

1.Kazakhstan and Turkey – emerging economies

Nowadays, economic relationships of Turkey and Kazakhstan are very strong and dynamic. Kazakhstan mostly exports mineral and agricultural products like wheat, oil, gas, coal, metals, while Turkey exports industrial goods: metallic and plastic products, furniture, textile and household chemicals.
Prime-Minister of Turkey Redjep Erdogan announced that “Turkey has intentions to increase its commodity turnover with Kazakhstan up to 10 bln dollars”. Today, this figure is about 3 bln dollars.

Graph 1 Turkey and Kazakhstan trade relationships dynamics in 2010-2012.



As I mentioned before, Kazakhstan's export is mostly represented with raw materials and minerals. Unfortunately, it reflects the whole economic structure of Kazakhstan.
So, in 2003 Kazakh government announced innovative way of development.
According to the Global Competitiveness Report 2010 – 2011, Kazakhstan took 72 place in the countries' competitiveness rank while Turkey's rank was 61.
Kazakhstan's GCI is characterized by negative tendency in Technological readiness rank (-7) and tremendous bad one in Innovation rank (-39), while Turkey show positive trends in one (+2) and more less negative (-1) in another indicator.
But as for KEI Kazakhstan has more good changes since 2000 (+5) in compare with Turkey which shows more negative situation (-7). But still Turkey's rank is higher than ours (69 against 73).
Looking at top 10 countries with highest KEI in 2011 which has positive or no changes in compare with 2010 KEI we can state that the gap between them and Kazakhstan is rather discouraging – about 4-5 points of difference in KEI.

Table 1 Comparative analysis of Turkish and Kazakh STI indicators

STI Indicators, 2011	Kazakhstan	Turkey
GERD, mln	$292,127	$11537,3
Share of GERD in GDP	0.16%	0.86%
Total number of FTE researchers	18,003	72,109
Innovation activity	5.7%	51,4% *
R&D financing by government sector	52.9%	29.2%.
R&D financing by business enterprise sector	46.3%**	45.8%
R&D financing by higher education sector		20.8%
R&D financing by foreign funds	0.3%	0.7%

Source: Turkish Statistical Institute
*- statistic data for 2008-2010 years.
**- financing by own means of enterprises (business and higher education)

Table 2 R&D funding indicators of Turkey in dynamics

	2003	2004	2005	2006	2007	2008	2009	2010
GERD, mln $	2840,0	3567,7	4617,5	5193,4	7051,9	7744,5	8815,7	9582,5
GERD per capita population, %	42.47	52.67	67.33	74.81	100.37	108.96	122.62	131.54
GERD per GDP	0.48	0.52	0.59	0.58	0.72	0.73	0.85	0.84

Source: OECD, Main Science and Technology Indicators, June 2012.

In September 2004, the Supreme Council of Science and Technology (BTYK) approved the new goals of science and technology in Turkey in line with which, two main targets were set: (a) To increase GERD/GDP ratio from 0.53% in 2002 to 2% by 2013 *(in 2011 it was equal to 0.86%),* half of this share being funded by the private sector *(in 2011 it was equal to 45.8%);* (b) To raise the number of full-time equivalent (FTE) researchers from 28,964 in 2002 to 150,000 by 2013 *(in 2011 it was equal to 72,109)* [1].
So, in order to reach those aims Turkey need to increase more than twice its investments in human capital in science, technology and innovation.

Table 3 R&D funding indicators of Kazakhstan in dynamics

	2003	2004	2005	2006	2007	2008	2009	2010	2011
GERD, mln $	81,24	112,15	160,93	195,28	223,07	287,83	262,8	227,05	292,13
GERD per capita population, $	5,46	7,5	10,67	12,83	14,49	18,48	16,44	14,01	17,67
GERD per GDP	0.25	0.25	0.28	0.24	0.21	0.22	0.23	0.15	0.16

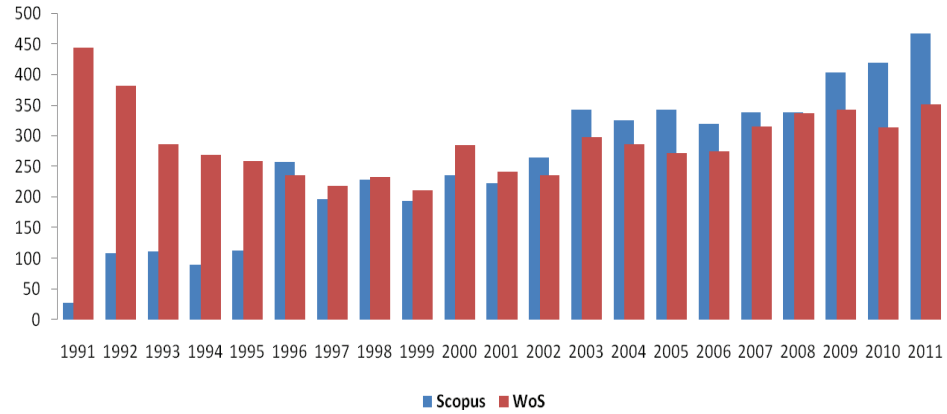
Source: National Statistics Agency data.

In comparison with 1999 (0.47%) Turkey approximately doubled in 2009 its share of GERD in GDP (0.85%) while Kazakhstan increased it by three times (from 0.08% to 0.24%) [2].
As for GERD per capita in Sweden this indicator is $1380,9, Finland - $1335,9, USA – $1307,6, Japan - $1168,5, Russia - $166,7. As you see, Kazakhstan drop behind those countries more than 60 times while Turkey's lag is at least 10 times [3].

2.Research productivity comparative analysis

From 1991 till 2011 5342 and 6088 publications of Kazakhstan authors were published in Scopus and WoS respectively (Graph 1) while Turkish authors published 6977 titles just in 2007 according to TUBITAK statistics. Nowadays, rank of Turkey in WoS with respect to scientific publications raised from 26th in 2000 to 18th in 2010.

Graph 2 Research activity of Kazakhstan in international citation databases



Transfer to market economy pushed local research to more collaboration. 41-55 %, and 59,4 % of publications in 2003 and 2007 respectively were held in collaboration with foreign colleagues from 40 countries. In particular most strong relations are built with Russia, USA, Japan, Italy, Great Britain, Poland, Canada, etc.
Kazakh authors are published in more than 1000 journals of Russia, USA, Germany, Netherlands and Great Britain.
In 2011 Kazakh Ministry of Education and Science subscribed all research institutes and universities to Web of Knowledge (Thompson Reuters) and ScienceDirect and Scopus (Elsevier).
This measure pushed up the number of publications from 478 in 2011 to more than 500 in the first mid of 2012. So, we can forecast that in 2012 total number of publications can reach 700-1000 meaning that in 1-2 years we have doubled number of publications.

Table 4 Number of granted patents in Turkey and Kazakhstan, by years.

	2007	**2008**	**2009**	**2010**	**2011**
Turkey	4790	4869	5610	5510	6539
Kazakhstan*	1278	1950	2049	2320	2330

Source: Annual reports of the Kazakhstan Patent Office and Turkish Patent Institute.
*- includes patents for utility models, inventions, industrial samples and selective breeding

The number of patents filings per 1 mln of population is 93,6 (in Russia – 195,9; Germany – 582,6; Great Britain – 289,7; USA – 741,8; Korea– 2 591,5; Japan – 2 720,7) [4].

3. University adjustments to technology transfer challenges

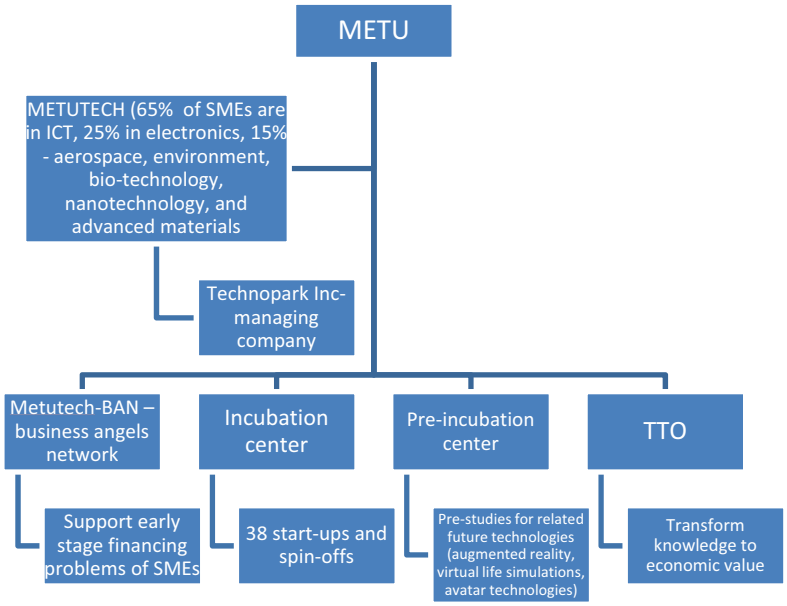
Nowadays, universities play a great role in generating patents. One of Turkish advanced universities which successfully implement their role in innovating their economy is Middle-East Technical University (METU). According to the Entrepreneurial and Innovative University Index that has been prepared by TUBITAK Sabancı University, METU and Bilkent University are at the first three rows among the 50 universities in the list (Table 5).
Among them METU gained the highest score on "Economic impact and commercialization" indicator (18.8). So, let us analyze METU's efforts in enhancing R&D results commercialization.

Table 5 The most highly ranked Turkish universities in 2012 by TUBITAK ranking system.

	S&T research capacity	Intellectual property pool	Collaboration & interaction	Entrepreneurial & innovative culture	Economic impact and commercialization
1. SABANCI UNİVERSITY	19.2	9.2	25.0	12.5	18.3
2. METU	18.9	10.6	22.2	12.2	18.8
3. BİLKENT UNİVERSITY	18.3	6.5	22.8	4.5	18.2

METU realizes its innovation policy through established METU Technopolis (METUTECH).

Graph 3 METU's structure specialized in technology transfer



The Middle East Technical University and METU Technopolis hold the "New Ideas New Businesses" - the Best Technological Business Idea Competition for the past three years. This competition is aimed to support young entrepreneurs.

Also, Technology Development Regions Law provides incentives for the development of R&D activities in regions by funding opportunities of institutions like TEKMER, TEYDEB, and TTGV as well are the financial services offered by METUTECH.

As for Kazakhstan, universities are not yet source of knowledge valuable for economic growth. They have no adequate infrastructure, qualified technology transfer managers and still don't understand their third mission - supplying innovations into the economy. Mostly they are engaged just in education activity and about 27% of all institutions conducting R&D are universities [5]. Universities cover 19% of total research personnel. Also our universities provide 16% of total expenditures for R&D (in Turkey – 47.4%[1]). According to National Statistics Agency 12% of all R&D projects are held in collaboration with universities. So, we

[1] data of 2009 year.

can state that universities are not strong. Unfortunately, our national statistics does not reflect profit of universities generated from technology transfer.

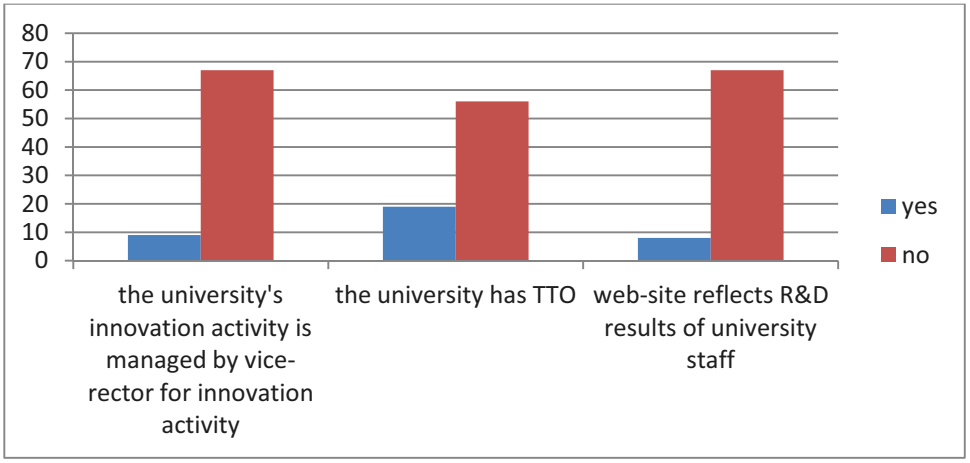
By the author of this article the study of 75 universities of Kazakhstan was held to evaluate their commitment to technology transfer and commercial activity in accordance with their web-site information. The universities are divided into three groups: national (6), state (29) and private (40). Their web-sites are surveyed on existence/availability of: 1) technology transfer offices (or somewhat like that), 2) top-manager for technology transfer activity (for ex., vice-rector for innovations), 3) announcement on R&D results of the university research staff.

According to the Graph 3 majority of universities are still not driven for commercial application of their R&D results. Just 9 of 75 have vice-rectors for innovation. However, none of those 9 vice rectors engaged entirely into innovation development activity: they juggle sometimes international relations or R&D activity.

Also, 19 universities of 75 have somewhat like technology transfer offices mostly named as innovation department. Just 3 of them have more than one unit committed to technology transfer (TT) development: Kazakh National Agrarian University (commercialization office, Kazakh-Japan innovation center, department for science and innovations), East-Kazakhstan Technical University named after Serikbayev (unit for R&D and innovations, business-incubator and intellectual property office), Eurasian National University named after Gumilyov (commercialization office, innovation park, department for science and innovations) and Karaganda State Technical University (innovation & technology center, commercialization office).

As for the third criteria, the pool of the university's R&D results are shown just in 8 cases of 75. This is due to weak activity in R&D results commercialization aspect.

Graph 4 Results of survey of 75 Kazakh universities



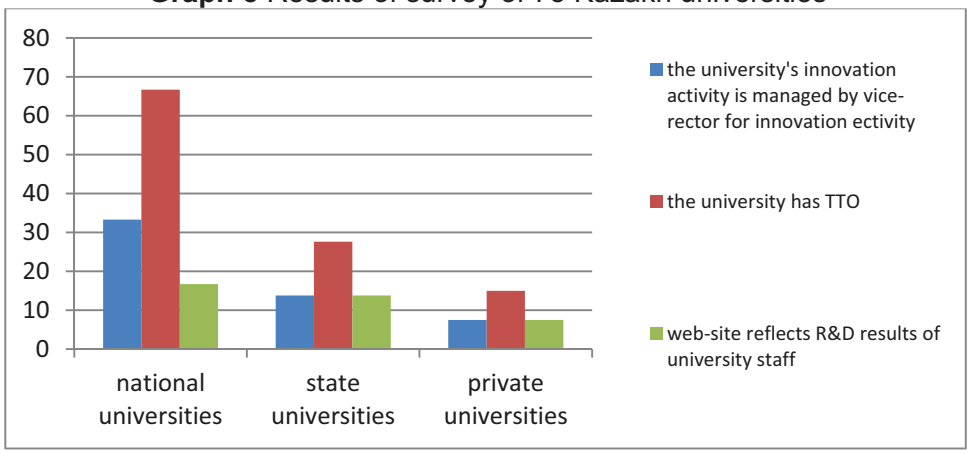
This study shows also universities adherence to R&D results commercialization by type of legal status (national, state and private). Kazakhstan has 1 international university (International Kazakh-Turkish University named after Khodja Ahmed Yassavi), 1 university with special status (Nazarbayev University), 6 national, 29 state-owned and 40 private-owned universities.

Table 7 Shares of universities according to investigated parameters.

Survey parameters, %	National universities	State universities	Private universities
The university's innovation activity is managed by vice-rector for innovation activity	33,3	13,8	7,5
The university has TTO	66,6	27	15
Web-site reflects R&D results of the university staff	16,7	13,8	7,5

The Graph 5 visually shows the dominance of national universities over state universities and state universities' dominance over private universities in terms of investigated criteria.
In total, about 11% of investigated universities are headed by vice-rectors for innovation, 15% of them have TTO, 7.5% reflect R&D results at their web-sites.

Graph 5 Results of survey of 75 Kazakh universities



The conducted research did not cover independent research institutions while they are more focused at R&D than universities. There are about 80 research institutions in Kazakhstan and they do not have enough commitment to commercialize R&D results as well.

4. Conclusion

In summary, we can state that Kazakh universities are not ready to bring commercial activity regarding their R&D results. The main issues are:

- shortage of R&D funding and full-time researchers;
- lack of incentives for inventors to commercialize their inventions;
- disadvantages of intellectual property right protection system;
- low innovation activity in the country;
- technological inflexibility of local production;
- shortage of qualified technology transfer personnel;
- inadequate mentality of local managers (absence of understanding the mission of universities, narrow vision, etc.);

All of these barriers evidence on immature business environment, insufficient commitment of local businesses and industries to high competitiveness, inadequate state regulation of competition development, lack of linking industry and university mechanisms and so on.
Here are the recommendations to overcome the situation:

1. increase funding sources for different life cycles of technologies
2. work out incentives for universities and industry links
3. elaborate mechanisms for university technology transfer systems development
4. use Turkish experience in building university technology transfer infrastructure
5. explore ranking systems for evaluating activity of universities in technology transfer.

Reference

1 http://www.proinno-europe.eu/page/innovation-and-innovation-policy-turkey
2 Report on world and Kazakhstan innovations tendencies. National Innovation Fund, 2011.
3 National Report on Science of Kazakhstan, Astana, 2012
4 Attachment to the decree of the Government dated by 19 of January of 2012 # 131 «Strategic plan of the Ministry of Education and Science for 2011 – 2015 years»
5 www.stat.kz

SKOLKOVO INNOVATION CLUSTER: INNOVATION GIANT OR COLOSSUS WITH FEET OF CLAY?[1]

Dina Williams[1],

[1]*University of Huddersfield, Queensgate, Huddersfield, UK d.williams@hud.ac.uk*

Purpose of the paper is to provide an understanding of the institutional context at the early stage in order to draw lessons and make adjustment for future development. More specifically the paper set to

(1) Examine the potential of Skolkovo Innovation Centre as a catalyst of innovation development in Russia and a prototype for regional innovation eco-systems;

(2) Examine Skolkovo's business model, e.g. to what extent the Skolkovo project focus on the linear view of innovation or it forms a part of an emerging interactive innovation system;

(3) Assess the chances of success for a top-down innovation project such as Skolkovo, e.g. to what extent the Skolkovo can be self-sustainable in mid- and long-term perspective.

In its design the paper is grounded in theoretical conceptualisation in innovation cluster development in combination with literature on effectiveness of business support infrastructure and draws upon debates in press, on-line community as well as face-to-face in-depth interview with key participants and stakeholders of Skolkovo project.

The lesson for the future development of the Skolkovo project should acknowledge the dynamism and complexity of the process, particularly the multiple levels of interplay and influences.

There is a need for greater understanding of cluster dynamics, particularly amongst policy-makers. This study provides insight into the early stage of the development process of top-down cluster and its drivers.

Keywords: *innovation, Cluster, Entrepreneurship, Regional Develoopment, Skolkovo Innovation Centre, Russia,*

[1] To a reviewer. This is a very first draft of the paper. Unfortunately I have had unusually heavy work load and most recently suffered ill health. I will be working on the paper strengthening its conceptual grounding.

1. Introduction

Since time of Schumpeter [1] the process of industrial innovation has been seen as associated with economic growth. Today innovation is widely recognised as a foundation for the competitiveness of regions, nations, and industrial sectors and firms. The experience of Western economies has proven that the most effective way of fostering innovation is building a strong linkage between science (academia) and industry. The experience of developed countries proves that successful technology transfer depends on linkage between academic science and business, and correspondence of the national business system to the national system of innovation. Lundvall [2] defines a national system of innovation as 'all parts and aspects of the economic structure and the institutional set-up affecting learning as well as searching and exploring the production system, the marketing system and system of finance'. The widely accepted notions of “knowledge-based economy” together with “national innovation system” [2–4] and the “triple helix” of innovation [5,6] place public research organisation (PRO) in the heart of modern economies demanding more active engagement with the business sector through transforming the PRO themselves into entrepreneurial organisations.

There exists extensive theoretical and empirical discussion of issues of innovation, knowledge exchange, technology transfer and academia-industry linkage in Western literature. When it concerns emerging economies and Russia in particular the understanding of the innovation processes is somewhat limited. Over the last two decades, Russia has undergone a profound transformation in its political, economic l and social systems. The collapse of the old system, including economic liberalisation combined with drastic cuts in governmental funding, has led to the breakdown and erosion of Science and Technology (S&T) system. In most recent time Russia has risen as a new economic and political power putting significant political emphasis on developing its innovation system. Adopted in November 2008 “The Concept of Long-Term Socio-Economic Development of the Russian Federation for the Period Till 2020” outlines transition from the economy based on export raw material to the innovation model of economic growth. So called economic modernisation programme announced by then President D. Medvedev aims to decrease country’s dependency on gas and oil, create diversified economy based on high technology and innovation. In the centre of this modernisation policy is a physical piste de résistance in a village south west of Moscow, Skolkovo, where the Government intent to build Russian Silicon Valley.

Skolkovo is not a first large scale project Russian Government undertook over last decades to stimulate research and innovation. But by far this is most grand and ambitious aimed on transforming and modernising the whole country. The project began in 2010 and had three years horizon to complete physical infrastructure and create a futuristic city.

The prime aim of this paper is to look at the stage Skolkovo project is in two years down the line and ascertain

- The potential of Skolkovo Innovation Centre as a catalyst of innovation development in Russia and a prototype for regional innovation eco-systems;
- The Skolkovo’s business model, e.g. to what extent the Skolkovo project focus on the linear view of innovation or it forms a part of an emerging interactive innovation system;
- The chances of success for a top-down innovation project such as Skolkovo, e.g. to what extent the Skolkovo can be self-sustainable in mid- and long-term perspective.

This is an exploratory study closed to the ground theory in its methodological approach. It draws findings upon debates in press, on-line community as well as face-to-face in-depth interview with key participants and stakeholders of Skolkovo project.

The paper starts with outline of background of Skolkovo project, its short history and key issues highlighted from its inception. Then it explains the methodological approach to the study; next it discussed the key findings from the interviews and concludes with key lessons we can learn from Skolkovo.

2. Background

In February 2010 then President D.Medvedev announced the intention to create a modern science-technological complex aimed at development and commercialization of new technologies, in five areas that he earlier announced as all-country priorities: energy efficiency, information technologies, telecommunications, biotechnologies, and nuclear technologies. Since its announcement in March 2010, the government pumped a small fortune into the project (roughly $290 million in 2011 and an expected $4 billion over the next two years) [7]. The innovation city will include computer labs, meeting spaces, and its own university for 1,200 graduate students that is founded with assistance of the Massachusetts Institute of Technology (MIT) and modelled after Stanford University, Silicon Valley's feeder school. The founders of the project claim there will be a great deal of partnering and incubating.

Before Skolkovo Russia has had around 100 science towns, techno parks and special economic zones. So far, the results of these privileged administrative areas have been extremely patchy. Despite their less than encouraging experience, the Russian leadership has decided to found another science town, Skolkovo, to become Russia's Silicon Valley [8].

According to Governmental officials [9], this should become an absolutely competitive project, and this is how it differs from everything that was done so far. This implies that previous initiatives were not globally competitive and that the Government learnt from earlier mistakes related to special zones, and hence, it grants Skolkovo sufficient administrative privileges i.e. tax holidays, a right to import technology from abroad without tariffs, and the freedom to operate outside the Russian bureaucracy. Even if considerable administrative privileges aid in designing a globally competitive innovation oasis inside Russia, the organisational skills of the leadership of Skolkovo Innovation City ultimately determine the success of this special zone. [11]

Nonetheless analysts in Russia and abroad comments that from the very beginning this was and remains to be a purely "governmental", top-down, centrally planned, command-style project – because its concept, location and other basic questions were discussed in a narrow circle of government officials with very limited representation of businesses and regional governments [9,10].

Although sometimes Skolkovo is presented as an exclave that should be taken out of the Russian context, this is hard to do taking into account Russia's international stances. World Bank ranks Russia's knowledge economy [11] in 55 place and ease of doing business [12] in 112 out of 185 countries in 2013, World Competitiveness Index [13] ranks Russia's quality of research institution in 70 place, university – industry collaboration in 85, governmental procurement of advanced technology products in 124, and availability of scientist and engineers in 90 place out of 145.

Skolkovo modelled on the US Silicon Valley; even Present D. Medvedev visited the Valley on several occasion establishing Skolkovo Innovation Centre as a rightful heir to the American high-tech success story.

Russia isn't alone in trying to engineer new technology centres. In fact Skolkovo is not a first project inspired by Silicon Valley in Russia; after visiting the Valley in 1950s Khrushchev attempted to replicate it in Akademrogodok in Novosibirsk [14]. Since then, a myriad or "Silicon wonders" sprang up around the world since 1980s. Most recent examples include China which has invested billions of dollars to launch tech parks across the country, as well as such nations as Spain, Singapore, Finland, and Malaysia. Most of these projects are well-intentioned efforts to boost national competitiveness. However top-down clustering doesn't tend to work nearly as well as when hubs of commerce and academia spring up from private efforts [14–17].

Studies that focused on examining successful and failed regional clusters and the role of governmental intervention agreed on limited role the government can play. Hospers *et al* [14] states that most governments tend to focus of high-tech clusters in attempt to increase competitiveness. However the fundamental issue is that policy makers in best intention in heart are not able to pick real winners (industry, technology or a particular venture). Another issue is that the true competitive advantage is in being different, replication of Silicon Valley doesn't make clear how a new cluster is differ from another, that leads to excessive investment and overcapacity. Furthermore Hospers *et al* [14] outline the need for embeddedness into the local context, e.g. economic structure, location, absorptive capacity for new technologies, etc.

Examining successful clusters authors agree that the key ingredient is entrepreneurship-led growth [16,17]. The governmental intervention at early stage instead of promoting can stifle the entrepreneurial discovery process [14]. Entrepreneurs, not buildings and real estate, are the key to innovation and economic growth [15]. Drawing on examples of successful clusters, not necessarily high-tech clusters, Hospers *et al* [14] outlined that their success grounded in embeddedness in economic structure, new combination of old tradition and global trends and spontaneity of their origin. Government indeed played a role but after an emergence of a cluster. The role government can play in branding and promoting successful cluster attracting further businesses and investment. Cluster require good infrastructure and a pool of educated talent to develop a technology hub, hence the government can enable creation of business support and technology transfer centres. However in a grand scale of things government can do very little with facilitation and tax reduction to be main priority areas.

The development of Skolkovo doesn't instil confidence in its success. As it was mentioned earlier, this is politically charged project where all decisions are made based on political considerations rather than practical realism. Russian government didn't escape of a trap idealising experience of the Silicon Valley but it neglected the fundamental principles of the Veallye success – entrepreneurial mind-set, evolutionary development and community engagement. The Russian context, location, economic structure, etc. are not taking into account. The measures themselves are not viewed critically, in their evolution. In the final analysis this leads to disappointment because the adopted measures do not work correctly in the Russian environment. Skolkovo is just one of many innovation projects of the Soviet and more recent past and yet there is a dramatic lack of monitoring and evaluation of previous initiatives to understand pitfalls and opportunities.

When there are resources, political will and a thought-out strategy for realization of a big project, then the chances for success are rather high. However all previous Russian history of big projects shows that some of the important components are always lacking.

The Skolkovo project may become a success if it will manage to create a persuasive set of measures, which, in turn, will provide an insight in how all government structures should work in order to create an innovative environment – not in the selected city but in the country as a whole. [9]

3. Methodology

3.1 General research approach

This is an exploratory study aim to ascertain the development of Skolkovo Innovation Centre and its chances to succeed where so many initiatives failed. Due to the lack of systematic research on clusters in Russia, the qualitative induction research strategy is adopted for the purpose of this research.

The research took place in September 2012 when the interview were organised with people who were considered to qualify to give informed opinion of the state of the development of the Skolkovo Innovation Centre. The interviews were secured at the following levels:

- Skolkovo Foundation:
    - Vice-President
    - Adviser to Vice-President
    - Director of one of thematic cluster
- Skolkovo Technopark
    - Director for Business Development
    - Business Development manager
- Skolkovo Institute of Science and Technology
    - Entrepreneurship and Innovation manager
- Venture Capital Industry
    - Global TechInnovations
    - EMF Capital Partners

The following section outlines the main themes for the interviews.

3.2 Issues outlined in the interview

Despite publicity in Russian and international press, experts are sceptical and critical about the future of Skolokovo and impact it could have on innovation development in Russia. The interviews with Skolokovo insiders and organisations working with Skolkovo were to address these issues.

In its framework, the study focuses on analysis of relations of the Skolkovo Innovation Centre with its main stakeholders such as domestic and foreign companies, universities and other public research organisations, business community including venture funds.

The first issue which was highlighted is market for innovation. The country's economy is dominated by resource-based industries, the share of non-resource based industries is shrinking; consumer oriented technology-based industries are negligible. Innovation absorptive capacity even in energy sector remains pitifully small. This poses a question if Skolkovo is able to contribute to innovation development of Russian economy.

In light of low demand for innovation within the country, there is always an option to offer new technologies to the foreign companies. However the question is whether or not Russian science is able to produce research outputs of high quality. Traditionally Soviet Union was views as a science powerhouse. Yet over last decades the science sector in Russia was significantly underfunded; if faces decline in numbers and aging of R&D personal. Brain drain, both internal and external remains a significant issue of Russian science. Experts within the science sector also mentioned that over last decades Russia didn't have any breakthrough discoveries in any major discipline dominating current scientific debate. All these pose a question of capacity of Russia science to instigate breakthrough innovation in the priority areas and the role Skolkovo can play in this process.

The issues of the quality of research output also associated to the relationships with other public research organisations. While internal brain drain is a serious issue for Russian science, some leading Russian scientists claim that Skolkovo will destroy what little left of Russian science, e.g. the chase for best people and best ideas for Skolkovo will drain the regional research organisations from the talents they have.

Alongside the quality of the research output is the question of quality of Skolkovo residents. If Skolkovo models itself of Silicon Valley, does it have a vibrant, dynamic and diverse community of entrepreneurs? How entrepreneurial are the Skolkovo residents? What are criteria to get the status and what are main obstacles facing them.

Finally, the Skolkovo project although given certain degree of autonomy is clearly a governmental initiative to create a top-down innovation cluster. What is the role of government in future development of Skolkovo.

4. Results and Discussion

The exploratory study aims to highlight and bring to the surface main issues surrounded Russia's mega innovation project. The interview also seeks to ascertain the responses to the criticism outlined in press and potential issues Skolkovo project might face in the near future. The interviews also brought to light some new dimensions to the Skolkovo project highlighting interaction between different institutions that constitute Skolkovo Innovation Centre, e.g.

- Skolkovo Foundation responsible for screening and selecting projects for funding and organised in five thematic clusters such as Nucler, Space, IT, BioTech, and Energy;
- Skolkovo Technopark, a property project desined to accommodate up to 1000 Skolkovo residents and key partners (MNCs as well as domestic corporations);
- Skolkovo Institute of Science and Technology (SkTech), graduate school founded with assistance from Massachusetts Institute of Technology with remit to advance research-led graduate education in science and technology.

This section starts with examining of the nature of Skolkovo resident companies, selection criteria as well as commercial viability of these companies. Then the discussion moves to evaluation of market demand for Skolkovo innovations. Next the relationships with local governments and other public research organisations (PRO) is analysed to establish role of Skolkovo in Russia's innovation system. Finally the study looks inside the Skolkovo project to

assess the impact of corruption both inside and outside of the project and role of government in its long term viability.

4.1 Who are Skolkovo residents and why they are there?

In September 2012 when the interviews were conducted there were over 650 registered Skolkovo residents; the current update on the Skolkovo web site stated over 750 companies registered as Skolkovo residents. In September 2012 one of Skolkovo Foundation Vice-Presidents stated that there were "*800 small companies went through the pipeline and two companies are actually close to IPO*". On a surface, these numbers are very impressive, especially taking into account a negligible number of technology-based small firms in the economy, not more than 1% of total number of SMES [18]. It worthwhile mentioning that physical infrastructure of Skolkovo Innovation Centre is still under construction. The HyperCube was open a month after the interview for this study took place.

Without any doubt Skolkovo is well publicised large scale predominantly government funded project able in short time to create a recognisable and prestigious brand. What else attract companies to become Skolkovo residents? First of all it is funding. The successful projects receive grants to carry on its R&D. Skolkovo residents exempt from corporation tax and VAT. In the future, when the physical facilities are completed there is a promise of access to world class infrastructure, research laboratories, and leading scientists. The status of resident is granted for maximum is 10 years or when a company reached $1mln in profit. According the Skolkovo *Foundation this is made deliberately to ensure a flow and renewal of ideas, people, projects. The past projects such as Zelinograd or Chernogolovka didn't have any time frame. They were populated by researchers and there was no provision for succession of generations. As a result now Zelinograd is a city of aging scientists. Skolkovo should be different, that's why we have 10 years cut off point"*.

When respondents were presented with a question to characterise Skolkovo residents most have admitted that they are "*research-based based start-ups*" which "*don't have ready for market product/service*". The representatives of an international venture fund working with some of Skolkovo residents also highlighted that what makes Skolkovo residents different from other technology-based companies they worked with is "*complete lack of understanding of commercialisation process … Skolkovo is full of people, clever people with pure academic background who don't have any business skills; they might have some interesting research going on but they don't know what to do with it on an open market*".

The interviews inside and outside of Skolkovo provided some insight to the situation. Firstly, despite the declaration of creating environment for innovative entrepreneurship, the selection criteria don't aim on support of ventures with high commercial potential. The main criterion for receiving financial support is presence of protected intellectual property and the research team has to be registered as a legal entity to obtain the status of Skolkovo resident. As it was explained the selection is based on advice of academic and technical experts in a particular area: "*It's not difficult to get status Skolkovo resident. Yes, start-ups have to be approved by technical experts but that's not so difficult*". Representatives of the venture fund see the low selectiveness as a key pitfall, they stressed that "*Skolkovo select on base of scientific and technological advances but they don't have any expect from venture funds, industrialists who*

could assess commercial perspective of a project. Projects which are not approved by venture funds shouldn't get into Skolkovo". Yet even in Skolkovo Techopark there is an opinion that "*Skolkovo is all about R&D, it's not about production. All our residents are here to continue their own R&D and to bring them to the status of market ready product/service*". Hence this difference in opinion really question the premise of Skolkovo of the project, e.g. is it about funding R&D or stimulating high potential ventures?

Connected to the first issue is an issue with the model adopted by Skolkovo to support high-tech companies. Skolkovo's Vice-President admitted that Skolkovo at present operates as low selective state-funded incubator at the same time he emphasised that "*We (Skolkovo) shouldn't be an incubation programme… I think in enthusiasm of how we started we attracted a lot of incubation companies, 90% of which will fail. This is not a good use of tax-payer money we have to be in the domain of high-potential start-ups, in technology which clearly has an edge, that accepted internationally by independent people. We should take these, very good, very promising and progress them to the market".* In similar vein representative of venture fund stressed that Skolkovo funding model is flawed *"I believe if Skolkovo is to foster innovative companies, they shouldn't give grants; grants don't motivate to achieve a commercial success*". On selection process representative of the Technopark stated that "*at the moment we already have more than 650 companies registered as residents. Maybe we need to slow down a bit as well as review the status of some companies. It's 2 years passed and we don't know anything about some companies. Maybe they are already dead as business; we need to have a systematic review*."

Another issue associated with previous two is characteristics of Skolkovo residents and problems facing them. These discussion doesn't concern MNCs and Russian corporations registered as Skolkovo's key partners and focus exclusively on the sector of small innovative companies received Skolkovo funding and status of Skolkovo residents. What became apparent from the interviews is that the advantages of Skolkovo residency attracted not only genuine stat-ups but established companies who could exploit such benefits as tax exemptions, access to financial resources, and brand image. The management of Technopark as well as Skolkovo Foundation insisted that they try to weed these type of companies out. When it comes to genuine research-based start-ups the respondents agreed that the main deficiency of Skolkovo residents especially of older generation is lack of business acumen. Representative of the Skolkovo Technopark characterised large proportion of Skolkovo residents as "'old school' academics who have very little ideas about market, business, etc. We try to help them but all they want is funding for their R&D, they will never come up with anything marketable". An acting Director of one of the thematic clusters pick up one issue which is quite typical for most of research-based start-ups across the world, namely an ability to translate new product into technological process of its manufacturing "*our teams can create a unique exemplar (doesn't matter it might cost an earth) but they are unable to translate it into cost-effective mass production*". The lack of business skills and entrepreneurial orientation is not a phenomenon exclusive to Russia; the issue is what kind of provision Skolkovo has to compensate for the lack of business skills. According to the Skolkovo Technopark management, the mission of the Technopark is "*to provide services to all our residents to ensure their success*". However it's worth mentioning that in September 2012 Technopark was able to accommodate only 40 companies and not all of them were Skolkovo residents. The rest of the Skolkovo companies are dispersed across Russia. While services provided by Skolkovo Technopark are not free, at the cluster level all residents are allocated a business mentor from the USA, UK, Israel (country with large number of Russian expats). However, "*the issue is that the residents don't listen to their mentors, e.g. they don't argue but they don't do anything either. Although Skolkovo School of Management is not a part of Skolkovo project, we did try to partner Skolkovo residents with student; didn't work either*".

At the same time, both at the level of Skolkovo Foundation and Skolkovo Technopark there is a strong opinion that new generation coming to Skolkovo is different "*the new generation, younger generation, is much more business oriented, they understand better their own limitation and try to find solution outside the original team", "we have a growing number of younger people, who have interesting ideas, who understand their limitation and learn fast*".

The common issue though related both to old and young generation of research entrepreneurs is the fact they are inward looking: "*Even when they are presented with an opportunity to raise venture capital they resist; they say: 'we don't want any external investment, only grant as we don't want to share equity'. These people still think that idea is everything, they don't understand that market will decide the value of their ideas*".

4.2 Where is the market for Skolkovo Innovations?

One of the main scepticism towards Skolkovo is that it will serve interests of MNC and create condition for further brain drain.

There was no much agreement on the demand for innovation in Russia even within Skolkovo. Management of the Skolkovo Foundation convinced that there is strong demand for innovation product generated by Skolkovo residents however they couldn't provide any specific examples of domestic companies or industries. At the cluster level the opinion was that the demand for innovation is patchy and some industries are looking for innovation solutions but normally they found these solutions abroad, not in Russia: "*There is domestic demand for innovation. Industries such as gas and oil, energy sector (everything from extraction to transportation) are very innovative, they are looking for new methods of exploration of natural resources. But yes, companies buy Western equipment as it has good reputation for reliability. Siemens is very strong on Russian market*" and furthermore "*Russian researchers are able to come up with world-class discoveries; however we don't have domestic companies able to implement these innovative solutions*". Representatives of the venture fund also agreed "*that there is no demand for innovation from domestic companies*". At the same time they mentioned that "what is interesting is that Russian R&D could be exploited but not by domestic companies but by foreign companies which are more oriented on improving their systems and processes, new products as well". Similarly an acting Director of a cluster noted that "*how we see things in Skolkovo is that if a team of researchers are able to sell their intellectual property to a foreign company, it is a success. ... Of course they won't be able to earn as much profit as a foreign company, which exploit their IPRs but license fees and royalties will provide a decent income for individual researchers and their families*". The responses both inside and outside support the criticism that Skolkovo doesn't have much impact on innovation development in Russia at large and main beneficiary of investment in Skolkovo R&D are MNCs.

Where respondents have agreed was the role the government and MNCs can play in boosting domestic demand for innovation. Skolkovo's Vice-President drawing on international examples stress the importance of presence of MNCs which could rejuvenate local supply chain making local companies to look for innovative solution. Yet, a representative of a Canadian firm disputed the prospects for creating a quality supply chain in Russian: "*there is a big issue with prototyping and manufacturing. In Russia high-end manufacturing base doesn't exist. We make all our hardware in Canada but all software in Russia. It's more cost effective for us*". Regarding the role of the government, drawing of US examples, representatives of venture fund stressed the importance of governmental intervention in boosting adaptation of innovative product and technologies. "*Governmental*

regulation and intervention is an important factor to stimulate demand for innovation especially in those companies which are state-owned". Relatively recently the Russian Government obliged all Russian state companies to increase investment in innovation. Representatives of the venture fund commenting on that stated that "this is a move in the right direction" but at the same time they were caution about this initiative: "*how do we know the product is truly innovative, or is it produced by new companies*" and further "*they appoint Director for Innovation, people who have no knowledge nor experience of innovation management, they create corporate venture funds but have no ideas how to manage these funds*".

The issue of demand for innovation both internally and internationally closely related to the quality of research output. The respondents were asked to comments of the level and quality of research conducted by Skolkovo residents and their commercial potential. Generally the respondents agree that the despite significant criticism quality Russian research output remains high. One of respondents attributed this to high level of connectivity and information exchange. The respondents, especially outside Skolkovo stressed the issue with Russian science is not the quality but R&D but technology transfer: "*The issue with R&D in Russia is the lack of consideration of commercial application of the research output. Scientist are focusing mainly on novelty and originality of the solution but not practical application of their discoveries*". The experts pointed again to the selection process and mentioned that the application could be found outside of original thematic area.

In terms of commercial potential without any doubts IT sector was singled out as most promising: "IT cluster is most dynamic cluster with a number of interesting projects and ideas. Success is rooted in strong education in this area" "The area where there is potential is IT. We do it very well and able to sell the product". These statements are supported by the fact that it was an IT company to go first through IPO on the Russian stock market. Furthermore interview with one of Skolkovo Technopark tenant also suggested a presence of talent pool of IT specialists. A Canadian company involved in a niche market of video conferencing services commented that "*it's very hard from us to find specialists in our niche area in Ottawa. In Moscow there is no problem with supply of talent and highly qualified specialists are ready to work for half of salary in Canada*".

When it comes to other Skolkovo thematic clusters the Energy cluster has relatively strong links with private companies both domestic and international, the situation with other clusters such as Nuclear, Space and BioTech is more problematic. According the representatives of the Skolkovo clusters, the main partners for Nuclear and Space clusters are state corporations RosAtom and RosCosmos respectively. The main concern however for Skolkovo Foundation is BioTech which has the least number of residents. At the same time Director of a cluster stated that while in other clusters there is a strong legacy of the Soviet science, there is no tradition of advanced research in biotech. However there is a potential of spill over of new ideas from other clusters such as nuclear for example.

4.3 Where does Skolkovo fit in a larger scale? A black hole or a template for the future

The major criticism towards Skolkovo project is that it drains the remaining talent and prospective ideas from the regional research centres. One of elders of Russian political science S. Kara-Murza was very categorical in his assessment of Skolkovo project, he believes that project like that destroys what left of the Russian science system.

Understandably representatives of Skolkovo are protective over the project: "*Yes, there is a position that it would be better to spend $5 bn between existing research centres rather than trying to build anything from scratch. But we did try that in the past, and where is the result? We are still where we started. A new project free from old legacy has better chances to succeed. Moreover, if you look at the regional research centres, there is no Big science anymore. All people do is writing grant application for their old R&D and that's all. No new ideas emerge there*".

Representatives of Skolkovo don't deny that there was a tension between Skolkovo and regional governments and regional research centres some of which have world-class reputation such as Novosibirsk: "*Indeed there was a lot of resistance from PRO and local government to start with. But now Skolkovo signs agreements with regional government and leading universities and research centres so that we can work together and share resources. Skolkovo is just one project we need lots of Skolkovo across all Russia*". The later idea, Skolkovo as a template for the future seems to be a main theme across all level and institution at Skolkovo: "*Here at Skolkovo we are developing a template for the future. If this model proves to be successful, it could be copied across Russia*".

The respondents of universities in Moscow and in regions however agreed that although strategic agreement with Skolkovo adds "weight" to the reputation and doesn't have any effect at the moment as the research teams stay within their institution. However the situation might change if the research teams, Skolkovo residents, have to relocate to Skolkovo in a near future. It doesn't appear that there is serious consideration of the role Skolkovo can play in the future development of innovation system. In this respect is very interesting position regarding of SkTech, The Skolkovo Institute of Science and Technology. In 2012 the SkTech which doesn't have physical space and only virtual faculty has raised a record for Russia endowment of $600 million out of which state companies are expected to provide $340 by paying 1% of their innovation budget with the state contribution will provide $1 billion over three years (2012-2015) [19]. SkTech projected to be a leading graduate school with strong research led Masters and Doctoral programme. It also set to close a gap in technology transfer and commercialisation: "*The idea of SkTech is actually that would become a kind of catalyst for commercialisation skills … The doctoral programme in SkTech will be design in a way that research is lined up with one of major companies and through their doctorate researchers will acquire not only research skills but skills of commercialisation…. In SkTech we basically start a system where we catalyse a culture within University of producing business ready and commercialisation ready researchers with a career in research. So that they don't have to disappear off into other roles and responsibilities*". However when asked if this new generation of commercially aware researcher will be used as a champions to ignite commercialisation process in other Universities, the representatives of SkTech and Skolkovo Foundation didn't have a clear answers. Moreover comments of Skolkovo Vice-President reconfirmed the concern that Skolkovo will drain best talents: "*the unique selling point to the large companies is that here in SkTech we will have not only research talents… but we have commercially savvy researcher available here on site on on-going basis who are available to industry. Arguably we will have the best researchers in Russia available at a single location and that's a big attraction for the businesses*". One of insiders in Skolkovo Foundation was critical outlining that even in its inception founders of Skolkovo did not consider lessons from previous project and development that took place in some universities and regional research centres. Although in official presentations Skolkovo's leaders stress the embeddedness of the project in Russia innovation system, so far there is little evidence to support that. So-called collaboration with regional universities and research centres is one way street so far. If the current trend continues there is a real danger of weakening regions which desperately need their universities and research centres to become hubs of economic development.

4.4. Skolkovo ecosystem or a jigsaw puzzle?

The official publications stresses that the Skolkovo is an ecosystem where all elements contribute to harmonise development of the whole project. However, even a simple observation and conversations with people representing different Skolkovo institutions leave a feeling of isolation. This feeling was confirmed to an extent by an analyst at Skolkovo Foundation, the respondent noted that despite carte blanche the project had at the beginning and opportunity to come up with creative solution, the execution, presidential appointments instilled a culture of bureaucracy where people don't feel free to express concerns or criticise the authorities.

The project, funding, started before actual model was piloted and tested, before the physical infrastructure was developed, before SkTech had it first students. For Skolkovo project to succeed according to Skolkovo Foundation representative it is important to create environment "*meaningful interaction; meaningful in a sense that you can't just make people to meet, you need to help them to collaborate and collaboration is an essential, most dramatic stage of commercialisation. In Skolkovo we never discussed this stage, but there is an issue there that someone who produces technology, does research but doesn't know much about application while there are expects who are familiar with the problems in industry and know about those applications. If they meet, they could think up a product that could be created using that technology*".

He also pointed that although matrix structure developed by McKinsey had its benefits when Skolkovo Foundation uncounted 15 employees, it also has its limitation especially in separation of thematic areas. When it comes to selecting projects and evaluating potential market the solution could be in material science but application in energy. Skolkovo's matrix structure doesn't have provision for cross-pollination and interdisciplinary research and evaluation, the areas where most of current breakthrough innovation take place.

4.5 Skolkovo, squeaky clean?

Finally the topic which one can't escape when the discussion concern of doing business in Russia – corruption. Extend of corruption in Russia pose a question could such large state-funded project be immune to bribery that swept the country. Understandably people inside Skolkovo Innovation Centre insist that the project is "clean". In Skolkovo Foundation it was said that "*I didn't see any corruption, plain stupidity, maybe but not corruption …I don't think issues of corruption are relevant to Skolkovo*". A foreign company, tenant of the Skolkovo Technopark has also confirmed that inside Skolkovo they didn't have experienced any corruption. At the same time the company admitted that corruption of governmental officials is a big problem and an barrier for international companies in Russia: "*We believe there is a huge market for our product in Russia but it's very difficult for us to tape into that market. At the moment our main clients are private companies but the potential for larger orders is to tap into governmental procurements. That sector (governmental. procurements) is corrupt beyond believe. We are a Canadian company, we don't pay bribes. Something has to be done there*".

Conversations with representative of universities presented a different picture. Some anecdotal evidence suggests that there is some sort of "businesses" around Skolkovo Foundation, which "guarantee" Skolkovo funding and resident's status for 30-40% of

awarded grant. Apart from reporting from a research team there is no other evidence to support that. Representatives of Skolkovo strongly refute such suggestions.

The most recent scandal with misappropriation of funds and fraud at the Skolkovo Foundation and the Skolkovo Customs Finance Company proves that Skolkovo is not immune to corruption and bribery and corruption became systemic in Russian business reality.

5. Conclusions: Is the sky is blue over Skolkovo

The global financial crisis underlined the deficiency of Russia's economic structure, its dependency on energy sector and export of raw materials. The response of the Government was a number of large scale initiatives to boost innovation development in the country. One of them is an ambitious and high profile project of replicating Silicon Valley in a village west of Moscow, Skolkovo Innovation Centre. From its very beginning the project attracted controversy as experience of other countries demonstrated those top-down innovation projects are more often failure than success. Russians remains optimistic.

The project started in 2010 and although it's clearly too early to draw any decisive conclusion, some lessons could be drawn based on the two years of experience.

Without any doubt in relatively short period of time Skolkovo has manage to report some significant successes. Skolkovo has already attracted some big names. Tempted by the tax breaks and anxious not to upset the Russian government, over 20 MNCs have signed up, including giants as Cisco, IBM and Siemens. Each of them will set up a substantial R&D laboratory to collaborate with SkTech. At the same time Skolkovo Foundation built an extensive pipeline of start-ups with over 750 firms obtained resident status.

Despite reported success there is a storm brewing under the surface. First of all in rush for number of residents the project adopted low selective funding model without involvement of industry experts, experts from venture funds, those who could give commercial evaluation to a prospective project. Moreover the Skolkovo financially supports research activities and as a result the vast majority of start-ups do not have marketable product/service and even by admission of the Skolkovo representative they will hardly ever have. Skolkovo also is in denial of problems they are facing in very near future. The first funding cycle is coming to the close, what they might discover that what have been done have no demand from the market (doesn't matter domestic or international).

Skolkovo reports that some of Skolkovo residents are able to attract venture capital. However, the local venture capital is limited and finds it's difficult to work with Skolkovo residents due to lack of business skills and understanding of commercialisation process. Hence to succeed in creation of viable start-ups Skolkovo needs to revise its funding model putting more emphasis to support of high potential ventures.

Secondly Skolkovo doesn't resolve issues with demand for innovation. Presidential instruction to state-controlled companies to increase investment in innovation and innovation output might stimulate some sectors of economy but do not change the overall landscape of archaic economic structure. State controlled mainly public infrastructure companies but those sectors which define the innovation development across the world except IT sector are not developed in Russia.

Thirdly, success of any innovation region or cluster depends upon presence of dynamic, diverse body of entrepreneurs. Before and after Silicon Valley United States enjoyed a significant level of entrepreneurship. That's not what could be said about Russia, entrepreneurship is in deficit. The premise that SkTech will be able to educate a new generation of technology entrepreneurs is far stretched. Moreover it won't be possible to build an entrepreneurial oasis in a desert. This also poses an issue of connectivity of Skolkovo with the rest of science and technology system in Russia. Instead of concentrating talent in one place it Skolkovo could become a hub of best practices where research teams could exchange ideas and work on join projects and return to their host organisations enriched with new practises and galvanise change in the regions.

Forthly, Skolkovo needs to make concretive efforts to integrate institutions comprising the Innovation Centre into organic learning organisation based on networking system full of interaction and communication.

Potentially the big blow to the project and its international reputation will be further evidence of corruption. While so far financial perks were attractive to international companies, further allegation and escalated corruption might prevent future influx of MNCs.

Alongside with successes the Skolkovo Innovation Centre is facing serious challenges. These still is time to learn lessons from first two years, the project is still in the development stage. Only time will tell how well Skolkovo will be able to weather the futures storms and challenges or it will fail under its own weight and ambition.

References

1. Schumpeter JA. Capitalism, socialism and democracy. New York: Harper and Brothers; 1932.

2. Lundvall B-Å, editor. National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning. Pinter; 1992.

3. Freeman C. The "National System of Innovation" in historical perspective. Cambridge Journal of Economics. 1995 Feb 1;19(1):5–24.

4. Nelson RR, editor. National Innovation Systems: A Comparative Analysis. Oxford University Press; 1993.

5. Etzkowitz H, Leydesdorff L. The dynamics of innovation: from National Systems and "'Mode 2'" to a Triple Helix of university–industry–government relations. Research Policy. 2000;29:109 – 123.

6. Leydesdorff L. The triple helix: an evolutionary model of innovations. Research Policy. 2000;29:243–55.

7. Savodnik P. Skolkovo, Russia's Would-Be Silicon Valley. BusinessWeek: magazine [Internet]. 2011 Sep 1 [cited 2013 Feb 25]; Available from: http://www.businessweek.com/magazine/skolkovo-russias-wouldbe-silicon-valley-09012011.html

8. Liuhto K. Rosnano and Skolkovo are Russia's best innovation promoting measures, but they are not enough to modernise Russia as a whole. Baltic Rim Economies. 2010;3:22–3.

9. Dezhina I. Big projects as a stimulus for innovation development in Russia. Baltic Rim Economies. 2010;3:30.

10. Merry W. The Crisis of Russian modernisation [Internet]. Open Democracy Russia. 2011. Available from: http://www.opendemocracy.net/od-russia/wayne-merry/crisis-of-russian-modernisation

11. World Bank. KEI and KI Indexes (KAM 2012) [Internet]. 2012. Available from: http://info.worldbank.org/etools/kam2/KAM_page5.asp

12. World Bank. Doing Business in Russian Federation [Internet]. 2013. Available from: http://www.doingbusiness.org/data/exploreeconomies/russia

13. Worrld Economic Forum. The Global Cometitiveness Report: 2012-2013 [Internet]. 2013. Available from: http://reports.weforum.org/global-competitiveness-report-2012-2013/

14. Hospers G-J, Desrochers P, Sautet F. The next Silicon Valley? On the relationship between geographical clustering and public policy. Int Entrep Manag J. 2009 Sep 1;5(3):285–99.

15. Wadhwa V. Top-Down Tech Clusters Often Lack Key Ingredients. BusinessWeek: technology [Internet]. 2010 May 4 [cited 2013 Feb 25]; Available from: http://www.businessweek.com/technology/content/may2010/tc2010053_047892.htm

16. Bresnahan T, Gambardella A, Saxenian A. “Old Economy” Inputs for “New Economy” Outcomes: Cluster Formation in the New Silicon Valleys. ICC. 2001 Dec 1;10(4):835–60.

17. Harrison RT, Cooper SY, Mason CM. Entrepreneurial Activity and the Dynamics of Technology-based Cluster Development: The Case of Ottawa. Urban Stud. 2004 May 1;41(5-6):1045–70.

18. Williams D. Russia’s innovation system: reflection on the past, present and future. International Journal of Transitions and Innovation Systems. 2011 Jan 1;1(4):394–412.

19. Dokukina K, Tovkailo M, Martynova T. State companies to transfer 1 percent of innovation budgets to Skolkovo. Russia Beyond The Headlines [Internet]. 2012 Mar 23 [cited 2013 Mar 1]; Available from: http://rbth.ru/articles/2012/03/23/state_companies_to_transfer_1_percent_of_innovation_budgets_to_skolk_15146.html

CAN INNOVATION BE THE KEY FACTOR FOR CITY COMPETITIVENESS? A CASE STUDY: ESKİŞEHİR

Engin Yüksel[1], Dr. Mehmet Sait Cülfik[2]

[1]Bursa Eskişehir Bilecik Development Agency, Yeni Yalova Yolu 4. Km Buttim Plaza Kat 6, Osmangazi / Bursa, Türkiye, engin.yuksel@bebka.org.tr

[2]Bursa Eskişehir Bilecik Development Agency, Yeni Yalova Yolu 4. Km Buttim Plaza Kat 6, Osmangazi / Bursa, Türkiye, mehmet@bebka.org.tr

Abstract

In the new era called "innovation and technology era", competition among companies, cities, regions and even countries has become increasingly based upon the innovation. For sustainable development of a city, having a long-established innovation culture and appropriate innovation strategies are crucial. As a regional development agency, BEBKA (Bursa Eskişehir Bilecik Development Agency) supports the innovation by various ways in TR41 Region, which consists of the cities Bursa, Eskişehir and Bilecik. With the aim of increasing the competitiveness throughout the region, BEBKA carries out some incentive programs based on the TR41 2010-2013 Regional Plan. In this paper we first take a look at BEBKA's supports and policies to increase the competitiveness of the cities of TR41 Region. Moreover, the main objective of this work is to investigate the industry story of Eskişehir in terms of its innovation capacity, as well as of the city competitiveness and we also focus on some cases as examples to show the innovation capacity and the effect on the competitiveness of Eskişehir. Finally, we assess the results of the projects that BEBKA has supported in Eskişehir related with R&D and Innovation.

Keywords

City Competitiveness, Eskişehir Industry, Innovation, Regional Development

1. Introduction

In the new era called "innovation and technology era", one of the major instruments for the competition is R&D and innovation. Countries try to increase their gross domestic expenditure on R&D, since it is the main indicator to have competitive advantage in science and technology. According to the R&D Activities Research of Turkish Statistical Institute (TÜİK), the R&D expenditures share in GDP is 0,86 % in 2011 [1]. However, the share is quite under than the R&D expenditures share of developed countries. Consequently, Turkey has been developing some policies for increasing the R&D and innovation activities and supporting via various governmental incentive programs.

The R&D Law provides special incentives for R&D investment projects in Turkey if a minimum of 50 personnel are employed in an *R&D center*. Another incentive instrument is

Technology Development Zones. There are 34 active Technology Development Zones in Turkey [2] and there are many advantages for the firms which operate in the zones. Addition to these supports, *Techno-initiative capital* for new scientists and *Industrial Thesis (SANTEZ) program* are also important supports given by Ministry of Science, Industry and Technology. Moreover, there are many other supports and incentives provided by various governmental organizations such as Small and Medium Enterprises Development Organization (KOSGEB), The Scientific and Technological Research Council of Turkey, Technology Development Foundation of Turkey and Regional Development Agencies.

Turkey offers plenty of opportunities on R&D and innovation by various ways, as mentioned some of them above. The vision of the Ministry of Science, Industry and Technology summarizes the concept which is *"To contribute to Turkey's goal of becoming one of the ten most developed countries in the World, with a competitive economy based on entrepreneurship, innovation, scientific development, technological production and creation of high added value."*

In this manner, the cities in Turkey are in a competition on developing R&D infrastructure and innovation. As local institutions, Regional Development Agencies are trying to improve the cities in their region regarding R&D and innovation capacity. Eskişehir is one of the most developed cities in Turkey and attaches particular importance to R&D and innovation. In this paper we mention about the innovative structure of Eskişehir.

2. Supporting R&D and Innovation in TR 41 Region

Bursa Eskisehir Bilecik Development Agency (BEBKA) was established by the council of ministers' decision, numbered 2009/15236 and dated 14 July 2009, on the basis of "Establishment, Coordination and Missions of Development Agencies" law dated 25.01.2006 and numbered 5449. Organizational structure of BEBKA consists of Development Committee, Administrative Board and General Secretary. Development Committee acts as the advisory body, administrative board is the decision-making body and Secretariat General represents the executive body of the agency. Determining the regional priorities by means of scientific methods and participatory approach 2010-2013 Bursa Eskisehir Bilecik Region Plan has been prepared. Within the scope of this regional plan, a model was generated that will shape development in terms of project financial aids, training requirements, investment and promotion opportunities [3].

As stated in the vision, *"To become a highly regarded and active institution that contributes to the vision of national development by pioneering sustainable development in the region and to be recognized nationally and internationally for regional development."[3],* BEBKA supports the cities in the TR41 region, which consists of Bursa, Eskişehir and Bilecik, in terms of their development and competitiveness. With the aim of increasing the competitiveness throughout the region, BEBKA carries out some incentive programs based on the TR41 2010-2013 Regional Plan. Financial supports are provided as direct financial supports, BEBKA has carried out 2 financial support programs. In 2010, with 12 million TL budget, *"Increasing Competitive Power in Industry and Tourism Financial Support Program"* was carried out. In 2011, the program titles were *"Environment and Energy, R&D and Innovation and Social Development"* and the budget was 16 million TL. Moreover, there are

some ongoing programs started in 2012 with 20 million TL budget. The program titles are *"Sustainable Industry, Small-scale Infrastructure in Tourism and Tourism Promotion".*

For all of the financial support programs, supporting R&D and innovation activities is one of the main goals. In 2010, over 50 % of the winning projects were related with R&D and Innovation. In 2011, 29 projects among 76 winning projects are *R&D and Innovation* projects which correspond to 38%.

As the numbers show us, BEBKA's one of the main goals is supporting R&D and Innovation in the region. For that, the most convenient tool seems to be financial support programs, however, BEBKA uses many other instruments, one of which is promoting R&D and Innovation by supporting R&D Project Brokerage Events in Eskişehir and Bursa. Moreover, as part of the investment support and promotion, BEBKA helps new R&D opportunities and innovative processes to be possible for the region.

3. A Competitive and Innovative City: Eskişehir

Being located in the strategic part of Turkey, Eskişehir has many advantages considering other cities. Eskişehir is the conjunction point of transportation system of Turkey. The first high speed train service in Turkey has started between Eskişehir and the capital city Ankara. Since logistics is one of the main necessities for development of industry, it is not a surprise that Eskişehir has a strong industry.

Eskişehir Organized Industrial Zone is one of the biggest Organized Industrial Zones (OIZ) in Turkey. Besides the size, Eskişehir OIZ is the most innovative and visionary OIZ in Turkey. Eskişehir OIZ has been selected as the greenest industrial zone of Turkey by Ministry of Environment and Forest in 2009. In 2011, Eskişehir OIZ has been considered worthy for Energy Oscar by ICCI. As the indicators of its innovative structure, natural gas power plant, Internet Service Provider, Logistics Center, Social and Sporting Facilities, a Modular Vocational High School, CNC Training Center, Industrial Automation Research and Application Center, Welding Technologies Research and Application Center, Industrial Design Center and Wastewater Treatment Plant and Accredited Environment Laboratory can be taken into account.

There are 462 firms actively operate in the zone [4]. The backbone of Eskişehir Industry is Metal & Machinery Sector. On that backbone Aviation and Railway Systems sectors has been flourished. TÜLOMSAŞ, one of the major companies in locomotive production, is settled down in Eskişehir. Being one of the famous locomotive producers of the world with its 500.000 m² of production campus, TÜLOMSAŞ is a pioneer major industry which manufactures in the European Standards. As an indicator of the development level of the sector in Eskişehir, "Railway Systems Clustering" pursues its activities. The cooperation in this cluster increases the international competitiveness of Eskişehir in the sector. As an important showing for Railway Systems sector is the attempt under the leadership of Anatolian University to establish a National Rail Systems Testing Center in Eskişehir. By the completion of this project, an international center that will be unique in Eurasia providing necessary testing and certification for the sector shall be established.

Regarding Turkey's recent attempts to improve domestic defense and aviation sector, Eskişehir has provided considerable contribution. TEI, which is one of the most important aviation companies in Turkey, is in Eskişehir. In addition to TEI, there are another important aviation companies operate in Eskişehir. Moreover, The Headquarters of 1st Air Force Command was established in Eskişehir. Within the context of clustering activities, "Eskişehir Aviation Cluster (ESAC) has been established and as a result of effective cooperation in this cluster, the international competitiveness of Eskişehir in the sector has been increased.

As a consequence of diversified industry structure there are other important sectors and we can see many innovative applications for these sectors as well. The Ceramic Research Center (SAM) operating under Anadolu University is one of the best university-industry cooperation models and serves sectoral consultation, testing and accreditation services beside R&D and innovation activities.

When we look at the sectoral distribution and products, we can see the general view.

Table 1: Sectoral Distribution of Industry Firms

Sectors	**%**
Metal & Machinery	41
Food Industry	12,3
Non-metal Mineral (Ceramics,Tile)	11,5
Chemistry & Plastic	11,5
Furniture, Paper and Forest Products	9,6
Mining	5,9
Textile & Clothing	3
Others	5,2

Source: Eskişehir Chamber of Industry

Table 2: Share of Products Among National Production

Products	**%**
Aircraft Engine	100
Diesel Locomotive	100
Borax (Global: 60%)	100
Compressor (Freezer)	95
Fridge & Freezer	60
Magnesite	60
Stove, Heater and Accessories	40
Ceramic Tile	40
Biscuit & Cracker	35
Tile	25

Source: Eskişehir Chamber of Industry

As seen from the Table 2, Eskişehir holds the leading position regarding Aviation Sector, Railway Systems Sector, Refrigerator Production, Ceramics Sector, Biscuit and Cracker Production and some valuable mines.

However, perhaps the most important innovative application in Eskişehir OIZ is the establishment of Eskişehir Technology Development Zone (ETDZ) within the borders of the zone. By that, Industry and R&D became closer. Moreover, there are extensions of the ETDZ located in both Anadolu University and Eskişehir Osmangazi University which gives excellent opportunity for spin-offs.

BEBKA has great contributions to the competitive and innovative structure of Eskişehir. In 2010, 24 projects and in 2011, 25 projects were supported financially by BEBKA in Eskişehir. Moreover, BEBKA has been supporting the *Esinkap R&D Project Brokerage Events* in Eskişehir since 2011. BEBKA and Eskişehir Chamber of Commerce are partners in these events.

Industrial Automation Research and Application Center project, which prepared by Eskişehir Chamber of Industry and Industrial Automation Research and Application Center project which prepared by Eskişehir Organized Industrial Zone, were supported as part of the *"Increasing Competitive Power in Industry and Tourism Financial Support Program"* which carried out by BEBKA in 2010. In same manner, Welding Technologies Research and Application Center project which prepared by Eskişehir Chamber of Industry, was supported as part of the *"R&D and Innovation Program"* which carried out by BEBKA in 2011.

Besides the competitive and innovative industry structure, Eskişehir has many other values which are also very important. Quality of city life, developed universities and visionary local authorities are the most supportive values of Eskişehir for its innovative structure. Least but not last, BEBKA has signed a protocol with 6 universities from the region aiming the university – industry cooperation.

4. Conclusion

After a short mention about what makes Eskişehir competitive and innovative, there is not much left to say. The key requirement of being innovative is having an innovation and entrepreneurship supportive culture and philosophy. Only that way all the given supports for increasing R&D and Innovation make sense. Eskişehir has that entrepreneurial spirit and innovative culture.

References

1 http://www.tuik.gov.tr/PreHaberBultenleri.do?id=10931

2 http://sagm.sanayi.gov.tr/userfiles/file/TGB%20g%C3%BCncel%20d%C3%B6k%C3%BCmanlar/TGB%20L%C4%B0STES%C4%B0%2016_01.pdf

3 www.bebka.org.tr

4 www.eso.org.tr

REGIONAL ASPECTS OF THE INNOVATIVE BEHAVIOUR OF EUROPEAN AND RUSSIAN ENTERPRISES

Oleg Golichenko [1], Yulia Balycheva [2]

[1] *CEMI RAS, 47 Nahimovskij Pr, Moscow, Russia, golichenko@rambler.ru*

[2] *CEMI RAS, 47 Nahimovskij Pr, Moscow, Russia, yulia.balycheva@gmail.com*

This paper addresses various types of innovative behaviour by European and Russian firms. Russian regions and several European countries are clustered according to the characteristics of innovative behaviour. Seven dynamic modes of the firms' innovative behaviour are presented. The thorough analysis of each mode yields several results. First, a company's innovation function may change over time. Moreover, these changes may be of a periodic nature and are associated with the need to pass through certain innovation stages. This characteristic gives rise to innovation cycles during which innovation creation or imitation phases are replaced by innovation diffusion or upgrading stages. The cycles within the different innovative behaviour modes may differ in terms of both the duration and the content of their stages. In addition, one period may contain multiple stages. The suggested approach encourages a better understanding of the innovation process structure in different regions. Consequently, this approach makes it possible to develop economic policy measures that will contribute to the growth of innovation activity and regional efficiency.

Keywords
Cluster analysis, Innovation, Innovative behaviour, Innovative modes

1. Introduction

The main purpose of this study is to present the most typical Russian and European innovative modes associated with geographical landscape. The regional level is chosen for a detailed analysis due to the strong influence of regional characteristics on innovation activity [1, 2]. So that different modes of innovative behaviour could be identified and analysed, Russian regions and several European countries are divided into homogeneous groups. The division of these areas into homogeneous groups makes it possible to find out common characteristics and avoid heterogeneity. For this purpose, various classification methods are usually used. These methods involve the identification of innovation attributes of various types, including diffusion characteristics and innovative product novelty [3]. The characteristics of the open innovation [4,5,6] and output-based innovation modes [7,8] are of crucial importance and they are taken often into account. The interactions between firms and organisations during the innovation process are classified according to their innovative status [3,8]. In other words, to generate innovative behaviour modes, it is essential to make use of the different types of innovative activity indicators. Analysing a firm's innovative behaviour mode, in turn, makes it possible to determine the firm's innovation strategy [9].

There is a small number of studies that identify innovation modes. Among them are ones in which cluster analysis is used to classify firms according to several innovation characteristics

[10,11]. In addition, the studies by Arvantis and Hollenstein examine the innovation modes in the Swiss service and manufacturing sectors [12,13]. The current study is devoted to the innovation modes used by manufacturing firms, which are used to generate technological innovations. The objects of the research are firms of Russia and other European countries. Cluster analysis is utilised to find out the modes. One important feature of this study is its use of a dynamic approach. This approach makes it possible to track temporal changes in firms' innovative behaviour. The approach also makes it possible to identify changes in companies' innovation functions, which may not be constant over time. In fact, these changes may be periodic due to firms' need to pass through certain innovation stages. This need gives rise to innovation cycles during which innovation creation or imitation phases are replaced by innovation diffusion or upgrading stages. The cycles corresponding to different innovative behaviour modes may differ in terms of both the duration and the content of their stages. In addition, some stages may be interrelated and occur within the same period. The mode choice factors under consideration are levels of research potential and welfare. The paper proceeds as follows. First, the data and procedure are described. Next, the modes of innovative behaviour that are typical of regions clustered from the lowest level of economic well-being to the highest are considered. Finally, the conclusions of the study are presented.

2. Data and procedure

The data used in the study were collected during the Main Science and Technology Indicators (MSTI), OECD Science, Technology and Industry Scoreboard, European Scoreboard and Russian innovation surveys (from 2000 to 2009). The Russian innovation survey collects data from a representative sample of more than 26,000 Russian firms (44 industries and 8 size classes and regions). The firms are asked to complete a questionnaire that addresses their innovative activities. This questionnaire yields information on many innovation indicators (in this paper, 18 of these indicators are used; see Table 1).

Table 1 Basic indicators used in the study

Creating innovations	Inputs	Outputs
Product innovators (% of all firms)	Gross domestic product (GDP) or gross regional product (GRP) per capita	Sales innovative products, i.e. new-to-firm and new-to-market products (% of total turnover)
Process innovators (% of all firms)	Total expenditures on innovation (% of total turnover)	Sales of new-to-market products (% of total turnover)
Firms introducing either a product or a process innovation (% of all firms)	Expenditures on new technologies (% of total turnover)	Sales of technologically new or significantly improved products (% of total turnover)
In-house innovators (% of all firms)	Structure of R&D expenditures by type (basic research, applied research, development)	Turnover of innovative-active firms (% of total turnover)
Firms using open innovations (% of all firms)	Researchers per 10,000 total employees	
Innovative-active firms co-operating with others (% of all firms)	Researchers by S&E fields	
Innovative product life cycle		
Number of patent applications per firm		

To cluster the chosen regions, i.e. Federal subjects of Russia and EU countries (see Table 3), the following indicators of innovative activity were used:

- Sales of innovative product (% of total turnover)
- Sales of new-to-market products (% of sales from product innovation)
- Ratio of firms introducing product innovations to those introducing process innovations
- Enterprises innovating in-house (% of all enterprises)
- Total researchers per thousand employees

To level a difference in economic development of Russia and Europe and to reveal similar modes of innovative behavior among territorial subjects of the Russian Federation and the countries of Europe, the relative indicators were utilized in the study. For this purpose two normalizations of the above-mentioned indicators were carried out. The normalizations were conducted separately for 62 subjects of the Russian Federation and for 12 European countries. This approach also makes it possible to identify similar modes of innovative behaviour among RF subjects and EU countries.

The normalisation procedure facilitated k-means clustering for all objects. As a result, the following seven clusters were obtained. The mean normalised values of these indices are presented in Table 2. To characterise the dependence of innovative behaviour types on well-being, the clusters were numbered such that a greater cluster well-being index was associated with a lower order number (Figure 1). The highest well-being index (GDP or GRP) was found for the first cluster; the seventh cluster has the lowest index.

Table 2 Means of normalized indices of innovative activity for clusters

	Share of turnover from product innovation	Number of researchers	Share of product innovations from new-to-market products	Share of enterprises innovating in-house	Ratio of innovative enterprises introducing products to those introducing processes
Cluster 1	1,94	6,40	0,62	1,10	1,22
Cluster 2	5,92	1,40	0,11	0,93	1,07
Cluster 3	1,38	2,59	1,18	1,08	1,46
Cluster 4	0,68	0,81	0,47	1,04	1,00
Cluster 5	1,50	0,98	4,57	1,03	1,11
Cluster 6	0,60	0,47	1,66	0,85	0,92
Cluster 7	1,95	0,48	0,55	1,14	3,36

As a rule, the GDP or GRP per capita is associated with a higher concentration of researchers in the region. However, in spite of this general tendency, some disturbances are observed. For example, the fourth cluster, which has better welfare than the fifth, has fewer research facilities.

The composition of the obtained clusters is shown in Table 3. This table shows that the European countries are distributed across three clusters (the third, the fourth and the sixth).It is worth emphasising once again that RF subjects and EU countries were clustered together based on their closeness of the innovation activity indicators.

Table 3 Distribution of regions across clusters

Cluster number	European countries	Subjects of the Russian Federation
Cluster 1	----------	Moscow, Moscow Region, St. Petersburg
Cluster 2	----------	Perm, Samara Regions
Cluster 3	Finland	Novosibirsk, Tomsk, Sverdlovsk, Nizhni Novgorod, Penza, Voronezh, Kaluga, Tver Regions
Cluster 4	Spain, Netherlands, Norway, Czech Republic, Luxemburg, Denmark, Germany	Belgorod, Bryansk, Vladimir, Ivanovo, Kursk, Lipetsk, Orel, Tula, Yaroslavl, Arkhangelsk, Vologda, Leningrad, Murmansk, Novgorod, Pskov, Astrakhan, Kirov, Saratov, Tyumen, Chelyabinsk, Irkutsk, Omsk, Amur Regions; Bashkortostan, Tatarstan, Mari-El, Sakha Republics; Primorye Territory, Khabarovsk Territory
Cluster 5	----------	Komi Rebublic, Rostov, Ulyanovsk, Kurgan Regions
Cluster 6	Hungary, Slovakia, Italy, Poland	Kostroma, Ryazan, Smolensk, Tambov, Kaliningrad, Volgograd, Orenburg, Kemerovo, Chita, Sakhalin Regions; Karelia, Karachai-Cherkess, Udmurt Rebublics
Cluster 7	----------	Dagestan, Kabardino-Balkar, Mordovia Republics

Following the clustering of the regions, an analysis was conducted to identify the most typical modes of innovative behaviour. For this purpose, additional groups of indicators were used. This approach made it possible to reveal the roles of the various regions within the clusters and to define the main characteristics of the innovation cycles.

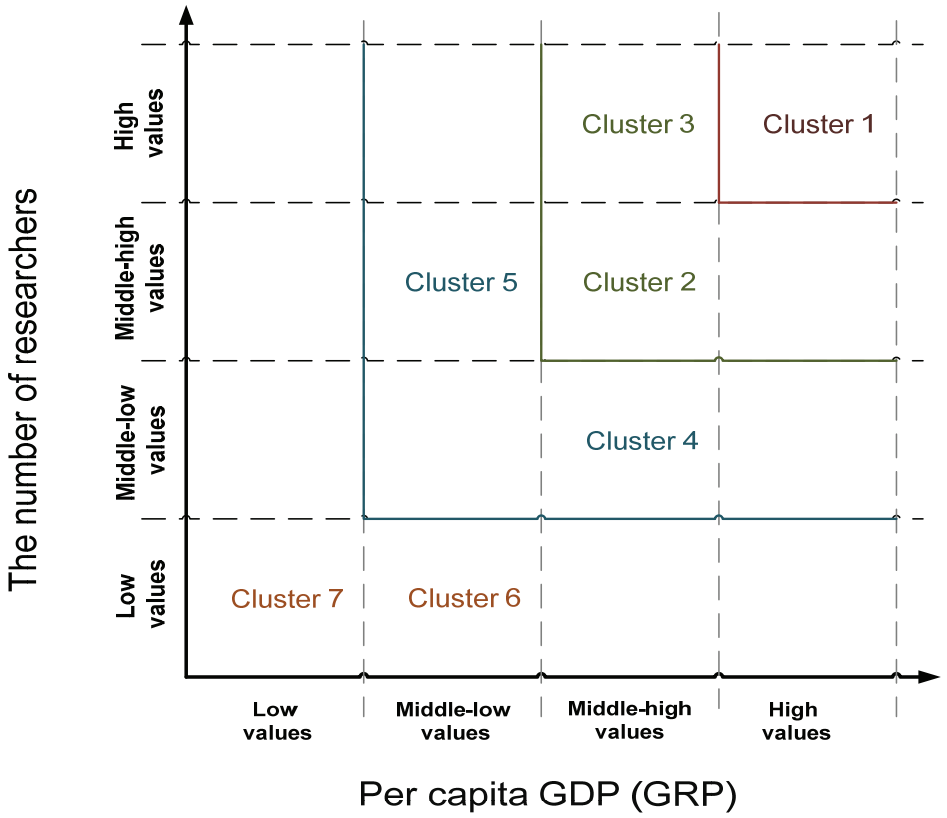


Figure 1 Ordering of clusters

3. Modes of innovative behaviour associated with low- and lower-middle levels of economic well-being

Firms introduce product innovations to attain new competitive advantage in the market. A firm or a company may attempt to foster in-house product innovation to gain exclusive competitive advantage. This phenomenon raises the question of whether these attempts are correlated with the firms' development levels (including their competences, resources and technological capabilities) or with the market environment (particularly the quality and quantity of consumer demand and the resource supply). Of these potential factors, consumer demand and the technological resources of firms are of the greatest interest to us.

If the level of economic development of region is not very high, the region will not feature high customer demand. In this case, a firm-producer operating in the domestic market will not be encouraged to manufacture high-quality, comparatively expensive products of high quality. At the same time, some degree of product novelty is needed to provide a market niche for the firm. Due to resource limitations and limited technological capacity, the firm must address external sources. To ensure some degree of product novelty, the firm can choose one of two alternatives:

- to introduce open product innovations by purchasing technology licenses or intellectual property rights (IPRs),
- to ignore IPRs if this opportunity is not available.

3.1 Re-engineering mode (Cluster 7)

If a firm chooses the second alternative, the innovation process will occur completely in-house. Due to their lack of financial resources and low level of competences, the firm will not be able to attract cooperation partners among technological leaders or pay for licenses and IPR. They will be forced to conduct in-house innovation processes by copying and reverse-engineering products and technologies and ignoring IPRs. The firm tries to decrease the costs by using relatively cheap labour. Product innovations will be completely dominant. Such firms are not creative and inventive [14] and will rely on their engineering knowledge [15,16]. The firms are adapters and informal collaborative innovators [17]. The diffusion of new-to-market products is widespread. This mode of innovative behaviour is common in the regions with the lowest welfare.

The mode is typical of regions in the seventh cluster (Table 3). The degree of novelty of product innovation is considerable, as the share of new-to-the market products is almost twice as high as the average share. That these firms actively ignore IPRs is confirmed by their low expenditures on disembodied technologies and their minimal patent activity. The ratio of innovative enterprises introducing products to those introducing processes is more than three times as great as its average value. These firms attempt to achieve rapid success through product expansion at the expense of technology improvements.

The innovation cycle in this behavioural mode is not complex (Figure 2). The cycle begins with the unauthorised copying or reverse-engineering of products that are new to the local market. The next stage is product diffusion. The level of diffusion is rather high and leads to increased competition among the producers of the products. This increase in competition induces firms to transition into to new stage of imitation. The cycle of reverse engineering and diffusion is of short duration. For Russian regions, the cycle takes two or three years and is not accompanied by substantial improvements in technology.

Figure 2 Prevailing innovative behaviour in the seventh cluster

3.2 Technology upgrading mode (Cluster 6)

Increases in economic well-being influence the competitive environment. Customer demand and technological opportunities provide more incentives to introduce high-quality and novel products into the local market; i.e., firms will choose the first alternative. Higher income levels enable firms to pursue open innovations and thus compensate for a shortage of research resources. There is a strong emphasis on process innovations that can facilitate the production of advanced products. Firms that choose this mode of innovation are domestic modifiers and act as formal collaborative innovators [17]. Reverse-engineering that does not demand significant R&D [18] is actively used. As the statistics show, in such modes of innovative behaviour, periods of product development replace periods of product diffusion. However, it is not possible to secure a wide spread of new-to market products. This pattern is driven by low consumer income and the considerable competition in the markets for the higher-quality products imported into the regions in question. This mode of innovative

behaviour prevails not only in several Russian regions but also in some post-socialist countries in Europe (see Table 3). Open innovation activity is largely unique to this behaviour mode. The support for open product innovations is combined with the most active use of process innovations. Large expenditures on embodied technologies are a characteristic feature of the mode. The transition towards advanced technologies requires highly qualified human capital, which is lacking in this cluster. Engaging in open innovation practice makes it possible to overcome this deficiency. However, the scale of innovation activity is not large (the share of innovative product sales is only 60% of the average share).

In this mode, product development is replaced by diffusion. Consequently, in this cluster, the period in which diffusion increases also features more technology acquisition, and the period in which diffusion decreases also features a lower level of technology acquisition. If we seek to understand this "pulsating" cycle, we should remember that a new successful product will encourage many competitors to catch up to the firm that is responsible for that product. As competition increases, firm's revenues fall. To maintain its former market position, a firm must advance technologically. For this purpose, the firm's purchase and adapt advanced technologies. They begin catching up by offering new-to-market products. Competition among firms with the same technological absorptive capacity causes a decrease in the diffusion of their products. To preserve their market shares, these firms must begin catching up by offering the new successful products that are introduced by market leaders. The firms will begin to intensively update their technological foundations by purchasing and adapting new technologies. Then, the innovative cycle is repeated (Figure 3).

Figure 3: Prevailing innovative behaviour in the sixth cluster

3.3 Product modification mode (Cluster 5)

An additional increase in well-being and the provision of research resources results in a more complex mode. Firms attempt to introduce and modify products that are new to the local market. Innovations occur mainly at the product level, and diffusion reaches a fairly great scale. The absence of the shortage of research potential increases technological absorptive capacity [19] and provides firms with an opportunity to increase the share of in-house innovations. The creativity in innovation increases due to R&D. The cooperation is insignificant. These firms function as formal non-collaborative innovators [17]. Their innovations are intended to improve and modify products that are known to the local market. Open innovations are intended to address catching-up problems. There are consecutive shifts from product catch-up to product modification and vice versa. Adoption behaviour is replaced by the modification of domestic innovations. Rapid diffusion occurs at each stage (Figure 4).

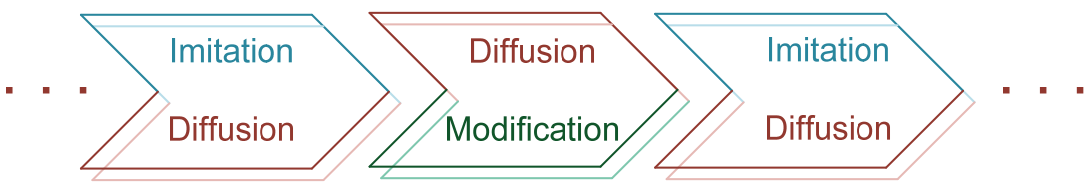


Figure 4: Prevailing innovative behaviour in the fifth cluster

This mode of innovative behaviour is particular to the regions in the fifth cluster. The research potential of this cluster is slightly lower than average but is considerably greater than that of the previous cluster. A successful catching-up process requires the active help of specialists in the technical sciences. This cluster has a high concentration of these types of specialists among its researchers. The main product life cycles of these firms are shorter.

4. Modes of innovative behaviour associated with middle-high and high levels of economic well-being

In economically successful regions, the human resources that are available for R&D have a significant influence on the chosen innovative behaviour mode. The limited scale of the human resources devoted to R&D strengthens the efforts of firms to catch up with their counterparts by offering products that are already known to the market. At the same time, the shift toward closed innovation rather than open innovation is evidence of the active, on-going product improvement processes that occur at this level.

4.1 Balancing mode (Cluster 4)

This phenomenon is aptly demonstrated by the regions in the fourth cluster. This cluster features high well-being, and its level of research resources is slightly lower than the average one. The cluster includes RF subjects and EU countries (Table 3). Relative to that of the fifth cluster, the lower level of human resources available for R&D considerably restricts opportunities for both active imitation and the widespread diffusion of "imported" new products (Table 2). Product innovations generate only 10% of the turnover in the cluster. The inefficient use of the available innovative potential in these Russian regions results in a low level of innovation diffusion. Moreover, the firms in the regions in this cluster do not use a particular innovation mode; they are neither active domestic innovators of new-to-market products nor active adopters of pre-existing products.

4.2 Cooperative mode (Cluster 2)

Increases in both economic well-being and R&D lead firms to prioritise creating and introducing new-to-market or significantly improved products. The firms in this cluster are new-to-market international or domestic innovators. Such firms can be referred to as active formal collaborative innovators. Cyclical changes occur in the innovative stages of these firms. One of these stages is the creation of new or significantly improved products. Another involves product diffusion. Open innovation is most actively used to introduce products of these two types. Cooperation processes are widespread, and the openness of the firms' innovation activities enables the "clustering" of complementary competences and R&D facilities. Periods of innovation creation are then replaced by periods of diffusion (Figure 5). This diffusion is rather significant and occurs during long periods. During such periods, firms function as adopters. Therefore, the roles of these firms change in a cyclical manner.

Figure 5 Prevailing innovative behaviour in the second cluster

In the second cluster, whose members follow the mode just mentioned, the scale of diffusion is almost six times as great as it is on average, and the duration of the diffusion period is approximately 4-5 years. This duration indicates that the quality of the products that these firms introduce is sufficiently high to secure and support their market power. This quality level enables firms to generate considerable barriers to entry into the market for long periods of time. When it seems that new competitors may be able to overcome these barriers, the diffusion stage is replaced by the introduction of new or significantly improved products. During the diffusion stage, the product that was previously introduced is diffused.

4.3 Open and creative mode (Cluster 3)

Further increasing the allocation of human capital to R&D to its “critical mass” shifts the balance between open innovations and in-house innovations toward the latter. It becomes possible for firms to introduce innovations that are also new to the international market, so these firms provide new-to-market international and domestic innovations. Open innovation continues to predominate, with a greater weight placed on product innovations than on process innovations. Due to their significant innovation potential, these firms have the option of combining innovation creation and diffusion during the same period. This mode includes a high level of innovation creation. Expenditures on R&D, IPR purchasing and licensing are rather high. In this mode, the regions generate intellectual property (IP). The mode described above is typical of the third cluster (Table 2). The share of researchers in the technical sciences and that of expenditures on R&D are both high in this cluster.

4.4 In-house mode (Cluster 1)

When firms and their environments have the maximum levels of researchers and well-being (cluster 1), innovation activity becomes more closed. The mode of innovative behaviour relies on the introduction of basic innovations that are diffused not only within the local market but also outside its boundaries. In addition, these regions are IP donors. The expansion of new products to external markets enables regions to attain considerable diffusion. In-house innovation prevails here because this cluster has strong research facilities.

This mode of innovative behaviour corresponds to the first cluster. Because these regions have high innovation potential, they generally rely on their internal capabilities (the share of firms conducting in-house innovation is 14 % higher than average). However, to modify and upgrade their products, firms cooperate rather actively (the share of firms engaging in cooperation is only 10 % less than the average value). Nevertheless, the firms in these regions do not introduce innovations that were fully created by others. This fact is confirmed by the finding that the share of outside sources of innovation creation is very low (Table 2). The firms in the first cluster try not only to compete and survive in their local markets but also

to expand their power beyond these local markets. More than 50% of firms focus on external markets. The output of this cluster is likely to be more competitive than that of other clusters. The cluster is an IP donor; its disembodied technologies are actively used by regions in other clusters. Statistical analysis reveals that the innovation cycle contains two stages. The first stage is the process of product creation or imitation and modification. The second stage includes the powerful processes of new product diffusion (Figure 8). It is noteworthy that diffusion processes occur during the first stage but on a far smaller scale. In other words, during the first stage, firms act mainly as new-to-market domestic innovators and modifiers; in the second stage, they play the role of adopters.

Figure 6 Prevailing innovative behaviour in the first cluster

5. Conclusions

This study has revealed that the basic innovative behaviour modes depend on the level of well-being and the level of human resources used for R&D. If the welfare level is low, the main factor that will enhance innovation activity will be an increase in this level. Once the well-being level reaches a certain value, its influence on firms' choices regarding their innovative behaviour decreases. In such a case, the extent of R&D personnel use is a stronger determinant of the type of innovative behaviour than the welfare level is.

The analysis of innovative behaviour under condition of low welfare level has revealed the following. Low welfare level is strongly associated with innovation activity, and this activity is a process closed to the greatest extent. The cooperation is weak, and firms introduce product innovations while ignoring IPRs (cluster 7). Without increasing research facilities, improvements in welfare shift the balance between open and in-house innovations towards the former due to purchases of IP and partly due to the development of cooperation (cluster 6). Firms most highly prefer process innovations at this point and heavily favour innovations that will improve their technological foundation. The increased presence of research facilities encourages firms to use in-house innovations (cluster 5). A nearly stable balance between open and closed innovations is achieved. Open innovations are used to catch up in the products that are already known to the market. In-house innovations target at the improvement and modification of these products. Cooperation processes are rarely used. The rather low level of research facilities strengthens the need for firms to employ imitation and incremental improvement as tools for innovation (cluster 4). Meanwhile, the slight domination of closed innovation over open innovation indicates that product modification processes are also occurring. The emphasis on modifying the technology base is equal to introducing new-to-market products. The increase in research potential that occurs with growth of welfare generates an opportunity for firms to organise equitable cooperative relationships (cluster 2). Thus, the balance between open innovations and in-house ones shifts towards the former. Further increasing the level of human capital that is allocated to R&D to its critical mass moves the activities towards closed innovations (cluster 3). There are opportunities to introduce innovations that are new to both domestic and international markets. Firms tend to actively introduce product innovations. In this mode of behaviour, expenditures on R&D and IR are high. When the maximum levels of research facility and

well-being have been attained (cluster 1), innovation process becomes more closed. In this scenario, the mode of innovative behaviour is based on introducing the innovations that are diffusing not only within the local market but also outside its boundaries. The research was supported by the Russian Humanitarian Scientific Fund (project N 11-02-00426□).

References

1 Evangelista R, Iammorino S, Mastrostefano V, Silvani A. Measuring the regional dimension of innovation. Lessons from the Italian Innovation Survey. Technovation 2001; 21: 733-745.
2 Potts T. The natural advantage of regions: linking sustainability, innovation, and regional development in Australia. Journal of Cleaner Production 2010;18:713-725.
3 OECD. Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data. OECD, Paris 2005.
4 Chesbrough H. Open Innovation. Harvard Business Press, Cambridge, Massassuchetts 2003.
5 Chesbrough H. Open Business Models. Harvard Business Press, Massasuchetts, Cambridge 2006.
6 OECD. Open Innovation in Global Networks. OECD, Paris 2009.
7 Arundel A, Hollanders H. EXIS: An Exploratory Approach to Innovation Scoreboards. European Commission, DG Enterprise, Brussels 2005.
8 OECD. Innovation in Firms: a Microeconomic Perspective. OECD, Paris 2009.
9 Dahan N M, Doh, J P, Oetzel J, Yaziji M. Corporate-NGO collaboration: Co-creating new business models for developing markets. Long Range Planning 2010; 43(2-3): 326-342.
10 Arundel A, van de Paal G, Soete L. Innovation Strategies of Europe's Largest Industrial Firms. Report Prepared for the SPRINT Programme, DG XIII of the European Commission 1995.
11 Cesaratto S, Mangano S. Technological Profiles and Economic Performance in the Italian Manufacturing Sector. Economics of Innovation and New Technology1993; 2: 237-256.
12 Hollenstein H. Innovation modes in the Swiss service sector: a cluster analysis based on firm-level data. Research Policy 2003; 32:845-863.
13 Arvanitis S, Hollenstein H. Innovative Activity and Firm Characteristics. A Cluster Analysis of Swiss Manufacturing Using Firm-level Data. Innovative Networks: Co-operation in National Innovation Systems. OECD 2001; 48-76.
14 Arundel A, Hollanders H. 2006 European Innovation Scoreboard Methodology Report: Searching the Forest for the Trees – "Missing" Indicators of Innovation. European Commission, DG Enterprise, Brussels 2006.
15 Kline S, Rosenberg N. An overview of innovation. In the positive sum strategy: Harnessing technology for economic growth. National Academy Press, Washington 1986.
16 Nascia L, Perani G. Diversity of Innovation in Europe. International Review of Applied Economics 2002; 16: 277–293.
17 Bloch C, L□pez-Bassols V. "Innovation Indicators", in Innovation in Firms: a Microeconomic Perspective. OECD, Paris 2009; 21–47.
18 Kim L, Nelson R. Technology, Learning and Innovation: Experiences of Newly Industrialising Economies. Cambridge University Press, Cambridge 2000.
19 Cohen WM, Levinthal DA. Innovation and Learning: Two Faces of R&D. Economic Journal 1989; 99(397): 569–596.

CLUSTERS FROM STRATEGIC MANAGEMENT PERSPECTIVE: THE ROLE OF CLUSTERS FOR FIRMS' INNOVATIVENESS

Judith Terstriep[1], Christian Lüthje[2]

[1]Westphalian University, Institute for Work and Technology, Research Department Innovation, Space & Culture, Munscheidstr. 14, 45886 Gelsenkirchen, Germany, terstriep@iat.eu

[2]TU Hamburg-Harburg, Institute for Marketing and Innovation, Schwarzbergstr. 95, 21073 Harburg, Germany, c.luethje@tu-harburg.de

A widespread assumption in economic geography and the economics of innovation is that clusters yield innovation by facilitating learning and knowledge spillover. However, empirical evidence how and to what extent firms benefit in their innovation activities from acting in clusters is scarce. This paper contributes to the micro-foundation of cluster effects by examining characteristics and activities of the cluster firms in relation to their innovativeness. Partial Least Square (PLS) regression analysis with data from 107 ICT cluster firms reveals that firms' relational embeddedness in cluster-internal and -external innovation partnerships significantly enhances their innovative success, which in turn positively impacts their overall performance. However, we find no empirical evidence for the often-suggested hypothesis that cluster-internal interaction enhances firms' innovation performance per se. And although our findings indicate the existence of an indirect effect of firms' absorptive capacity on the association between the structural embeddedness and innovative performance, this shows not to be significant.

Keywords

Clustering, Innovation, Strategic Management, Structural Equation Modelling, Relational Embeddedness

1. Introduction

The knowledge based view (KBV) and the relational view (RV) in strategy have largely extended resource-based reasoning by suggesting heterogeneous knowledge bases, capabilities and networks as key ingredients of value creation and innovation ([1],[2],[3]). Instead of developing capabilities and knowledge solely in-house, firms increasingly rely on multiple external sources of knowledge which accumulate over time [4]. Continuously interacting with their environment, innovative firms manage to combine 'firm-specific' and 'firm-addressable' resources which are at least partly controlled by the firm to gain competitive advantage [5]. Also the relational view points to the importance of networks as source of competitive advantage emphasising relation-specific assets such as knowledge sharing routines or effective governance structures for cooperation ([6],[7],[8]). Likewise, the literature on open innovation highlights the relevance of networks of interrelated firms as a key factor in the ability to generate innovation ([9],[10]).

In this vein, clusters as geographically concentrated groups of interconnected firms working in the same or in closely related sectors [11] are deemed as important ecosystems for open innovation. Based on the idea that proximity matters for innovation being located in a cluster

is believed to enhance firms' innovative performance. Localized knowledge exchange and other non-market interactions are increasingly regarded as key explanations for spatial concentration of knowledge-intensive industries such as information and communication technologies (ICT). It is argued that clusters as *'knowledge accessing institutions'* allow for an improved access to innovation-related knowledge, facilitate knowledge spillovers and interactive learning, and thereby, nurture innovation ([12],[13],[14]).

With his seminal publication 'The Competitive Advantage of Nations', Porter [15] laid the ground for a widespread resurgence of interest in the issue of regional clusters. According to recent theories interactions give firms an innovative advantage which results in better economic performance. Of particular interest is the evolving *knowledge-based cluster theory* which emphasises the role of interactive learning processes and the development of relational capital as primary source of positive cluster effects ([16],[17]). Albeit knowledge on clusters has improved considerably during the past decade, major questions relating to the micro-foundation of clusters are underexplored. In particular, quantitative empirical investigations on the specific innovation-related benefits firms derive from clusters remain scarce. Little is known on how and through what mechanisms proximity conveys innovation value to clustered firms (cf. [18],[19]). While the research interest in clusters was primarily on aggregated effects of clusters on the regions' innovativeness and competitiveness, leaving firm-level effects unexplored, more recently we observe a shift from the macro- towards the micro-level as unit of analysis. This is reflected by an increasing number of studies devoted to the role of clusters in business formation and growth ([20],[21]) as well as studies investigating with differing foci the interplay of cluster membership, firm performance, innovativeness and/or interactions (cf. [(22)],[23],[(24)],[25]). However, the empirical results are by no means consistent, they rather deliver contradictory results on the relationship between clustering and firm's innovativeness ([26],[27]). This results in conflicting advice to managers and policy makers how to reap the benefits of clusters for fostering innovation

Bridging innovation, management and cluster theories the current study taps into this research gap by examining whether the availability and accessibility of cluster-specific resources such as knowledge and competencies facilitate clustered firms' innovativeness and performance. Moreover, we ask for the impact of firms' internal capabilities (e.g., absorptive capacity) on cluster-related benefits. Exploring the 'black box' of cluster effects using micro-level data, this exploratory study will contribute to providing firms with a better basis of strategic decision-making for investments in cluster-specific activities.

The remainder of this paper is organized as follows. First, an overview of prior research on clusters and firms' benefits is provided. From this, we develop hypotheses on the relationship between the involvement of firms in regional clusters and the firms' innovative performance. Next, the data sources and variables used in this study are presented, followed by the empirical results. Conclusions, limitations and directions for further research are outlined in the final section.

2. Theoretical background and hypotheses

The theoretical background section is organised in three parts. First, we provide an overview of core insights that shaped the field of cluster theory. In the second part, we present prior research on cluster effects. Based on this discussion, we formulate the hypotheses in the third part of this section.

2.1 Conceptualising clusters

As depicted in figure 1, clusters embrace four constituent elements. They facilitate agglomeration economies arising from *spatial proximity* [11] and are characterised by *sectorial concentration.* That is, clusters are composed of firms belonging to a particular industry or technology field connected through 'related variety' (cf. [28],[29]).

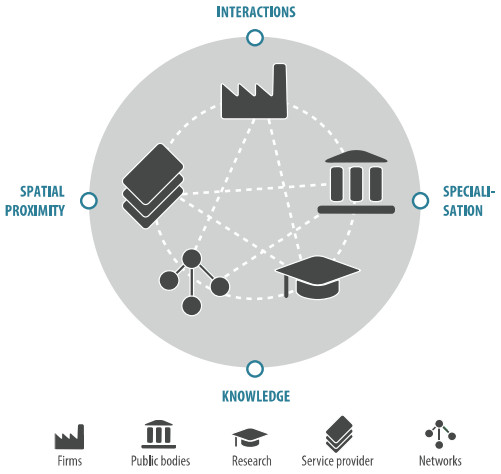


Figure 1 Clusters' constituent elements

Interactions among regional stakeholders distinguish clusters from pure agglomerations [30]. These links refer likewise, to horizontal and vertical relations between firms, market-based transactions, and untraded or informal relationships as well as to institutional ties between firms, research organisations and public bodies. Finally, clusters are earmarked by a high degree of sticky specific knowledge, difficult to access for firms outside the cluster ([31],[32]). Such 'embedded knowledge' is based on routines, habits and norms established through collaborative experience ([33],[34]).

Porter [35] identified three mechanisms through which clusters affect firms' competitiveness:

Firstly, clusters contribute to gains of productivity resulting from *factor conditions* such as access to specialised workforces, information, and complementary resources, as well as resulting from competition. Secondly, clusters improve firms' innovativeness due to *favourable demand conditions* which increase the competitive pressure forcing firms to innovate. Thirdly, clusters stimulate *business formation*, which in turn facilitate innovation and cluster growth. Following Porter, innovation is driven by the recursive interplay of competitive and cooperative forces, while the focus is on competition.

Subsequent work has emphasised the social and relational dimension of clusters. These *multidimensional cluster approaches* take an integrated systemic view of market and social relations ([36],[37]). Taking this as point of origin, innovation and learning are the key outcomes of the inter-organizational relationships, and knowledge is the core strategic resource [16]. In this vein, Hervás-Oliver [38], for example, strives to bridge RBV, the concept of dynamic capabilities and absorptive capacity, to explain firms' benefits from knowledge flows within clusters. Channels of knowledge transfer and interactive learning comprise horizontal interactions, vertical relations among competitors, formal and informal cooperation, spin-offs as well as workforce mobility.

Spatially-bound personal contacts are a precondition for the transfer of implicit knowledge and fuel the spatial concentration of innovation activities as well as the formation of clusters ([16],[17]). In addition, it is argued that the more diverse the relationships between cluster actors, the better the access to new ideas and knowledge, providing enhanced opportunities for innovation ([39],[17]). A diverse cluster-specific knowledge base allows clustered firms to continuously recombine existing and generate new knowledge as basis for future innovation. Besides, spatial proximity does not only contribute to enhanced personal contacts but also to a more effective knowledge transfer between co-located parties ([40],[41]). It is also argued that clusters contribute to a reduction of transaction costs, namely the costs for the identification, accessibility and transfer of innovation-related knowledge, as well as to a

decrease of innovation-related uncertainty due to the diverse knowledge sources available in the cluster [42].

2.2 Hypotheses

To sustain competitive advantage firms must be able to continuously update their knowledge base ([43],[44]). At the same time they need to find a balance between knowledge exploitation which requires diversity, and knowledge exploration which asks for specialisation [45]. Interactions with firms' external environment contribute to knowledge acquisition and enhance their learning and innovative capacities. Drawing on the relational view in strategic management, networks have the potential to open the access to locally bound resources which, in turn, enable firms to bundle complementary resources. Investments in relational assets also allow for an optimisation of inter-firm business processes through co-specialisation [6]. Routines for a continuous inter-firm knowledge exchange facilitate learning and capacity building, while proximity within clusters favours the evolvement of unique mechanisms of knowledge transfer, generation and recombination. In the view of KBV, this common reference framework paves the way for an enhanced access to innovation-related knowledge and competencies. Assuming that firms rely on multiple sources of knowledge and competencies in order to innovate, we hypothesise as follows:

- *Hypothesis 1: The more intense a firm's interactions within the cluster are, the higher is the impact of cluster membership on a firm's innovation performance.*

Ambidexterity between knowledge exploitation and exploration spanning firms' internal and external resources is difficult to achieve. In this context, the management literature points out that a firm's absorptive capacity – that is its ability to identify, acquire, understand and exploit external knowledge – directly influences its innovative capacity and performance (cf. [45],[46],[47],[48]). Pertaining to clusters, it can be assumed that the ability of a firm to successfully participate in interactive processes of learning is determined by its internal resources and capacities. Possessing an adequate level of absorptive capacity will allow firms to better combine internal and external sources of knowledge [49]. Forasmuch, we rather emphasise the enabling role of absorptive capacity than its direct impact ([50],[51],[52]). Hence, the relationship between a firm's interaction intensity in the cluster and its innovation performance (see hypothesis 1) is expected to be moderated by the firm's absorptive capacity. The better a given firm manages to achieve compatibility between its internal knowledge base and the knowledge embedded in the cluster, the more it will benefit from knowledge transfer and learning in the cluster. Accordingly, it is anticipated that firms with high levels of absorptive capacity are in a better position to identify and exploit cluster-specific knowledge which complements what they already know.

- *Hypothesis 2: A firm's absorptive capacity moderates the association between the intensity of cluster internal interactions and a firm's innovation performance. The higher a firm's absorptive capacity, the stronger is the association.*

Next to the frequency the quality of interactions plays a decisive role for cluster firms' innovativeness. As is emphasised by the multidimensional cluster approaches, interactions within clusters can range from competitive to cooperative relationships on a vertical, horizontal and lateral level. With respect to innovation, cooperative relationships within a cluster in particular bear the potential to create competitive advantage. Firms perceived as trustworthy are expected to gain access to knowledge and competences which remain hidden or non-accessible for other clustered firms. Forasmuch, firms' relational embeddedness in a cluster, measured as the level of innovation-related joint activities with other actors in the cluster, should help to get better access to new ideas and complementary

innovation-related knowledge. It seems reasonable that firms embedded in joint innovation activities develop cognitive proximity, a common understanding of key concepts and a joint knowledge base. Next to the acquisition of new knowledge, a common reference framework for collective learning reduces the uncertainty about the quality and usefulness of the acquired knowledge [53]. A proven track record on cooperative innovation activities (i.e. reputation) also nurtures the development of trust, cooperation routines, habits and shared norms which, in turn, are expected to facilitate the exchange of sticky information and to enhance the willingness to transfer valuable knowledge ([33],[54]). Taken together, it appears that a firm's relational embeddedness has great potential to enhance the firm's capabilities to induce a constant flow of successful innovations.

- *Hypothesis 3: A firm's relational embeddedness in a cluster positively impacts its innovation success.*

It is a commonly held assumption by scholars that there is a need for a constant inflow of knowledge into a cluster to sustain clusters' innovation dynamics. Such 'inflows' are assumed to nurture a continuous renewal of the clusters' knowledge base preventing negative lock-in effects due to 'cluster blindness' or 'overembeddedness', and therewith, sustain firms' innovativeness and competitiveness [55]. This insight at the macro-level of clusters can also be transferred to the micro-level of the cluster firm: A firm's interactions within the cluster *('local buzz')* need to be complemented by well-developed external linkages *('global pipelines')* to rejuvenate firms' knowledge base over time ([56],[57]). As potential cooperation partners within a cluster are limited in number and variety, clustered firms most probably benefit from the interaction with partners beyond the cluster's boundaries. Due to a lack of cognitive proximity the establishment of trustworthy relationships with external partners, however, goes hand in hand with higher uncertainty and investments [58]. Nevertheless, these relationships can be expected to complement the knowledge transferred and exploited through cluster-internal relationships. We therefore propose an interaction effect between the level of cluster-internal and cluster-external communication. In addition, a direct effect of a firm's relational embeddedness in external networks on its innovative success is expected.

- *Hypothesis 4: The duality of a firm's cluster-internal and -external interactions has a positive multiplier effect on its innovation performance.*
- *Hypothesis 5: A firm's relational embeddedness in external networks is positively associated with its innovative success.*

As firms rely on continuous innovation activities to sustain their competitive position in dynamic markets, it is assumed that innovation performance and innovative success positively impact a firm's performance.

- *Hypothesis 6: A firm's innovation performance and innovative success is positively associated with its overall performance*.

In order to test the outlined hypotheses, we formulate a structural equation model (see appendix 1) comprising five latent exogenous variables (cluster-internal interactions, duality of cluster-internal and -external interactions, cluster-internal and -external relational embeddedness and absorptive capacity) and three latent endogenous variables (innovation performance, innovative success and firm performance).

3. Data and methodology

The empirical field of the present study is composed of two regional ICT clusters located in Germany and Switzerland. The sector was chosen, because ICT as general purpose technology affects virtually any area of private, public and economic life and is considered as an impetus for innovation and productivity (cf. [59],[60],[61]). Due to its high knowledge-intensity and a high pace of innovation [62], the ICT sector as a whole as well as its sub-segments tend to cluster [24].

3.1 Sample description

The data was collected from questionnaire surveys by means of an electronic questionnaire addressing firm managers listed in the cluster organisations databases. The two clusters comprise 505 cluster members from Germany (325) and Switzerland (180) including firms, research organisation and public bodies. After two written reminders and several telephone reminder calls, 150 completed questionnaires were received from cluster firms, representing a response rate of 29.7%. Omitting those with incomplete data at the central questions, 107 questionnaires were used in this study (rate of usable responses: 21.2%). The relatively high rate of non-responses to central questions such as innovation activities might be attributed to the large number of rather small firms that were not willing to provide the related information. Approximately 30% of the respondents are micro enterprises with less than 10 employees, 60% are small and medium-sized enterprises (10 to 249 employees) and the remaining 10% are large enterprises with more than 249 employees. The distribution of firms by age is as follows: 28% younger than 9 years, 33.6% between 10 to 19 years, 32.7% between 20 to49 years and 5.6% older than 49 years. More than half of the respondents are highly specialised in their respective segment, while only 20% of the sample reported to generate the predominant share of their turnover with many different products/services. More than 42% of the firms surveyed are active in software and IT services (SITS), about 47.7% in SITS and hardware, 2.8% in hardware only and 7.5% in other subsectors. The vast majority of respondents target regional and national markets (81.3%), additional 8.4% international markets and about 10% reported to serve equally regional, national and international markets.

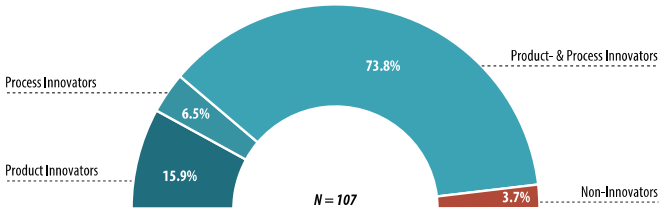


Figure 3 Innovative Firms (%)

As depicted in figure 3, the majority of respondents in the sample (96.3%) can be classified as 'innovative firms' which confirms the sector's high innovation dynamic. Almost two-third of cluster firms (73.8%) has introduced both product and process innovations. Additional 15.9% introduced product and 6.5% process innovations.

3.2 Methodology and measures

The study employs Partial Least Square (PLS) regression analysis, introduced by Wold [63] and further developed by Lohmöller [64], to explicitly account for moderating effects as well as for reflective and formative constructs. Whereas, the reflective manifest variables are determined by the latent variable and should be highly correlated, formative measurement models are applied when an explanatory set of indicator variables underlies the latent construct and, therefore, do not necessarily correlate ([65],[66]). That is, the direction of

causality is from the indicators to the latent construct. Considered as a 'soft modelling' approach, PLS has proven to be particularly advantageous with non-normal distributions, small sample sizes and combinations of formative and reflective measurement models (cf. [67],[68],[65]). PLS distinguishes between two sets of linear equations: the inner model *(structural model)*, defining the relationship between latent variables, and the outer model *(measurement model),* linking latent variables with a set of manifest variables [68]. The estimation comprises three stages: *(i)* the iterative estimation of latent variable scores, *(ii)* the estimation of outer weights/ loadings and path coefficients, and *(iii)* the estimation of location parameters. Multi-item measures are used for the *structural* and *relational embeddedness* inside and outside the cluster ([69],[70],[71]), the *absorptive capacity* ([72],[73],[48]) as well as for the *innovative success* ([74],[75],[76]). Respondents were asked to rate the single items on a seven-point Likert scale (from 1 = fully disagree to 7 = fully agree). The number of radical and incremental product/service innovations, improvements of existing products/services as well as process innovations introduced during the past three years measured *innovation performance.*

For two of the five *exogenous variables* a formative measurement model was applied and the remaining three were specified as reflective constructs: *Cluster-internal interaction* and *cluster-external interaction* are specified as reflective constructs with five items representing the horizontal, vertical and lateral cluster dimension. The decisive criterion here was that according to knowledge-based cluster theory interactions along the horizontal (competitors), vertical (complementary firms and customers) and lateral dimension (research organisations and public bodies) are equally important for interactive learning and knowledge generation. Respondents were asked to assess the frequency with which they interact internally and externally with the above stakeholders. A firms' *duality of cluster-internal and -external interactions* is specified as formative construct consisting of five items reflecting their orientation with respect to the aforementioned stakeholders. For each item a quotient from cluster-internal and -external interaction frequency was calculated. *Cluster-internal and -external relational embeddedness* expressed by the quality of interaction within and outside the cluster are itemised as formative constructs. The respondents were asked to indicate whether they cooperate in the framework of their innovation activities in the field of knowledge exchange, joint projects or both with the aforementioned stakeholders in course of their innovation activity. Adapting scales from earlier studies, firms' *absorptive capacity* is modelled as reflective construct consisting of variables referring to the acquisition, assimilation, transformation, and exploitation of external knowledge (cf. [51],[48]).

All *endogenous variables* were measured reflective: *Innovation performance* is modelled as reflective construct of five items representing the different types of innovations: *(i)* product/service innovation new to the market, new to the firm and incremental innovation in terms of improvement of existing products/services, and *(ii)* process innovation in form of cost-cutting innovations and quality-enhancing innovations. *Innovative success* is measured by respondents' assessment of the degree to which *(i)* the introduced market and firm innovation launched more successfully in market, *(ii)* more additional markets beyond the core business could be entered, and *(iii)* the overall market success was higher compared to its competitors. A *firm's performance* is measured reflective by the single indicator development of revenues during the past three years.

4. Results

Descriptive results show that the participating firms use the cluster most frequently for knowledge transfer and market observation, while joint projects occur only occasionally (see figure 4). ICT firms give high priority to the protection of their proprietary knowledge, which partly explains the relatively low frequency of joint projects and technology transfer. This is

consistent with the response to safeguards for intellectual property applied by firms: More than two-third of the firms surveyed report to use secrecy and/or patents and copyrights to protect their intellectual property.

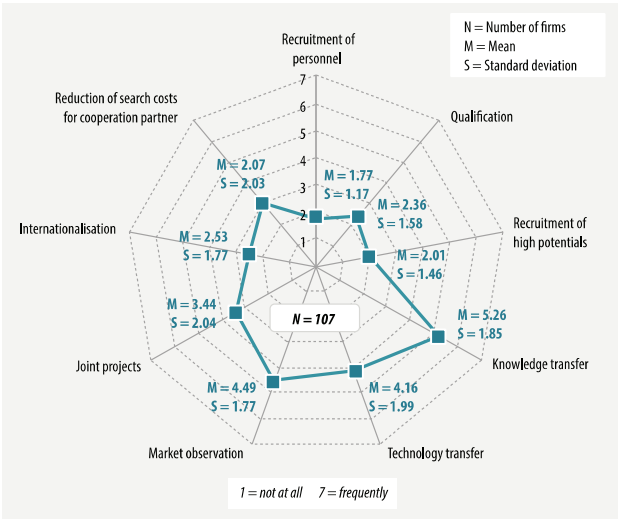


Figure 4 Cluster usage

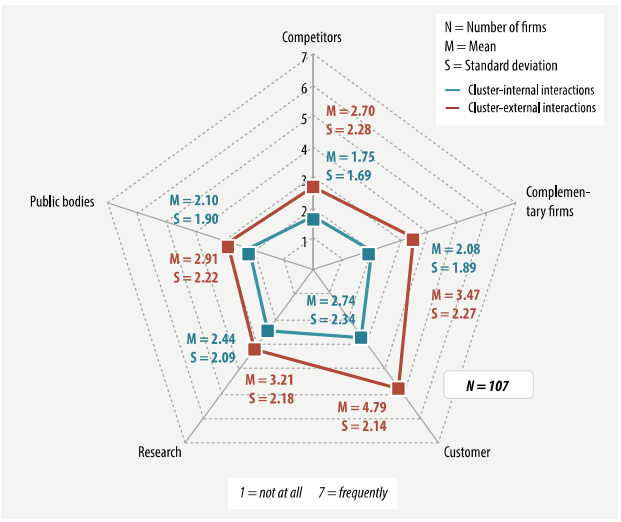


Figure 5 Interactions by degree of formalisation

Furthermore, the results illustrate that the vast majority of respondents is involved in cluster-internal and -external interaction, although with varying degrees of intensity. Concerning these linkages one can observe different degrees of formality regarding cluster-internal and -external relationships (see figure 5): While interactions of the focal firm with competitors, complementary firms, customers, research and public bodies are rather informal, external interactions are characterised by formal arrangements. These results are conform with the multidimensional cluster approaches. For example, Saxenian [77] proposes in her study that one of the primary reasons for the relative success of Silicon Valley over Route 128 in Boston is that knowledge is easily shared through informal relationships of individuals belonging to competing firms and other cluster actors in Silicon Valley. Asked for the importance of the cluster for their innovation activities during the past three years about 8% of firms attributed to the cluster a high importance, 48.6% a medium and 42.1% no significance.

4.1 Analysis of measurement model

4.1.1 Evaluation of the reflective measurement model

In order to ascertain *unidimensionality* an explorative factor analysis was conducted for each reflective construct. In accordance with the Kaiser criterion, only those factors with an eigenvalue above one were extracted. In addition, factors with loadings of less than 0.4 were eliminated. Based on these results, two of the nine indicators of the construct 'absorptive capacity' were dropped. Examining the factor loadings assessed *indicator reliability*. For a variable to be reliable a minimum loading of 0.7 is required, indicating that more than 50 per cent of the variance of the measure is accounted for by the construct. All factor loadings lie well above this threshold. Composite reliability (CR) indicates a construct's internal consistency [78]. CR coefficient is superior to Cronbach's alpha, as it does not assume that all indicators are equally weighted [79]. As illustrated in table 1, all constructs meet the threshold value of 0.7. In addition, the predictive relevance of the reflective constructs was evaluated using Stone-Geisser criterion (Q^2). In our analysis, all Q^2 values range above the

threshold value of zero. Finally, we assessed the *discriminant validity* of the constructs indicating extent to which the items of a given construct vary from those of other constructs in the model by using Fornell/Lacker's [(79)] measure of average variance extracted (AVE). To meet the requirements of *discriminant validity,* the square root of a construct's AVE should be above the correlation between the construct and other constructs in the model ([78], [79]). That is, discriminant validity.

Table 1 Reliability and validity of reflective constructs

Construct	CR (>0.7)	AVE (≥0.5)	Q^2	Fornell-Lacker criterion
Absorptive capacity	0.87	0.51	0.49	passed
Innovation performance	0.84	0.63	0.62	passed
Innovative success	0.87	0.68	0.68	passed
Cluster interaction	0.89	0.62	0.62	passed

4.1.2 Evaluation of the formative measurement model

Quality criteria for reflective measurement models cannot be applied to formative models due to their reverse causality. Therefore, careful specification is a necessity before data collection. In addition, *multicollinearity* of indicators should be assessed, as substantial correlations among formative indicators result in unstable estimates for indicator coefficients making it difficult to separate the distinct influence of individual indicators on the formative construct [65]. As related measure *Variance Inflation Factor* (VIF = 1//1-R^2) assess the degree of multicollinearity and should not exceed the threshold of 10 [80]. All formative constructs are below the threshold. In order to evaluate the *quality* of formative indicators, indicators weights as well as their significance can be assessed. Although weights might reach value below those of reflective indicators, they should not simply be eliminated [65].

4.2 Analysis of structural model

The *squared multiple correlations* (R^2) of the latent endogenous variables are the essential criterion for the assessment of the structural model [68]. It indicates the explanatory power of model. Chin [78] describes R^2 values of 0.67, 0.33 and 0.19 as essential, moderate, and weak. According to these suggestions, only the construct of innovation performance (R^2 = 0.22) meets the threshold at low level. Nevertheless, the interpretation of R^2 depends on the question analysed. The relatively low values for innovative success (R^2 = 0.12) seem reasonable, because cluster-internal and -external relational embeddedness are only two factors among other not considered factors that impact a firm's innovative success. Also, innovation performance and innovative success are just two factors effecting firms' performance. Forasmuch, R^2 values from 0.10 to 0.20 are not unusual. Predictive relevance for the structural model is also assessed by the Stone-Geisser criterion Q^2 (redundancy) for the reflective constructs. As illustrated in the subsequent table, all constructs are above the zero threshold.

Table 2 Structural model – squared multiple correlation and Stone-Geisser criterion

Construct	R^2	Q^2 (redundancy)
Innovation performance	0.221	0.1531
Innovative success	0.121	0.0544
Firm performance	0.072	0.0384

4.3 Testing of hypotheses

With a weight of 0.253 the factor 'cluster-internal relational embeddedness' expresses the largest explanatory share for a firm's innovative success, while the weight of 'cluster-external relational embeddedness' (0.205) is slightly lower. *Hypothesis 3 and 5* are, therewith, confirmed. A significant positive impact of innovation-related cooperation experience (cluster-internal $\rightarrow p < 0.02$; cluster-external relational embeddedness $\rightarrow p < 0.05$) and on firm's innovative success exists. As was expected, innovative success significantly ($p < 0.02$) impacts firms' innovative performance *(hypothesis 6a)*, whereas innovation performance has barely any effect *(hypothesis 6b)*. Most surprisingly and contrary to the expectation, the intensity of cluster-internal interactions does not seem to have a significant impact on firms' innovation performance *(hypothesis 1)*. Despite a quite high path coefficient (0.358), this results inevitably in non-significance of moderating effect of *absorptive capacity* on the association between the intensity of cluster internal interactions and a firm's innovation performance *(hypothesis 2).* Likewise, *hypothesis 4* has to be discarded, indicating that higher levels of cluster-external interactions do not complement cluster-internal interactions in the proposed way. The estimated model, with its squared multiple correlations for the latent endogenous variables and the related path coefficients, is illustrated in appendix 2.

4. Discussion of results

This study was conceptualised to investigate whether the availability and accessibility of cluster-specific resources such as knowledge and competencies facilitate clustered firms' innovation performance, innovative success and their overall performance, while accounting for the heterogeneity of firms in terms of their absorptive capacity. It is against this background that we estimated direct effects of a firm's cluster-internal interactions and cluster orientation on innovation performance as well as the moderating role of absorptive capacity. Furthermore, direct effects of a firm's prior cooperation experience, expressed by its cluster-internal and -external relational embeddedness, were considered. This distinction between frequency and quality has proven to be useful to verify the formulated hypothesised correlations.

Our empirical findings substantiate that firms' benefits from being located in a cluster originate particularly from high quality relational ties. Being engaged in innovation-related joint projects and/or intended knowledge transfer contributes to firms' innovation success and overall performance. Likewise, this applies to innovation-related cooperation with partners beyond the cluster boundaries. Therefore, it seems reasonable to conclude that firms embedded in both cluster-internal and -external innovation-related networks profit most from being located in a cluster. However, accounting for the fact that maintaining relationships with distant partners bear higher risks resulting from uncertainty and missing cognitive proximity, a firm's relational embeddedness into a cluster seems highly beneficial. Accordingly, firms, and especially those with limited resources such as micro- and small-enterprises, need to find a balance between internal and external embeddedness which on the one hand allows for a sufficient access to and inflow of knowledge and competences, and an efficient maintenance of these relationships on the other. Unlike other studies (cf. [24], [81]) revealing positive respectively negative impacts of a firm's cluster-internal interactions on its innovation performance, we could not observe any significant effect. Hence, the conclusion could be drawn that high levels of interaction per se do not enhance firm's innovation performance, but require some form of strategic orientation. Nevertheless, this does not necessarily mean that cluster-internal interactions are of no value for the

clustered firms, but might be attributed to the fact that the surveyed firms did not perceive the value of untraded interdependencies (e.g., intended and unintended knowledge spillovers) for their innovation activities. A further explanation could be that the majority of firms in the sample are highly specialised. As a consequence, at least partially overlapping knowledge bases as precondition for absorbing cluster-specific resources might exist only to a limited extent. Also a lack of transparency in resources available in the cluster may partly explain the low impact of cluster-internal interactions. In this case, cluster organisations could function as *'boundary spanners'* or *'knowledge brokers'* channelling the available resources among clustered firms. Summarising, this study leads to a better understanding of cluster-benefits and its underlying mechanisms at the firm level, and thus contributes to the micro-foundation of clusters. Moreover, the results not only have implications for cluster theory, but also for firm and cluster managers. In order to attain substantial cluster-benefits, entrepreneurs as well as cluster managers should focus on the quality of relations rather than on the frequency of meetings, events and so on. Based on these findings, future studies should conduct more detailed investigations of specific cause-effect relationships, especially with regard to the motivation of firms to establish close relational ties within a cluster, as well as concerns further cluster-, inter-firm and firm-specific factors with a potential impact on innovation performance, innovative success and firm performance.

Our findings are subject of some limitations: Firstly, the sample size is small. Notwithstanding that the sample replicates the clusters' population and PLS approach is applicable to small populations, a larger dataset would lead to more robust results. Secondly, the relationships between the latent exogenous and endogenous variables should be accepted with caution, as all variables to measure the constructs were collected during a specific time period. By replicating the findings for the same sample, robustness could only be validated.

References

1 Grant RM. The Knowledge-Based View of the Firm. In: Choo CW, Bontis N, editors. The Strategic Management of Intellectual Capital and Organizationel Knowledge. Oxford: Oxford University Press; 2002. p. 133–48 .

2 Dyer JH, Singh H. The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage. Academy of Management Review 1998; 23(3):660–79.

3 Kogut B, Zander U. Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology. Organization Science 1992; 3(3):383–97.

4 Grant RM, Baden-Fuller C. A Knowledge Accessing Theory of Strategic Alliances. Journal of Management Studies 2004; 41(1):61–84.

5 Sanchez R, Heene A. The New Strategic Management: Organization, Competition, and Competence. New York, N.Y: Wiley; 2004.

6 Dyer JH, Kale P. Relational Capabilities: Drivers and Implications. In: Helfat CE, Finkelstein S, Mitchell W, Peteraf MA, Singh H, Teece DJ et al., editors. Dynamic Capabilities: Understanding Strategic Change in Organizations. Malden, MA: Blackwell Pub.; 2007. p. 65–79 .

7 Lavie D. The Competitive Advantage of Interconnected Firms: An Extension of the Resource-based View. Academy of Management Journal 2006; 31(3):638–58.

8 Duschek S. Inter-Firm Ressources and Sustained Competitive Advantage. management revue 2004; 15(1):53–73.

9 Chesbrough HW. Open Innovation: A New Paradigm for Understanding Industrial Innovation. In: Chesbrough HW, Vanhaverbeke W, West J, editors. Open Innovation: Researching a New Paradigm. Reprinted. Oxford: Oxford University Press; 2008. p. 1–12.

10 van de Vrande V, Vanhaverbeke W, Gassmann O. Broadening the scope of open innovation: past research, current state and future directions. International Journal of Technology Management 2010; 52(3/4):221–35.

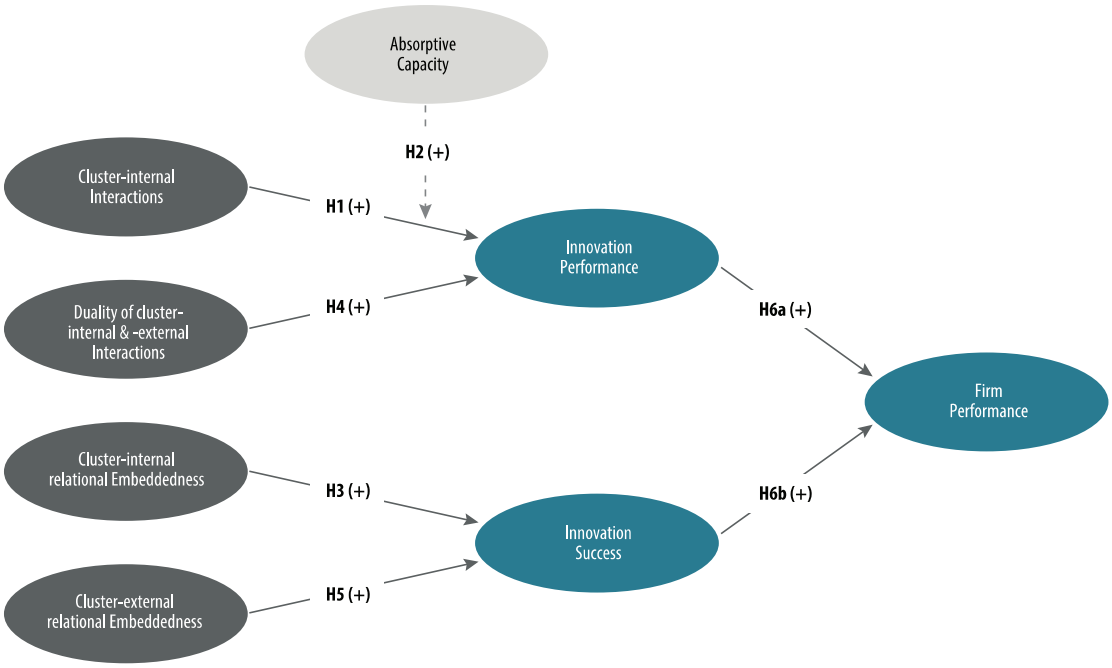
11 Porter ME. Location, Competition, and Economic Development: Local Clusters in a Global Economy. Economic Development Quarterly 2000; 14(1):15–34.

12 Tallman S, Jenkins M, Henry N, Pinch S. Knowledge Clusters and Competitive Advantage. Academy of Management Review 2004; 29(2):258–71.
13 Caniëls MCJ, Romijn HA. What drives innovativeness in industrial clusters? Transcending the debate. Cambridge Journal of Economics 2005; 29(4):497–515.
14 Zaheer A, Bell GG. Benefiting from Network Position: Firm Capabilities, Structural Holes, and Performance. SMJ 2005; 26(9):809–25.
15 Porter ME. The Competitive Advantage of Nations. New York: Free Press; 1990.
16 Bahlmann MD, Huysman MH. The Emergence of a Knowledge-Based View of Clusters and Its Implications for Cluster Governance. The Information Society 2008; 24(5):304–18.
17 Bathelt H. Knowledge-based clusters: regional multiplier models and the role of 'buzz' and 'pipelines'. In: Karlsson C, editor. Handbook of Research on Cluster Theory. Cheltenham, UK: Edward Elgar; 2008. p. 78–91 (Handbooks of Research on Clusters Series; vol. 1).
18 Huber F. On the Role and Interrelationship of Spatial, Social and Cognitive Proximity: Personal Knowledge Relationships of R&D Workers in the Cambridge Information Technology Cluster. Regional Studies 2012; 46(9):1169–82.
19 Mitchell R, Burges J, Waterhouse J. Proximity and knowledge sharing in clustered firms. International Journal of Globalisation and Small Business 2010; 4(1):5–24.
20 Delgado M, Porter ME, Stern S. Clusters and entrepreneurship. Journal of Economic Geography 2010; 10(4):495–518.
21 Maine EM, Shapiro DM, Vining AR. The role of clustering in the growth of new technology-based firms. Small Business Economics 2008; 34(2):127–46.
22 Huber F. Do clusters really matter for innovation practices in Information Technology? Questioning the significance of technological knowledge spillovers. Journal of Economic Geography 2011; 12(1):107–26.
23 Kukalis S. Agglomeration Economies and Firm Performance: The Case of Industry Clusters. JOM 2010; 36(2):453–81.
24 Zhao Y, Zhou W, Huesig S. Innovation as Clusters in Knowledge Intensive Business Services: Taking ICT Services in Shanghai and Bavaria as an Example. IJIM 2010; 14(1):1–18.
25 Beaudry C, Swann P. Firm growth in industrial clusters of the United Kingdom. Small Business Economics 2009; 32(1-2):409–24.
26 Jiménez KP, Junquera B. Why Are Clusters Beneficial?: A Review of the Literature. Human Factors and Ergonomics in Manufacturing & Service Industries 2010; 20(2):161–73.
27 Karaev A, Koh LSC, Szamosi LT. The cluster approach and SME competitiveness: a review. Journal of Manufacturing Technology Managment 2007; 18(7):818–35.
28 Boschma RA, Iammarino S. Related Variety, Trade Linkages, and Regional Growth in Italy. Economic Geography 2009; 85(3):289–311.
29 Frenken K, van Oort F, Verburg T. Related Variety, Unrelated Variety and Regional Economic Growth. Regional Studies 2007; 41(5):685–97.
30 Rocha HO, Sternberg R. Entrepreneurship: The Role of Clusters Theoretical Perspectives and Empirical Evidence from Germany. Small Business Economics 2005; 24(3):267–92.
31 LeSage JP, Fischer MM. Estimates of the Impact of Static and Dynamic Knowledge Spillovers on Regional Factor Productivity. International Regional Science Review 2012; 35(1):103–27.
32 Gertler MS, Wolfe DA. Spaces of knowledge flows: Clusters in global context. In: Asheim BT, Cooke P, Martin R, editors. Clusters and Regional Development: Critical reflections and explorations. Repr. London: Routledge; 2008. p. 218–35.
33 Moodysson J, Jonsson O. Knowledge Collaboration and Proximity: The Spatial Organization of Biotech Innovation Projects. European Urban and Regional Studies 2007; 14(2):115–31.
34 Bathelt H, Malmberg A, Maskell P. Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. Progress in Human Geography 2004; 28(1):31–56.
35 Porter ME. Locations, Clusters, and Company Strategy. In: Clark GL, Feldman MP, Gertler MS, editors. The Oxford Handbook of Economic Geography. Oxford: Oxford University Press; 2003. p. 253–74.
36 Kiese M. Stand und Perspektiven der regionalen Clusterforschung. In: Kiese M, Schätzl L, editors. Cluster und Regionalentwicklung: Theorie, Beratung und praktische Umsetzung. Dortmund: Rohn; 2008. p. 9–50 .

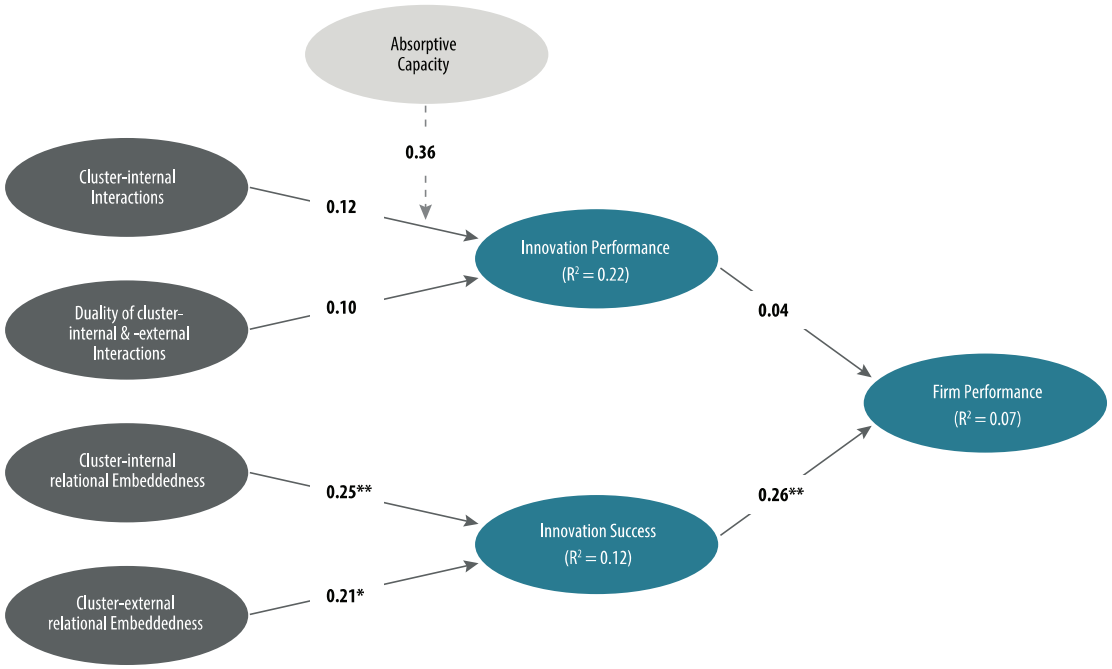
37 Bathelt H. Toward a Multidimensional Conception of Clusters: The Case of the Leipzig Media Industry, Germany. In: Power D, Scott AJ, editors. Cultural Industries and the Production of Culture. London, New York: Routledge; 2004. p. 147–68.
38 Hervás-Oliver J. When and why companies benefit from collocation in clusters?: DRUID Conference 2011, Copenhagen, Denmark; 2011.
39 Hervás-Oliver J, Albors-Garrigós J, Marques Vicari F. Low-tech Clusters and Innovation: The Role of External Ties in Avoiding Internal Myopia; Paper presented at the 9th International CINet Conference, "Radical Challenges in Innovation Management", 7-9 September 2008, Valencia, Spain. Valencia; 2008.
40 Sreckovic M, Windsperger J. Organization of Knowledge Transfer in Clusters: A Knolwedge-Based View. In: Tuunanen M, Windsperger J, Cliquet GHG, editors. New Developments in the Theory of Networks. Heidelberg: Physica; 2011. p. 299–315 .
41 Arikan AT. Interfirm Knowledge Exchanges and the Knowledge Creation Capability of Clusters. Academy of Management Review 2009; 34(4):658–76.
42 Gilbert BA, McDougall PP, Audretsch DB. Clusters, knowledge spillovers and new venture performance: An empirical examination. Journal of Business Venturing 2008; 23(4):405–22.
43 Prahalad CK, Hamel G. The Core Competence of Corporation. Harvard Business Review 1990; 68(3):79–91.
44 Zahra SA, George G. Absorptive Capacity: A Review, Reconceptualization, and Extension. Academy of Management Review 2002; 27(2):185–203.
45 Al-Laham A, Tzzbar D, Amburgey TL. The dynamics of knowledge stocks and knowledge flows: innovation consequences of recruitment and collaboration in biotech. Industrial and Corporate Change 2011; 20(2):555–83.
46 Escribano A, Fosfurib A, Tribób JA. Managing external knowledge flows: The moderating role of absorptive capacity. Research Policy 2009; 38(1):96–105.
47 Hervás-Oliver J, Albors-Garrigós J. The role of the firm's internal and relational capabilities in clusters: when distance and embeddedness are not enough to explain innovation. Journal of Economic Geography 2009; 9(2):263–83.
48 Lichtenthaler U. Absorptive Capacity, Environmental Turbulence, and the Complementarity of Organizational Learning Processes. Technovation 2009; 52(4):822–46.
49 Cohen WM, Levinthal DL. Absorptive Capacity: A New Perspective on Learning and Innovation. Administrative Science Quarterly 1990; 35(1, Special Issue: Technology, Organizations and Innovation):128–52.
50 Wang C, Han Y. Linking properties of knowledge with innovation performance: the moderate role of absorptive capacity. Journal of Knowledge Management 2011; 15(5):802–19.
51 Camisón C, Forés B. Knowledge absorptive capacity: New insights for its conceptualization. Journal of Business Research 2010; 63(7):707–15.
52 Todorova G, Durisin B. Absorptive Capacity: Valuing a Reconceptualization. Academy of Management Review 2007; 32(3):774–86.
53 Bathelt H. Cluster Relations in the Media Industry: Exploring the 'Distanced Neighbour' Paradox in Leipzig. Regional Studies 2005; 39(1):105–27.
54 Maskell P, Malmberg A. Myopia, knowledge development and cluster evolution. Journal of Economic Geography 2007; 7(5):603–18.
55 Menzel M, Fornahl D. Cluster life cycles - dimensions and rationales of cluster evolution. Industrial and Corporate Change 2010; 19(1):205–38.
56 Giuliani E. What drives innovative output in emerging clusters? Evidence from the wine industry.; 2008. SPRU Electronic Working Papers 169 [cited 2009 Feb 20]. Available from: URL:http://www.sussex.ac.uk/spru/documents/sewp169.pdf.
57 Boschma RA, Ter Wal AL. Knowledge Networks and Innovative Performance in an Industrial District: The Case of Footwear District in the South of Italy. Industry and Innovation 2007; 14(2):177–99.
58 Morrison A, Rabellotti R, Zirulia L. When Do Global Pipelines Enhance the Diffusion of Knowledge in Clusters? Economic Geography 2013; 89(1):77–96.
59 Lengyel B. The Hungarian ICT Sector: A Comparative CEE Perspective with Special Emphasis on Structural Change. In: Welfens PJJ, editor. Clusters in Automotive and Information & Communication Technology: Innovation, Multinationalization and Networking Dynamics. Heidelberg, New York: Springer; 2012. p. 113–34.

60 Bloom N, Draca M, Kretschmer T, Sadun R. The Economic Impact of ICT. London: Centre for Economic Performance; 2010. SMART 2007/0020.
61 Karlsson C, Maier G, Trippl M, Schiedschlag I, Owen R, Murphy G. ICT and Regional Economic Dynamics: A Literature Review. Luxembourg: Joint Research Centre; 2010. Publications Office of the European Union.
62 Weterings ABR. Do firms benefit from spatial proximity? Testing the relation between spatial proximity and the performance of small software firms in the Netherlands. Utrecht: Koninklijk Nederlands Aardrijkskundig Genootschap; 2006.
63 Wold HO. Soft modeling: The basic design and some extensions. In: Jöreskog K, Wold HO, editors. Systems under indirect observation. Amsterdam: North-Holland; 1982. p. 1–53.
64 Lohmöller J. Latent variable path modeling with partial least squares. Heidelberg: Physica-Verlag; 1989.
65 Diamantopoulos A, Riefler P, Roth KP. Advancing formative measurement models. Journal of Business Research 2008; 61(12):1203–18.
66 Jarvis CB, MacKenzie SB, Podsakoff PM. A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research. Journal of Consumer Research 2003; 30(2):199–218.
67 Vinzi EV, Trinchera L, Amato S. PLS Path Modeling: From Foundations to Recent Developments and Open Issues for Model Assessment and Improvement. In: Vinzi EV, Chin WW, Henseler J, Wang H, editors. Handbook of Partial Least Squares. Berlin, Heidelberg: Springer; 2010. p. 47–82 .
68 Henseler J, Ringle CM, Sinkovics RR. The Use of Partial Least Squares Path Modeling in International Marketing. Advances in International Marketing 2009; 20:277–319.
69 Ter Wal AL, Boschma RA. Applying social network analysis in economic geography: framing some key analytic issues. The Annals of Regional Science 2009; 43(3):739–56.
70 Boshuizen J. Join the Club: Knowledge Spillovers and the Influence of Social Networks on Firm Performance. Twente; 2009.
71 Alegre J, Chiva R. Assessing the impact of organizational learning capability on product innovation performance: An empirical test. Technovation 2008; 28(6):315–26.
72 Lewin AY, Massini S, Peeters C. Microfoundations of Internal and External Absorptive Capacity Routines. Organization Science 2011; 22(1):81–98.
73 Flatten TC, Engelen A, Zahra SA, Brettel M. A measure of absorptive capacity: Scale development and validation. European Management Journal 2011; 29(2):98–116.
74 Forsman H. Improving Innovation Capabilities of Small Enterprises: Cluster Strategy as a Tool. Int. J. Innov. Mgt 2009; 13(2):221–43.
75 Carter AP. Measurement of the clustering and dispersion of innovation. In: Polenske KP, editor. The Economic Geography of Innovation. Cambridge, New York, Melbourne: Cambridge University Press; 2007. p. 13–29.
76 Powell WW, Grodal S. Networks of Innovators. In: Fagerberg J, Mowery DC, Nelson RR, editors. The Oxford Handbook of Innovation. Oxford: Oxford University Press; 2006. p. 56–85.
77 Saxenian A. Regional Advantage: Culture and Competition in Silicon Valley and Route 128. Cambridge, Mass: Harvard University Press; 1996.
78 Chin WW. The partial least squares approach to structural equation modeling. In: Marcoulides GA, editor. Modern methods for business research. Mahwah, N.J: Lawrence Erlbaum; 1998. p. 295–336.
79 Fornell C, Larcker DF. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. JMR 1981; 18(1):39–50.
80 Diamantopoulos A, Winklhofer HM. Index Construction with Formative Indicators: An Alternative to Scale Development. JMR 2001; 38(2):269–77.
81 Cotic Svetina A, Jaklic M, Prodan I. Does collective learning in clusters contribute to innovation? Science and Public Policy 2008; 35(5):335–45.

Appendix 1: Theoretical deduced Structural Equation Model



Appendix 2: Results Structural Equation Model



STEPS TOWARDS THE DEVELOPMENT OF MODEL FOR SUPPLIER SELECTION IN INDUSTRIAL ENTERPRISES

Nikolay Kolev[1]

[1]*University of Ruse, 8 Studentska Str., Ruse, Bulgaria, nkolev@uni-ruse.bg*

The paper deals with the procurement process as an integral part of logistics activities and more specifically with one of its core elements – supplier evaluation and selection. It represents a first step towards the development of an integrated model for vendor selection, which can be applied universally across industrial sectors but also has the option for customisation in accordance with the specifics of business organisations. The paper presents a general framework for the procurement process and its major elements, critically analyses the decision-making techniques at each of the stages and proposes specific requirements for an integrated supplier evaluation and selection model.

Keywords
Procurement, Supplier evaluation and selection, Supply Chains

1. Introduction

The contemporary business environment, characterised with low profit margins, high expectations from end-consumers and decreasing times-to-market requires that industrial enterprises use every opportunity to improve their business processes. To achieve this goal, companies need to work with their supply chain partners and try to improve their overall effectiveness. One of the most important processes in the supply chain is the procurement function. Given the increased share of costs generated by procurement, purchasing decisions can be determinative for the overall business results. As enterprises are becoming increasingly dependent on their suppliers, and both direct and indirect consequences from erroneous decisions can be significant and affect the company's profitability, there is a need for systematic and transparent approach to handle partner evaluation and selection.

Despite the obvious importance of procurement and supplier selection in particular, most of the industrial enterprises use simple and subjective approaches to determine the most appropriate partners. Furthermore, a large part of the current theoretical and empirical research also fails to provide specific solutions for existing procurement problems. The paper aims at filling this research gap by providing an analytical framework and by establishing the major requirements towards a universal and configurable model for evaluation and selection of suppliers in industrial enterprises.

2. Determining the requirements towards an integrated model for supplier evaluation and selection

The rest of the paper is organised as follows: Section 2.1 provides a general decomposition framework for business processes and their respective stages at three consecutive levels: supply chain, procurement process, and supplier evaluation and selection. Section 2.2

reveals the approaches and techniques currently used in the process of supplier evaluation and selection, and determines their major strengths and weaknesses. Section 3 presents major conclusions and outlines recommendations and requirements for an appropriate integrated and industry-independent model for vendor evaluation and selection.

2.1 Identification of supply chain and procurement decision-making framework

The development of a universally applicable model for supplier evaluation and selection can only be achieved by the provision and use of a standard framework for business processes in the supply chain. Multiple attempts have been made to structure supply chain processes [1], [2]. One of the most widely used models for organisation of the activities in the supply chain is the Supply Chain Operations Reference Model (SCOR) [3]. It provides detailed description of business processes in the supply chain, so that they can be successfully standardised. The model is industry independent and allows its users to apply and share universal good practices and techniques for management of the processes within their respective supply chains. The SCOR model is composed of several sections and is organised around five major business processes – plan, source, make, deliver and return.

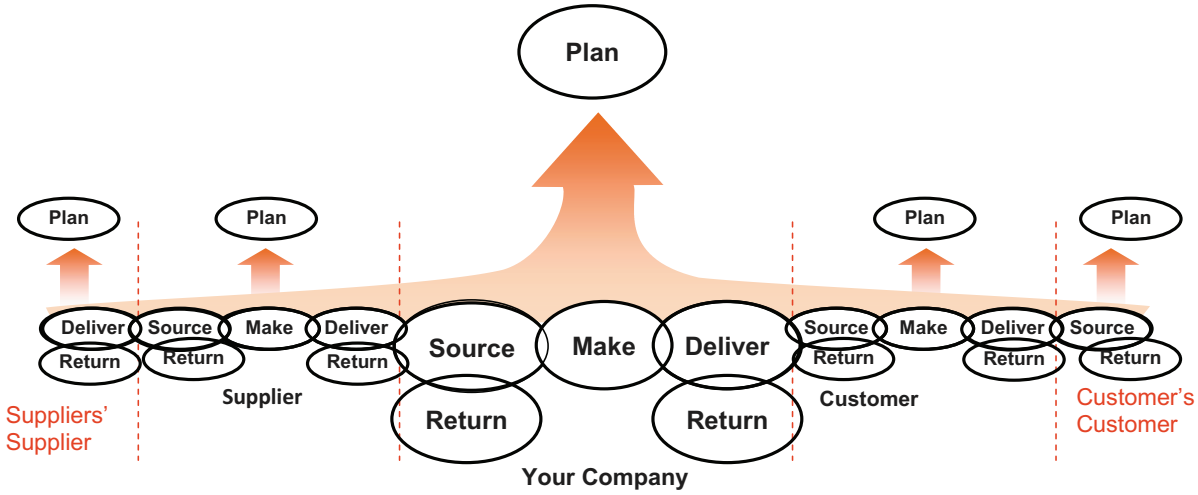


Figure 1 Organisation of the SCOR model

All five main business processes chain can affect the overall competitiveness of the enterprise. However, empirical research has demonstrated that procurement has a foremost importance in the supply chain since it provides best opportunities for cost reductions. If a firm spends a large percentage of its available capital on materials, the sheer magnitude of expense means that efficient purchasing can produce significant savings. Table 1 shows the cost of purchased materials as percentage of sales revenue in several industries [4].

Table 1 The importance of procurement.

Industry	Percent of Sales
Food and kindred products	56.4
Textile	59.0
Wood product	58.3
Petroleum	81.0
Machinery	50.7
Transportation equipment	64.1
Average manufacturing firm	52.7

Sourcing (or procurement) is the process of acquiring all necessary products in the most efficient way while at the same time satisfying the consumer requirements in terms of quality, quantity, time and location. It forms an essential link between organisations in the supply chain, and provides a mechanism for coordinating the flow of materials between customers and suppliers [5].

Procurement activities, as described in the SCOR model, can vary in accordance with the type of the sourced product. Procurement of make-to-stock products uses broadly available standard products, which do not require repetitive elaboration of technical specifications and/or terms of reference. Procurement of make-to-order products often involves sourcing of one-of-a-kind products in line with the specifics of customer requests, which requires a proactive and constantly changing approach to sourcing. Procurement of engineer-to-order products entails tight cooperation and partnership with potential suppliers and often involves repeating evaluation and selection decisions. The SCOR model provides detailed description of the activities involved in the procurement process as well as appropriate metrics defined in five major groups: reliability, responsiveness, flexibility, costs and assets [3].

Decision making within procurement also requires an appropriate decomposition framework, which has to be able to provide information on the specific stages of the process. Aissaoui et al identify a logical framework, composed of five major procurement elements, coinciding with the main decision making stages, which can be applied to most purchasing situations: (1) a “make-or-buy” analysis, (2) supplier selection, (3) contract negotiation, (4) design collaboration, (5) procurement and (6) sourcing analysis [6].

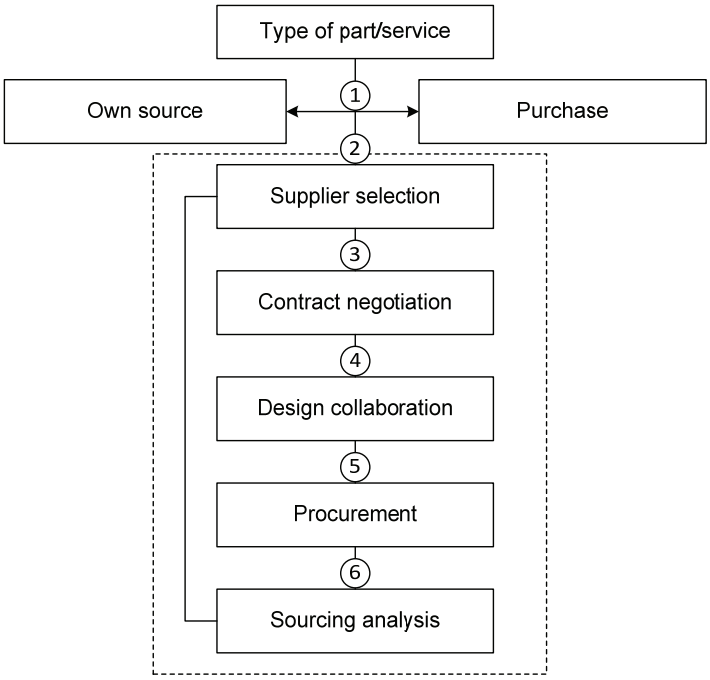


Figure 2 Major purchasing processes [6] (adapted)

A "make-or-buy" decision looks both at the economics of the part or service (i.e. cost-effectiveness analysis) and at its strategic importance. A company needs to decide on whether to produce a certain part or service internally or outsource it to an external supplier. The supplier selection stage selects a group of suppliers for the delivery of products or services on a basis of predetermined criteria. This is one of the core decisions in procurement. Contract negotiation aims at designing appropriate contracts and clauses to provide certain security in the relationships with suppliers. This is also the stage to decide on the use of short- or long-term procurement contracts. Design collaboration stage aims at the establishment of agreements between the purchasing organisation and the supplier to commonly develop parts and services that meet customer needs. Physical procurement decisions are related to securing timely and cost-efficient deliveries of products and services as well as to lot sizing and inventory management problems. The overall efficiency of the procurement process is addressed at the sourcing analysis stage.

These stages have their specific characteristics in accordance with the type of the products sourced. Procurement of make-to-stock products includes activities such as scheduling, receiving, verifying, transferring and authorising payments. Demand for these products is usually driven by forecasts within some of the other supply chain processes – plan, make and deliver. Suppliers will most likely stock substantial quantities of these products even before a specific purchase order. Procurement of make-to-order products includes purchasing and supply of products, which are produced and delivered only as a result of a specific customer requests, planned in the distribution process. These products are not usually stocked and their production is always a result of specific purchase order. Procurement of engineer-to-order products includes the identification of supply sources, selection of suppliers and negotiations, scheduling product deliveries, receiving and verification, transfer and payment authorisations. These actions are carried out for products specifically designed and manufactured in response to technical specifications and/or terms of references. Evaluation and selection of suppliers is implemented for each individual order.

Make-to-stock products are generally available and have low procurement risk. The largest number of parts and components procured by any organisation will fall into this category.

These are routine products used directly in the manufacturing processes. Delivery disruptions are rare and there are multiple alternative suppliers. Frequent changes in the supplier base are not desirable. However, as quality characteristics of these products are similar, switching costs between suppliers are usually low. Sourcing make-to-stock products requires purchasing of products with higher value and low to medium procurement risk. Usually there are multiple suppliers and thus opportunities for significant cost savings. Buyers prefer short-term contracts, which allow them to proactively search suppliers. As a result, these products are ordered in small batches and the supplier base is often changed. The major objective is cost reduction. Sourcing engineer-to-order products involves the delivery of products with high value and high supply risk. Sources of supply are usually different in accordance with the specific purchase order and enterprises are proactively looking for suppliers with design capabilities.

Usually, procurement processes in industrial enterprises are clearly defined with systematic procedures to be followed by the available personnel. In addition, only the stages involving supplier evaluation and selection, procurement and sourcing analysis are a direct responsibility of procurement departments. All other activities require competencies attributable to other organisational departments. Furthermore, supplier evaluation and selection is the only activity, which exerts direct influence over the business results of the enterprises. Physical procurement is just a formal act of order processing and implementation based on contact conditions, while sourcing analysis is a necessary step for receiving feedback from certain decisions in the overall procurement process.

Supplier evaluation and selection is considered as one of the most important activities within the procurement process. Monzcka defines this stage as the primary procurement task [7]. Ellram and Carr conclude that procurement has a major contribution towards the corporate strategic success by means of the appropriate selection of suppliers in support of the long-term strategy of the company and its competitive positioning [8].

Decision making in the supplier selection stage is not limited to the final evaluation and selection of suppliers as indicated in the general procurement framework above. There are multiple decomposition models, which can be used to present in a systematic way the entire process for supplier selection with specific stages that can be used for decision-making and analysis. Monczka identifies 7 critical steps included in the evaluation process [7]: (1) Identify key sourcing requirements; (2) Determine sourcing strategy; (3) Identify potential supply sources; (4) Limit suppliers in selection pool; (5) Determine method of supplier evaluation and selection; and (6) Select supplier and reach agreement.

Despite the fact that these stages encompass the activities for supplier evaluation and selection, they are not appropriate for analysing the decision making processes, as most of the steps are either purely administrative decisions or lay outside the procurement process. One appropriate structure, used in several research works is proposed by de Boer et al [9], further amended and modified by Luo et al [10] and Wu and Barnes [11]. It is composed of the following stages: (1) Supplier selection preparation, (2) Criteria formulation, (3) Pre-classification, (4) Final selection, and (5) Application feedback.

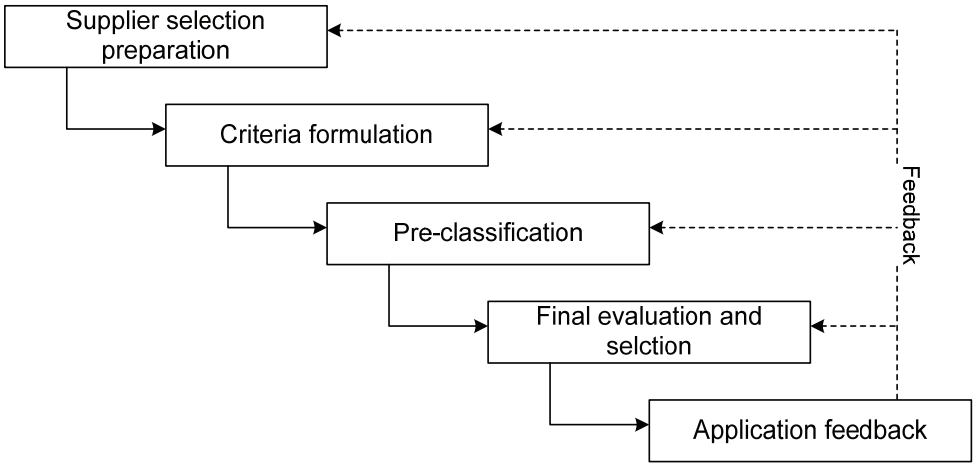


Figure 3 Stages of for supplier evaluation and selection

Each of the stages in Figure 3 can have different elements and characteristics dependent on the type of products to be sourced as identified in the SCOR model and the specific purchasing situation.

One appropriate classification of purchasing situations is initially proposed by Kraljic [11] and used with different modifications over the years. They are divided in three major groups - new purchasing tasks, modified purchasing tasks, and repetitive purchasing tasks.

New purchasing assignments are the most complex situations characterised by high level of uncertainty – a new product or service needs to be procured and no prior experience or supplier information is available. Modified rebuy situations require the procurement of a new product from a known supplier or customised product from a new supplier. The level of uncertainty is moderate as either initial evaluation criteria are already identified and known (in case of existing products) or supplier performance data are easily available (in case of existing suppliers). Repetitive procurement has the lowest level of uncertainty, as both product specifications and supplier performance information are existent and reliable. There is one difference in straight rebuy of strategic items where the supplier pool is limited and often the evaluation situation is limited to appraisal and not an actual selection [12].

Table 2 Supplier evaluation and selection framework - adapted from Wu and Barnes [11]

Stage	New purchasing task	Modified purchasing task	Straight re-buy routine products	Straight re-buy strategic products
Supplier selection preparation	- Make-or-buy decision; - One-off decision; - Varying importance	- Decision on the number of suppliers to be used; - Moderate importance; - Repeating decision	- Replacing the current supplier; - Low importance; - Repeating decision;	- Decision on work changes with current supplier; - High importance; - Repeating decision
Criteria formulation	- No previously defined criteria; - Lack of historical data for suppliers performance	- Historical data available; - Previously used criteria available	- Historical data available; - Previously used criteria available.	- Historical data available but choice is limited; - Previously used criteria available
Pre-classification	- Large pool of suppliers; - Sorting rather than ranking	- Large pool of suppliers; - Sorting and ranking	- Large pool of suppliers; - Sorting rather than ranking	- Very small supplier pool; - Sorting rather than ranking
Final selection	- Smaller pool of suppliers;	- Small pool of suppliers;	- Small pool of suppliers;	- Very small supplier pool;

	- Ranking rather than sorting; - Multiple criteria; - No historical records; - Model used once	- Ranking rather than sorting; - Fewer criteria; - Lot sizing decisions; - Repeating use of model	- Ranking rather than sorting; - Fewer criteria; - All quantities are allocated to a single supplier	- Evaluation rather than selection; - Sole souring
Application feedback	- Change of customer demands; - Decisions about model changes.	- Changes in supplier structure and quantities allocation	- Short or long term contracts; - Performance evaluation	- Improvements in the work with the current supplier

The three consecutive frameworks presented above and related to the overall supply chain, the procurement process and the evaluation of suppliers define the main tasks that need to be solved in the process of vendor selection. Decisions need to be taken separately at each level and no single approach or technique can be appropriate for each of the activities involved.

2.2 Approaches and techniques used for supplier evaluation and selection

A large number of general multi-criteria decision-making approaches has been adapted and used for supplier evaluation and selection, ranging from qualitative methods to complex operations research techniques. These techniques need to be analysed and allocated to each of the supplier selection framework stages in order to reach a conclusion about the appropriate combination of methods to be used in the vendor evaluation process.

Supplier selection preparation

Qualitative methods are predominantly used in the preparatory phase of supplier evaluation and selection. They aim to define the precise needs and requirements towards a potential supplier. As stated in Aissaoui et al, this might not be an easy decision [6]. Due to the shortened life cycles, continuous search for new suppliers is a priority for some companies, aiming to diversify their product range. In other purchasing environments, the establishment of long-term relationships with the supplier might be first priority requirement. Despite the importance of this stage of the supplier selection framework, research is very limited despite the fact that different purchasing situations require different decisions. No specific techniques can be identified and operations research methods are not applicable.

Criteria formulation

As a contrast to supplier selection preparation, the criteria formulation stage is well studied and research initiatives date back to the 1960s. The classic research works of Dickson [13] and Weber et al [14] are based on empirical investigation among purchasing managers and identify a number of criteria such as quality, delivery, performance history, warranties, production facilities and capacity, etc., each described by their relative importance. Contemporary procurement research also indicates that the categories of cost, quality, delivery, flexibility and customer service, each corresponding directly to manufacturing performance, continue to dominate at this stage of supplier selection.

Empirical qualitative methods are complemented by both theoretical and experimental methods, described in procurement research, but the selection of best criteria for a certain type of situation is often neglected. Expert's judgement is widely used as opposed to more precise and objective techniques. As noted in Wu and Barnes [11], there are certain models for generalisation of criteria, followed by specific modifications dependant on the type of

industry. Huang and Keskar [15] present a quantitative integration mechanism in terms of a set of comprehensive and configurable metrics arranged hierarchically that takes into account product type, supplier type, and OEM/supplier integration level. Based on the firm's business strategy, the management configures an appropriate set of metrics used to measure supplier performance.

Several important conclusions can be made for the techniques used at this level of procurement decision making. Supplier selection criteria, used currently by purchasing organisations, are largely identical to the ones identified in classical research works but their relative importance is changing among different purchasing situations and industries. A typical selection model would include both qualitative and quantitative criteria, often conflicting in nature, while their perceived importance would largely be a product of subjective human judgement. In addition, new procurement tasks and repetitive tasks cannot make use of the same evaluation criteria. New assignments are based mostly on offers and/or product/service specifications while repetitive tasks can rely on additional data related to supplier characteristics and performance. The inclusion of broad range of criteria secures long-term relationships as factors such as design and technological capabilities can be introduced. However, the introduction of additional criteria makes selection decisions complex and problematic. Consequently, this stage of the procurement process requires clear differentiation of criteria to be used dependent on the type of industry and purchasing situation. The standard classification of business processes identified in the SCOR model and the respective metrics of reliability, responsiveness, flexibility, costs and assets can be successfully used to group evaluation and selection criteria in order to achieve certain standardisation of the process. Configurable sets of criteria can be established along these major groups of metrics to be used in different combinations of sourced products and purchasing situations.

Pre-qualification of suppliers

The purpose of this stage is to rule out inefficient candidates, thus reducing the supplier pool to a manageable number of potential partners. Pre-qualification represents a process of sorting rather than ranking. One exception is the purchasing of strategic products or services as the supplier pool is extremely limited and pre-qualification might not be necessary.

In vast majority of the cases, pre-qualification of suppliers relies on operations research and statistical methods, such as data envelopment analysis, cluster analysis and artificial intelligence models [16]. These methods can also be used at the final selection stage, but their sorting nature makes them more suitable for pre-qualification.

Data envelopment analysis (DEA) is a non-parametric mathematical programming technique built around the idea of frontier analysis. It assesses the relative efficiency of decision making unites by calculating a ratio of weighted sum of outputs and inputs. As the model computes the most favourable set of weights for each supplier without making other suppliers' efficiency greater than one, DEA is able to overcome the subjective judgements for relative importance of criteria. Another major advantage of the technique is that DEA does not require a priori knowledge of the functional dependency between inputs and outputs. In addition, some modifications such as introduction of assurance regions, super-efficiencies, variable or constant return of scale allow for significant flexibility in the process of pre-qualification. Assurance regions of multipliers [17] allow the incorporation of human judgement, thus allowing the introduction of specific requirements of the purchasing organisation. Super efficiency iterations can further differentiate among weekly and strongly efficient suppliers, thus producing two distinctive groups of efficient and inefficient suppliers. As a non-parametric method, DEA is able to include both qualitative and quantitative evaluation criteria. Still, qualitative criteria depend on human judgement for their inclusion in the model. One of the main disadvantages of DEA is the difficult differentiation between

inputs and outputs as multiple research works define the same performance attributes as both inputs and outputs.

Cluster analysis (CA) is a statistical approach, which uses an algorithm to classify suppliers into a number of clusters in such a way that the differences between items within a single cluster a minimal and differences between items from different clusters are significant. CA reduces the probability of rejecting a 'good' supplier too early in the process via subjective reduction of the often-large original set [6]. In CA, suppliers and decision criteria represent objects to be clustered and characteristics to examine to find similarities between objects respectively [18]. A major drawback of CA is its computational difficulty and the possibility to solve the problem with different clustering algorithms which can lead to a different number of clusters while, in fact there are no significant differences between them.

Case base reasoning (CBR) is a part of artificial intelligence methods. As a general rule, they are based on computer-aided systems, which can be "trained" either by experts or by means of processing historical data. Subsequently, any person from the purchasing organisation - even without expert knowledge - can consult the system in similar but new decision situation. Similar to all artificial intelligence models, CBR represents a database that provides a decision maker relevant information from similar, previous decision situations and cases. CBR systems are very new and very complex and their efficiency drops with the increase in the number of cases [11].

Apart from the three major quantitative methods used in pre-qualification, qualitative (categorical) methods are also applied at this stage of supplier selection. These techniques rely entirely on buyers' experience and their subjective judgement, aiming to qualify potential partners in three major groups – "good", "neutral" and "unsatisfactory".

Final supplier selection

Most of the existing research concentrates on the final supplier selection stage. Models can be distinguished according to whether they are for single or multiple products' procurement situations. Operations research methods dominate this stage of partner selection. Linear weighting models, mathematical programming models, analytical hierarchy/network process models and fuzzy set models are among the most often used techniques [11].

Linear weighting models provide weights to criteria where the biggest weight indicates higher importance. Ratings are then multiplied by their weights and summed to obtain a single evaluation score. Lots of modifications have been introduced, including exclusion of compensatory models (where a high rating on one criterion can compensate a low rating on another) and introducing techniques for inclusion of uncertainty and imprecision. Simplicity of implementation is the main advantage of linear weighting models but despite the numerous adaptations, they are unable to completely overcome subjective assignment of both weights and suppliers' scores. Any attempt to include objective assigning of weights and scores makes models too complicated for practical use.

Mathematical programming (MP) techniques applied to the problem of supplier selection include goal programming, multi-objective programming and integer programming. They aim to formulate the decision problem as a mathematical objective function, which needs to be maximised or minimised. The main advantage of mathematical programming models is their ability to handle multiple products simultaneously, thus implementing lot sizing and quantity allocation within the supplier selection phase. In addition, they can be easily combined with various techniques used at previous stages, using their results as inputs. Mathematical programming models are more objective but as opposed to DEA, they require explicit knowledge of the objective function and the dependencies between inputs and outputs. In addition, it is very uncommon for MP techniques to include other than quantitative criteria in supplier selection problems.

Analytic hierarchy process (AHP) techniques provide a hierarchical structure to model the supplier selection phase. The hierarchy shows the relationships between goals, criteria and alternatives. These models allow the incorporation of uncertainty, experience and even intuition in a logical structure in order to calculate criteria weights as opposed to directly assigning them. However, AHP models are compensatory in their nature as the alternatives (suppliers) receiving low scores on a certain criterion can compensate with high score on another. As a difference to mathematical programming models, AHP can easily accommodate qualitative data, but assume uni-directional hierarchical factor structure, which is not always realistic. A further development of this technique, the analytic network process (ANP) allows for the inclusion of additional complexity and interrelationships between hierarchical levels and criteria. Additionally, ANP overcomes the problem of rank reversal, which is a common characteristic of AHP. As noted by Sarkis et al [19] final solutions of ANP may not be clearly defined without the introduction of secondary criteria.

Fuzzy set theory (FST) models can also be applied to the supplier selection problem since they allow simultaneous treatment of precise and imprecise variables. FST can also model human judgement and incorporate multi-criteria information thus making it suitable for situations characterised with uncertainty. FST models can be successfully combined with other operations research models to overcome inconsistencies in human judgement.

3. Conclusions and directions for future research

Some important conclusions can be made both in terms of the different evaluation and selection stages and in terms of the overall evaluation and selection process.

(1) Subjective decision-making is dominant at the criteria formulation stage. In most practical and research cases, importance of criteria is subjectively indicated based on existing experts' knowledge and experience. Such an approach used at the start of the evaluation process influences negatively the final selection decision.

(2) Practically, no attempts have been made for the identification of configurable sets of criteria in accordance with a specific purchasing situation or types of products to be procured. Each procurement situation has been handled as an individual purchasing assignment.

(3) The pre-qualification stage needs to be completely objective in order to avoid rejections of potentially suitable suppliers. All methods currently used have substantial drawbacks: intuitive determination of evaluation scores, inability for formation of exactly two groups of efficient and inefficient suppliers, assumptions for exact repetitions of historical events, etc.

(4) The final supplier selection stage has used multiple approaches but some of them have major problems: subjectivity in assigning evaluation scores, necessity for preliminary determination of objective functions, substantial calculation efforts.

(5) Almost all research efforts are concentrated on solving the problems of a single stage in the supplier evaluation and selection framework. Integrated models are rare and most of them suffer from the weaknesses in the various stages identified above.

(6) The large number of techniques used for supplier evaluation and selection indicates that none of them can be used individually for all the stages of the process. However, a suitable combination can be applied to overcome the identified weaknesses.

The "ideal" solution for evaluation and selection needs to satisfy the following requirements:

- Successful integration of large number of qualitative and quantitative criteria due to the multi-criteria nature of the decisions;

- Creation of opportunities for criteria configurability in accordance with the type of the sourced product and the purchasing situation;

- Avoiding subjective evaluations at least in the pre-qualification stage in order to evade the exclusion of potentially suitable supply chain partners. If intuitive scoring cannot be entirely prevented, evaluation scores need to be presented within broader intervals to account for possible risks and errors;
- Providing clear understanding of the operation of the model and easy adaptation to existing in-company software applications.

Future research efforts need to be directed towards the identification of appropriate combination of techniques and their integration into a common evaluation model.

References

1 Global Supply Chain Management Forum. gsb.stanford.edu/scforum. Accessed: December 2010.
2 European Logistics Association. What matters to top management? A survey on the influence of supply chain management on strategy and finance. Brussels. 2002
3 Supply Chain Operations Reference Model (SCOR), Version 7.0. Supply Chain Council. 2005
4 Taylor GD. Logistics engineering handbook. Boca Raton: CRC Press; 2008.
5 Waters CDJ. Logistics an introduction to supply chain management: Palgrave Macmillan; 2003.
6 Aissaoui N, Haouari M, Hassini E. Supplier selection and order lot sizing modelling: A review. Computers and Operations Research. 2007;34(12):3516-40.
7 Monczka RM. Purchasing and supply chain management. Mason, Ohio: South-Western; 2011.
8 Ellram LM, Carr A. Strategic purchasing: A history and review of the literature. International Journal of Purchasing and Materials Management. 1994;30(2):10.
9 De Boer L, Labro E, Morlacchi P. A review of methods supporting supplier selection. European Journal of Purchasing and Supply Management. 2001;7(2):75-89.
10 Luo X, Wu C, Rosenberg D, Barnes D. Supplier selection in agile supply chains: An information-processing model and an illustration. Journal of Purchasing and Supply Management. 2009;15(4):249-62.
11 Wu C, Barnes D. A literature review of decision-making models and approaches for partner selection in agile supply chains. Journal of Purchasing and Supply Management. 2011;17(4):256-74.
12 Kraljic P. Purchasing must become supply chain management. Harvard Business Review. 1983;61(5):109-17.
13 Dickson GW. An analysis of vendor selection systems and decisions. Journal of Purchasing. 1966;2(1):5-17.
14 Weber CA, Current JR, Benton WC. Vendor selection criteria and methods. European Journal of Operational Research. 1991;50(1):2-18.
15 Huang SH, Keskar, H. Comprehensive and configurable metrics for supplier selection. International Journal of Production Economics. 2007;105(2007):510-23.
16 Ho W, Xu X, Dey PK. Multi-criteria decision making approaches for supplier evaluation and selection: A literature review. European Journal of Operational Research. 2010;202(1):16-24.
17 Thompson RG, Langemeier LN, Lee CT, Lee E, Thrall RM. The role of multiplier bounds in efficiency analysis with application to Kansas farming. Journal of Econometrics. 1990;46(1-2):93-108.
18 Bottani E, Rizzi A. An adapted multi-criteria approach to suppliers and products selection—An application oriented to lead-time reduction. International Journal of Production Economics. 2008;111(2):763-81.
19 Sarkis J, Talluri S, Gunasekaran A. A strategic model for agile virtual enterprise partner selection. International Journal of Operations and Production Management. 2007;27(11):1213-34.

COOPERATIVES VERSUS GLOBAL CAPITALIST OBJECTIVES

Abdullah Ökcesiz[1] , Deniz Ökcesiz[2]

[1]*Karadeniz Technical University, Trabzon, Turkey, okcesiz@gmail.com*

[2]*Karadeniz Technical University, Trabzon, Turkey, denizokcesiz@yahoo.com*

Abstract:
After long and hot discussions concerning future issues of the world, it was foreseen by many prominent industrialists, distinguished futurologists and writers that a majority of workforce will not be lucky enough to find occupations ,as 1/3 of the active population will be enough to keep the economy going in the coming century.It seems that even this prediction, which has been scaring Europeans since 1980s, does not reflect future division of welfare among social classes.In fact, the ratio of working class(people who will have their share from gross national product)will constitute even less than 1/3 of the whole population.To be more precise, they will be about 1/5, or according to the up-dated predictions of those futurologists.

Future remodeling of the world points out a 20/80(20% working 80% unemployed) formula.Are all these assumptions over-exaggerations in a society where outsiders are consoled with "tittytainments"?Considering this scenario,cooperatives gain more importance as a means of socio-economical politics.For the remaining 2/3 of the society, cooperation seems to be the best economical tool.Even if not preferred, cooperatives seem to be the most ideal and essential system for social and economical peace.

On the other hand, what can be done through cooperatives in spite of those predictions or intentions of global capitalism?In our essay, we are putting forward our arguments discussing the potential contribution of cooperatives to the solution of contemporary issues of the world, explaining the social and economical effects expected from cooperative activity aiming to point out and emphasise the importance and the role of cooperation in the process of global financial crisis once more.

Keywords:Cooperatives, Global Capitalism,Privatization,Social and Economical Results,The Society

1.Introduction

It is acknowledged that global capitalist system is merely functional in respect of structure, and its function is economic in a way that includes the production, consumption and exchange of goods and services.Just as Marx and Engels pointed out 150 years ago, capitalist system commoditizes capital,labor and land.As the system expands, its economic function begins to dominate people's and society's lives penetrating into areas such as culture , politics and jobs , which were not once regarded directly related to economy.[1]

Being an abstract concept does not make global capitalist system less important.This system rules our lives in the same way as any regime rules people's lives.[2]

2.Globalization and Cooperation

When finance had been democratized, the world was no longer a place where countries' national dept was controlled by a handful of bankers.First, several countries controlled national depts of several countries.Then, some wealthy individuals and bankers gained control over that money. Finally, today, we live in a world where national depts of many countries are controlled by many individuals through pension or mutual funds.This proves that local usury has become global as well.

In the 19th and at the beginning of the 20th centuries, industrial revolution and global financial capitalism were storming through Europe and America.Some people turned up claiming to be capable of saving the free market from this perverting and brutalizing drift and creating a world never dependent on those reckless bourgeois capitalists.Those revolutionary thinkers were Marx, Lenin and Mussolini - among some others, of course.

Socialism, communism and facism, the regimes they were suggesting were tried from 1917 until 1989, and, thus, helped the first globalisation age to end.There was one thing to say about these regimes:They did not work.[3]

When it comes to ask which system is more effective in improving life standards, the answer is free market capitalism.Other systems may be distributing income more fairly and efficiently, but none of them is as efficient as free market capitalism in creating the income to be distributed.[4]

Starting out with this very persuasive thought and mentality and going through periods of capitalism and liberalism we have arrived at the period of turbo capitalism today on the pretext of globalisation.

You do not need to be a Muslim or Jewish fundamentalist in order to react to this globalisation system which causes you to feel alienated from your own home.This is a universal phenomenon.Especially with its economical aspect, it is like cancer spreading all tissues, organs and the brain of the body- the world.[5]

In the 17th century, German philosopher Immanuel Kant put forward the idea of "United States of Europe", which was supposed to establish permanent peace in the continent.With globalization, the idea of a European Federation developed during the wars fought and agreements made among nation-states of Europe. Thus, we can partly observe the organization of the global capital as a political, social and economical alliance in the European Union.Initially, the name was European Economic Community.Karl Popper called this "step by step social engineering".[6]

While social engineering was carrying on its activities in favour of capitalism,as a reaction to this, socialists, communists, fascists, and partially capitalists suggested some systems and instruments so that people with low income , such as workers, villagers, retailers,manufacturers would not be harmed and their rights and benefits would be protected.One of them is cooperation against global targets of global capital.

With the influence of 1789 French revolution Stein-Hardenberg reforms were made in Germany in 1808 preparing the intellectual ground for abolishing feudalism.The 1808 reforms saved people working in agricultural sector from feudalism ; thus, serfs became villagers.However, those villagers were out on the end of a limp because a new system was not substituted for the old one.[7]

According to their intellectual origins the chief forerunners of cooperation come from those three groups:Liberals, social Christianity members and socialists.[8] Social Christians wanted to associate Christianity with socialism.They argued that there was no other alternative than trying cooperation ,which has a place in Christianity as well, to amend the society and economy.According to social Christians people who do not have socialistic ideas cannot be Christians.[9]

As universally known, Marx, one of the founders of modern socialism, was an opponent of cooperation by any means.[10] Because the socialist society put forward by himself can be formed by proletariat, not by cooperatives .[11]

The funny part is that when we look at the profiles of the people who struggled against injustice and slavery, we see that most of them come from rich and noble families.
Prophet Mohammad belonged to a wealthy and noble family. A small group of aristocrats around La Fayatte realised French Revolution.A French socialist Saint Simeon was a rich aristocrat; Robert Owen was a wealthy industrialist; Engels was the son of a very rich manufacturer. [12]

Some anarchists like Kropoktin, some imaginative socialists such as Owen and Fourier, representatives of scientific socialism school like Marx and Engel supported the idea of earning as much as needed as their ultimate goal. [13] The basis of this controversial idea is involved in Islamic doctrine as well. Famous practise of giving alms, which can be explained as giving away the surplus to poor people, thus sharing your wealth with the ones in need is the principle.

In socialistic period everyone should consume as much as he works while in communism everyone consumes as much as he needs. People produce and consume for themselves in capitalism but in cooperatives people produce and consume for each other.

3.Global Targets and Cooperatives

Arising from societies' genuine feeling of collaboration and encouraging them to prepare for difficulties of financial life in unity and solidarity, traditional forms of cooperation are encountered in every society, region and continent with its various patterns troughout human history.[14] This shows that although all levels of society had culturally internalised values of sharing and living together without excluding each other they appear to have given up those values with competition and an insatiable desire for wealth while entering the 21st century.

It is clear that people cannot be rich and powerful through cooperative system.Knowing this perfectly, global capitalism is trying to create a consumer society and design societies accordingly as their ultimate target. However, cooperatives have been an ideal doctrine for the ones who aspire to social justice , welfare and wealth.

Especially in the last few decades we have been witnessing a phenomenon of fewer number of multinational companies gaining control over the economic sources and markets in the

world.It had been expected that 4/5 of world's markets would be controlled by 200 multinational companies towards the end of the 20th century.[15] After discussing issues related to future, several prominent study groups, writers and businessmen assume that 20 % of world's workforce will be enough to keep the world's economy going in the 21st century."We don't need any more workpower," they think.

Considering the population growth rates of countries, luxury loving and lazing peoples of the world and their avarice [16] the world modal of this age is 20 to 80 formula even if we allow for cooperatives in economic systems.What will happen to the rest against these intentions and predictions of global capitalists? We can only keep them in the system as share-holders of cooperatives.

"You win while producing and I win while consuming."

This way, the suggestion of sharing the financial areas for the benefit of each other can ensure all economic systems to carry out peacable activities. Joining forces with capitalism in the production area, with cooperatives in the consumption area and the idea of carrying out the activities and organising according to this may seem to be difficult , yet, it will be associated with opening economic assets to the service of everyone and sharing them for the benefit of each other. For fair sharing and distribution of property among masses, cooperation can easily be used as a convenient means, method or system in every respect.

4.Conclusion

Wherever there is a resentment it is easier and more effective to reconcile them with the current economic system through cooperatives.It can be easily integrated into the current system and possible disadvantages can be eliminated or it is seen as an acceptable solution by everyone.This indicates the suspension role of cooperatives between opposite poles and a consumer cooperative belonging to the workers in a workplace can easily play the same role.It is also emphasized that cooperation,the common language of socio-economic peace, is essential to build up a better world.[17]

Democratic Capitalism, supposedly, provides numerous benefits such as an equal, happy, healthy society where you can have everything you want for a price. It claims to be contributing to the society by providing an exponential growth rate, social good , freedom and equivalence in addition to being built on democracy, being the best, working perfectly well with human nature(in fact, human greed) and offering people viable alternatives.[18] However, it is doing everything for its own advantage in the long run.

Yet, looking at the process and the result , we can see that capitalism has been globalised and, thus, become turbo-capitalism.Moreover,it has become unhealthy and obese while individuals and small and medium-size structures have become feeble.

Global capitalism lost its initial innocence in the course of time; and by establishing its own oligarchy, it is continuing on the way of becoming a monarchic system.Global feudalism is being established.Privatization is helping this process.If capitalism wants to remain sustainable it has to give cooperatives a place in its own system.Moreover, by placing some of the eggs in the basket of cooperatives, global capital can regain its former attraction on its journey to reach global targets, I think.

References

1 Soros, G. *Küresel Kapitalizm Krizde* (Çev.Gülden Şen) . İstanbul: Sabah Kitapları,1999 :p.97
2 Ibid.p.97
3 Friedman, T.. *Lexus ve Zeytin Ağacı Küreselleşmeni Geleceği* (Elif Özsayar) . İstanbul: Boyner Holding Yayınları,1999: p.124
4 Ibid.p.124
5 Friedman, pp.124-352
6 Soros, p.97
7 Turan, K.. *Kooperatifçiliğin Sosyo-Politik Yapısı* . Ankara: Özkan Matbaacılık Ltd.Şti.,1994: p.121
8 Kessler, G.. *Kooperatifçilik* (Çev.Z.Fahri Fındıkoğlu) . İstanbul : İ.Ü.Yayınlarından no.120, 1940: pp.27-66
9 Turan, pp.109-121
10 Kessler,pp.27-66
11 Ökcesiz, A.. *Üçüncü Sektör(Kooperatifler ve Kooperatifçilik)* . Trabzon: İnkilap Kitabevi,1999: p.140
12 Turan,p.12
13 Ibid.p.29
14 Turan,pp.63-64-121
15 Güven, S.. *Ekonomik Demokrasi ve Servetin Geniş Kitlelere Yayılmasında Kooperatifçilik Politikası* . Bursa: Ezgi Kitapevi Yayınları,1997: p.62
16 Martin, H.-P. ve Schumann, H.. *Globalleşme Tuzağı Demokrasiye ve Refaha Saldırı* (Çev.Özden S.Karadana ve Mahmure Kahraman) .Ankara: Ümit Yayıncılık,1997: pp.34-159
17 The International Summit of Cooperatives . *The Amazing Power of Cooperatives*,2012: from http://www.2012intlsummit.coop/site/home?template=newsDetail&newsID=7089
18 Nunno ,Jed & Rachael . *Top 10 Greatest Benefits of Capitalism* People & Politics ,Comments, Friday December 24, 2010: from http://listverse.com/2010/12/24/top-10-greatest-benefits-of-capitalism/

SELECTION AND EVALUATION OF FACTORS INFLUENCING THE INNOVATION ACTIVENESS OF SMALL AND MEDIUM-SIZED ENTERPRISES

Svilen Kunev[1], Diana Antonova[2]

[1]University of Ruse 'Angel Kanchev', 8 Studentska str., Ruse, Bulgaria, snkunev@uni-ruse.bg

[2]University of Ruse 'Angel Kanchev', 8 Studentska str., Ruse, Bulgaria, dantonova@uni-ruse.bg

Through conducting critical analysis of the interrelationship between the innovation activeness process (IA) and the localization process for SMEs, the present research creates a system of methodological requirements for evaluating the factors influencing the competitiveness of industrial enterprises and offers consistent administration of a complex of strategic solutions in sectoral and regional aspects.

Keywords
Innovation activeness, machine-building SMEs.

1. Introduction

The goal of the research conducted is to determine at sectoral and regional levels the influence of some factors on the innovative activeness [1], [2], [3], [4], [5], [6] of a group of SMEs and to offer a system of methodological requirements for their choice and evaluation of the processing industrial enterprises through consistent application of a set of strategic solutions for improving their competitiveness.

The research objectives are as follows:

1. To formulate methodological requirements for the choice and evaluation of factors, influencing the innovative activeness of SMEs.

2. To prepare a conceptual model for factor influence on the innovative activeness of SMEs and methodology for its use by processing industrial enterprises through consistent application of a system of strategic solutions for improving their competitiveness.

3. To apply experimentally in real conditions over a specific sector of the processing industry the methodological concept created for factors influencing the innovative activeness of industrial SMEs.

2. Methods

The methodological foundation includes a system for evaluating the influence of an identified set of factors influencing the competitiveness of a group of SMEs at sectoral and regional levels [7]. It is directed to defining the main steps and interrelations of the results obtained from an empirical study conducted through 207 unique interviews of business subjects from the Machine-building sector, operating in the Region of Ruse (level NUTS 3), concerning the

state of localization factors in the region and their degree of influence on the company activities of the companies under study [8], [9], [10], [11], [12].

The stages and the relations between the results within the frames of the concept suggested are systematized in Fig. 1.

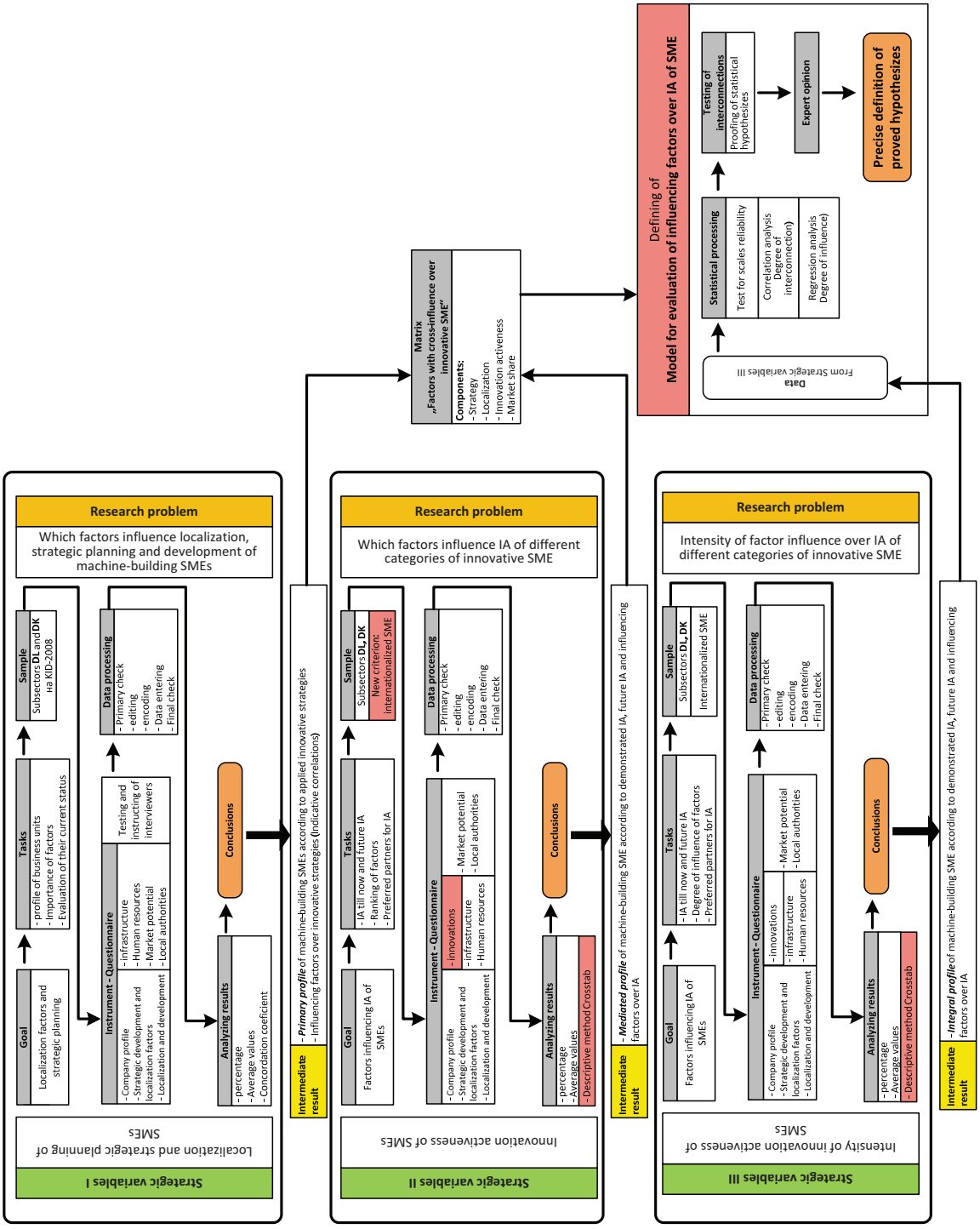


Fig. 1. Methods for researching the factor influence
(After the example of machine-building SMEs in Ruse Region)

3. Conceptual model for evaluating factors influencing IA

It presents the logical frame of the solution proposed for *evaluating* factors influencing the innovative activeness of the SMEs under survey in the following parameters:

3.1. Steps of the solution

- Defining the innovation activeness in its role as an independent variable;
- Formulating research hypotheses;
- Analysing the strength and direction of influencing factors through correlation analysis;
- Measuring the degree of independence of the dependent variable on the changes in independent variables with the aid of regression analysis, thus proving dependence;
- Checking the significance of the hypothesis describing the dependence, conclusions;
- Conducting control study through expert evaluations to compare the adequacy of the hypotheses proved statistically;
- Precise formulations of the hypotheses proved.

3.2. Approbation of the model

- *Depending variable*: The innovation activeness is determined by the innovation solutions applied till that moment and about the frequency of future application of the different types of innovations;
- *Independent variables*: All possible influencing factors from all thematic areas of the questionnaire prepared in advance for the purpose of the survey.

4. Formulating research hypotheses

Based on preliminary statistical analysis the following research hypotheses have been formulated:

□*1: Innovation activeness (IA) is directly dependable on the period when the enterprise was established, its capital structure and the reasons for starting business activity; the presence and application of strategic planning documentation in the enterprise.*

□*2: IA is in direct correlation with: the growth of economic entities; positive attitudes to developing those entities in the region where they operate; experience in transitional innovation projects; interaction between the different types of innovative solutions; the opportunity for common projects with business entities from another branch or a competitor; strengthening the importance of insufficient provision of production and technical staff.*

□*3: IA is strongly influenced by: access to qualified human resources; appropriate locations for settling; developed transport system; auxiliary programmes; development of market environment and increasing the business consumers.*

□*4: IA is weakly influenced by: the state of production, transport and social infrastructure; the evaluation of the activities of local authorities.*

The logical connection of the research hypotheses with the subject of research (innovation activeness) is shown on Fig. 2.

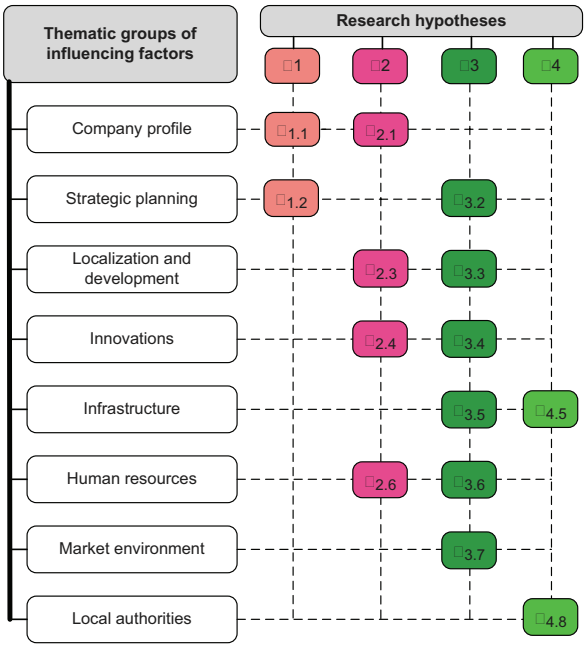


Fig. 2. Research hypotheses „Innovation activity – influencing factors“

5. Methods for approbation of the concept for innovation activeness of SMEs

Subject of empirical research

The factors influencing the activities of the innovative SMEs are the subject of research [13], [14], [15], [16], [17], [18]. The analysis is directed towards: determining the most significant influencing factors on one hand, and identifying the evaluation of the operators for the current factors and conditions.

Object of empirical research

The research is directed to businesses from the machine-building sector in the region of Ruse, since for the period (2000-2006) almost 90% of the foreign investments in the region have been in the manufacturing industry and the machine-building sector is part of it. According to the Classificator of business activities in Bulgaria, the enterprises selected for research operate in Sector Manufacturing with sub-sectors „DL – Manufacturing of electric, optical and other equipment” and „DK – Manufacturing of machines and equipment outside those classified in sub-sector DL”.

Official statistical data for 2008 confirm the significance of the administrative region selected, since it attracts 42,5% of all FDI in North Central Planning region. The sector and the comprising sub-sectors traditionally generate tangible revenue share from sales in the area and occupy key position concerning the number of employed people and the volume of production.

According to the method described in item 2, three types of profiles have been defined, which are illustrated in fig. 3.

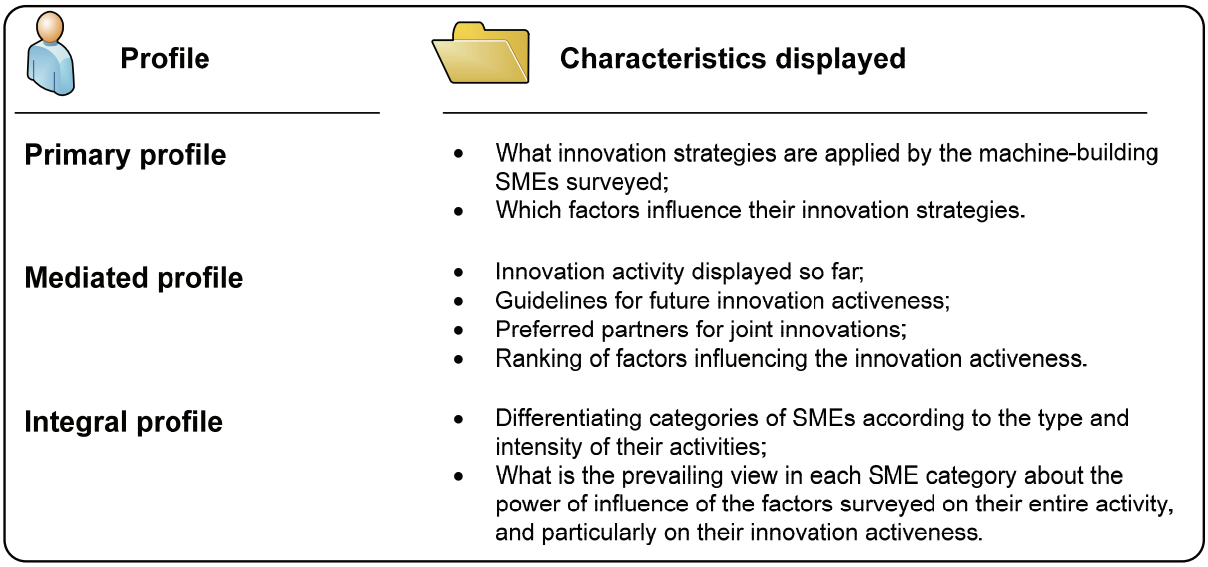


Fig. 3. Profiles resulting from the three stage empirical research

Results from the Strategic variable I:

The primary profile of enterprises differentiates them according to the fields and the innovation activities they demonstrate into four groups of organisations: „product innovators", „organisational innovators", „marketing innovators A" and „marketing innovators B". Concerning the *relation between the innovation strategies demonstrated and the company profile* of the subjects the following claim can be made:

- Product innovators are relatively strongly influenced by the choice of legal type, year of establishment of the company, location and number of partners when forming and applying strategies for a new product;
- Organisational innovators are partially influenced by the number of partners, the number of staff and the choice of location;
- Marketing innovators from group A are influenced in a relative aspect by the location where they operate, the interlocal placement and the legal type;
- Marketing innovators from group B are relatively influenced by the year of establishment, the legal type and the number of partners.

Concerning the *relation between the innovation strategies and the influencing factors from the environment*, in which the organization operates, the following conclusions can be drawn:

- With product innovators there is a positive dependence on the factors „availability of raw materials and other materials", „access to plots and buildings" and „developed infrastructure in the region". The factors that have negative influence are „qualified labour force", „market potential", „local tax system" and „access to expert help";
- With the organizational innovators the factors that have a relatively bigger influence are: „availability of qualified labour force", „developed infrastructure", „access to plots and buildings" and„availability of raw materials and other materials". „Local tax system" and „possibility of using expert services" also have positive correlation although it is not so high.
- With marketing innovators from group A, the only factors that influence positively the change of innovation activeness are: „access to plots and buildings" and „level of the local tax system". The other factors surveyed have a negative sign of interaction with relatively higher correlation coefficients of „influence of developed infrastructure" and „access to expert help".
- The innovation activeness of market innovators from group B correlates mostly with the changes in the infrastructure state; with the changes of the market potential of the region; the access to raw materials and other materials; the possibility of using expert help. The level of the local tax systems has a weaker influence while the availability of qualified labour force and the access to appropriate plots and buildings has a negative influence.

Results from the Strategic variable II:

The mediated profile of the enterprises is built by analyzing the four main types of businesses according to the strategies they apply and according to their answers on whether they have performed any innovations so far, what is their intended field of innovation, which is their preferred partner in implementing innovation projects and which factors they consider when making decisions for innovation. The main features of the mediated profile and its categories show that:

- All four groups of businesses declare that they have had experience in implementing innovation projects so far and the positive answers prevail (over 70%). The highest value under this index is for marketing innovators type B (85,7%), followed by organisational innovators (81,8%), marketing innovators (75%) and product innovators (72,7%);
- Most preferred for future innovation are product innovations, with expected highest percentage of approval for product innovators (81,2%), followed by marketing innovators B (71,4%). The next preferred innovations are the technological ones, which have the highest index for the product innovators (63,4%). They are followed by process innovations with equal approval for product and marketing innovators B (45,5%). ServIces are mostly preferred only with marketing innovators B (57,1%), with the remaining profiles they come last;
- Suppliers, customers, international companies or consultancies are among the most preferred partners for joint innovations. Product innovators and marketing innovators A would first choose a supplier or international company (45%), and later they may turn for cooperation to a client (40-45,5%) or consultant (30-45,5%). With organisational and marketing B innovators the consultant is the most preferred (42,9-45,5%), followed by an international company (35,7-45,5%) and supplier (36,4-35,7%). The least preferred of all groups SMEs for partners are the local authorities, competitors and financing organisations;
- The preferences of the consumers are ranked as the most significant factor unanimously by the four categories of innovators, with the highest index going to product innovators (90,9%). Next most influential are the human resources in the region, their second place being highest for marketing innovators B (57,1%). With product and organizational innovators the third place is held by intellectual protection (45,5%)and the legal basis (36,4-45,5%). In contrast, marketing A and B innovators put in third position the availability of partner for innovations (35,7%) and the access to supporting programmes (35-42,9%). The smallest significance for all categories of SMEs have the development of local educational system, the availability of clusters and the support of branch organisations.

Results from the Strategic variable III:

The integral profile aims to show not only the factors influencing the innovation activeness of the machine-building businesses under survey, but also to present the power of influence of those factors according to the respondents. The conclusions are as follows:

- When starting a business activity, the practical realization of skills and abilities, together with the guarantee for personal and family security have a strong influence over the largest share of the four categories of SMEs – from 41,7% for the process and service innovators, through 50% - for the technological innovators to 66,7% - for product innovators. The next most influential factor is that of income increase (35,7-44,4%);
- For the strategic planning of businesses the availability of work force with appropriate qualification is extremely important, with the highest share in the service innovators (58,8%). It is followed by the market potential of the region, which is extremely important for the product innovators;
- A large number of innovation factors are extremely important for the greater part of the categories of SMEs. This can be seen for the factors “clients’ interest towards new goods/services”, “favourable national legislature””; intellectual property protection””, and “measures for encouragement of innovations””;
- From the factors of the market environment average to strong impact has the improvement of living standard and the incomes in the region –this index is the highest for the product innovators (44, 4%). Reducing the competitors on the local market has an average influence;
- From the localization factors the availability of qualified work force in the region has strong to very strong impact – most significantly for the service innovators (47,1%) and product innovators (44,4%). Average to strong influence has the proximity to airports, railway stations and ports, as well as the developed transport infrastructure (28,6-41,7%). The small number of competitors and the low cost of work force have average impact.

6. Applied model for selection and evaluation of factors influencing the innovation activity of SMEs[1]

A starting point for surveying relations and dependencies through *correlation analysis* is determining the dependent and independent variables, which are the subject of research in the survey [19], [20], [21], [22], [23], [24], [25], [26], [27]. From the questionnaire designed for empirical research, *the dependent variables,* characterising the manifestations of innovation activity in the businesses surveyed are as follows: *innovation experience available so far; readiness for future complementation of innovation projects by types of innovations* – through technological improvements and innovations, product innovations and service and process innovations.

On Fig. 4 on the next page the whole plan of the model of innovation activity approbated and the impact of the factors that influence it is shown. Only factors with the so called cross-impact have been shown, the relations illustrating only statistically important correlations.

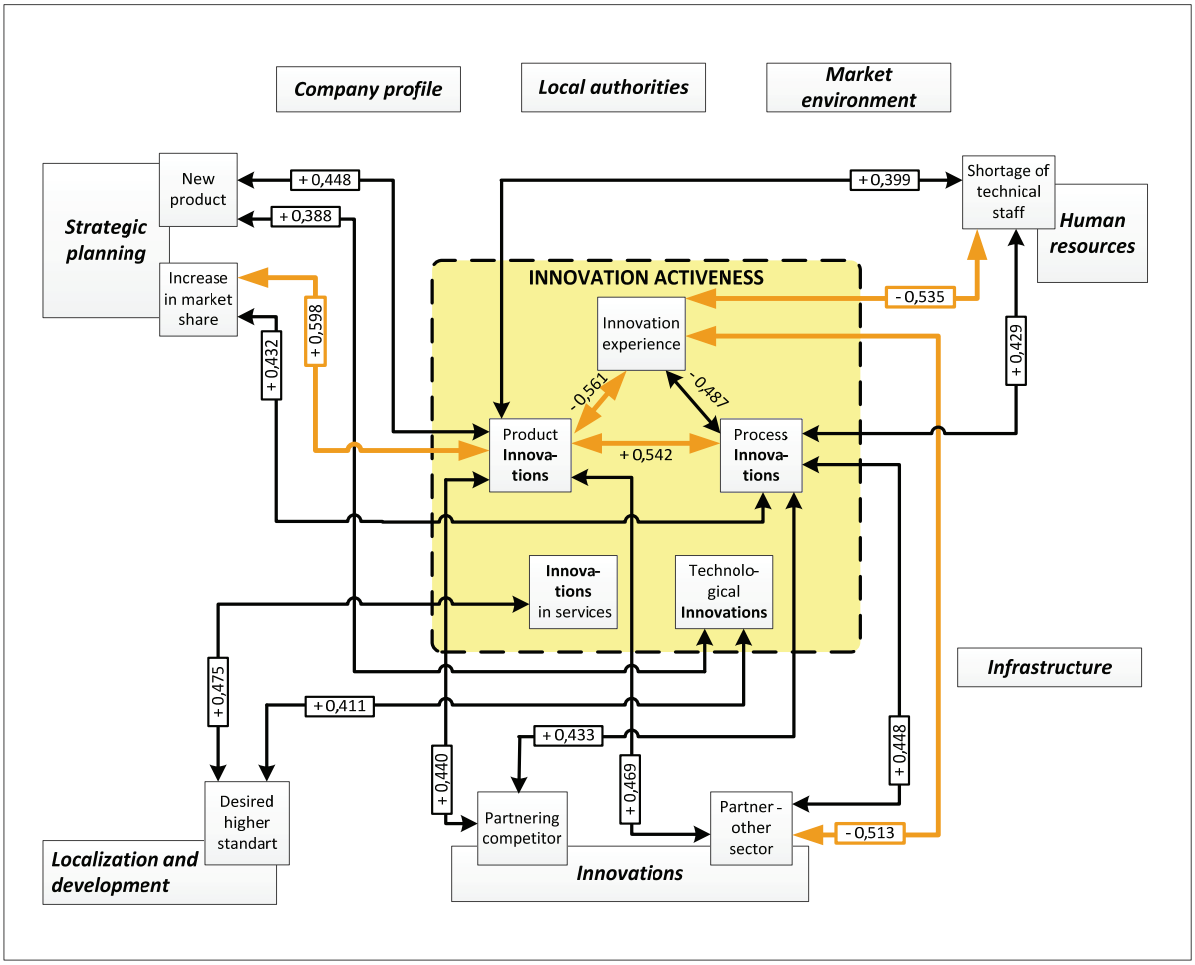


Fig. 4. Approbated model of innovation activity and impact of factors influencing it.

[1]The concept model formulated for research of the factors influencing IA of SMEs is verified on SMEs from the Machine-building sector in Ruse. The statistical data analysis is conducted with SPSS, version 14.0 software, licensed to "Angel Kanchev" University of Ruse.

For all dependent variables, characterizing the innovation activeness of the machine-building SMEs surveyed *regression analysis* has been conducted as well. Summarising the evaluations of the regression models and of the individual influences of the variables included in them, we can make the following conclusions about the depending variables:

58% of the changes in the variable „Innovation experience available" are based on the regression model with: 19,1% due to sales of company products in Bulgaria; 6,3% - due to the combined transport use; 3,5% - due to the readiness for process innovations; 2,5% - due to the availability of partner from another branch for participation in innovation projects; 1,3% - due to lack of technical staff; 0,7% - due to the availability of free plots for locating production lines; 0,5% - due to readiness for product innovations; 0,4% - due to lack of management staff.

52,9 % of the changes in the variable „Readiness for technological innovations" are based on the regression model with: 8,4% due to striving for realization of skills and abilities at the start of a company; 4,2% - due to the proximity to raw materials when choosing a production site; 4,2% - due to the low cost of work force in the region; 3,1% - due to a desire for higher standard of living in the region; 3,0% - due to access to suitable plots and buildings for the activities to be developed; 0,6% - due to developing strategies for new products 0,5% - due to growing in size of the business.

55,5 % of the changes in the variable „Readiness for product innovations" are based on the regression model with: 5,2% due to innovations realized so far; 3,1% - due to a strategy for entering a new market; 3,0% - due to a new product strategy; 2,1% - due to a lack of technical staff; 1,7% - due to a lack of production staff; 1,4% - due to a strategy for expanding market share; 1,0% - due to readiness for realization of process innovations; 0,8% - due to cooperation with a partner from another branch for innovation projects; 0,7% - due to a vision adopted for the development of the production activities.

42,5 % of the changes in the variable „Readiness for service innovations" are based on the regression model with: 7,3% due to the quality of legal procedures of local authorities; 6,5% - due to the number of partners in the capital of the enterprise; 2,6% - due to initiatives and programmes that help the innovations; 2,1% - due to availability of qualified human resources as a factor for innovations; 2,0% - due to the desire for a higher standard of living in the region; 1,9% - due to the increase of sales through corporate clients; 0,4% - due to the availability of qualified human resources as a factor for strategic decision-making.

64,5 % of the changes in the variable „Readiness for process innovations" are based on the regression model with: 12,9% due to the period of existence of the enterprise, 12,5% - due to increase of sales through new shops; 5,3% - due to cooperation for innovations with a partner from another branch 4,7% - due to cooperation for innovations with a competitor; 4,5% - due to a strategy for expanding the current market share; 2,2% - due to readiness for product innovations; 0,1% - due to a lack of technical staff; 0,1% - due to innovations having been completed so far.

7. Expert evaluation

The expertise is carried out through personal interviews of owners and managers of business units from the sector under survey on the territory of Ruse Region in the period November-December 2011. The check list contains all claims, expressing proven significant correlations between the influencing factors and the manifestations of innovation activities. The experts were asked to provide their answers in two fields: level of expert agreement with the statement (dependence); assessment of the strength of the relations between factor and outcome, as a result from the specific claim (Table 1).

Table 1. Results from the survey with expert evaluation

Hypothesis	Confirmed sub-hypotheses	Rejected sub-hypotheses	Unspecified sub-hypotheses
□**1**	□1.1a, □1.1b, □1.1c, □1.2a, □1.2b, □1.2c, □1.2e	□1.2d	
□**2**	□2.1, □2.3□, □2.3b, □2.4d, H2.4e, H2.4f, H2.4g, H2.4h, H2.4j, H2.6a, H2.6b		□2.4a, □2.4b, □2.4c
□**3**	□3.2, □3.3a, H3.3b, H3.3c, H3.3d, H3.4a, H3.4b, H3.6, H3.7a, H3.7b	□3.5	□3.7□
□**4**		□4.5	□4.8

8. Conclusions

The model applied for research on factors influencing IA of SMEs is suitable for use in various industrial sectors.

1. *The innovation activities are* directly related to R&D, but the two categories differ in the degree of innovation of the results, as well as the focus and the range of their purpose. *The innovation activeness (IA) is* a final stage of the innovation activities and can be characterized through the type of innovations realized by the enterprise and their degree of novelty. *The innovation intensity* is an accompanying index, measuring the innovation activeness, taking into consideration the ability of the enterprises to combine several innovations simultaneously, considering predominantly the degree of novelty of the products introduced on the market.

2. A logical model of IA and the influence of impact factors for machine-building SMEs has been developed with the individual manifestations of IA in the enterprises surveyed proved and characterised quantitatively. Those variables, which display a statistically significant correlation connection with at least two of the main types of IA have been identified. The relations between the variables are grouped in two fields**:**

- *Inner circle of innovation activeness* – these are correlation connections between the different types of innovation practices within the frames of the entire IA, namely: available innovation experience, as well as readiness for technological, product, process and service innovations;
- *Field of influence of the impact factors* – these are the variables, which interact with at least two types of innovation activeness simultaneously, or: a strategy for a new product; a strategy for expanding of existing market share; a desire for higher living standard in the region; cooperation with a competitor it his capacity as a partner for innovative solution; cooperation with a partner from another branch for realizing of innovations; lack of technical staff.

3. IA of *technological innovators* depends directly on the realization of skills and abilities as a reason for their creations and on the strategy for a new product; in direct correlation with the size of the enterprise and the desire to operate in a region with higher living standard; strongly influenced by the proximity to raw materials when selecting production site and depends on the low cost of human resources.

4. IA of *product innovators* is directly dependent on a strategy for a new product, for expanding the market share and entering a new market; in direct correlation with innovation experience, process innovations, availability of partner form another branch or a competitor, lack of technical or manufacturing staff; strongly influenced by the policy of development through increasing the capacity.

5. IA of *process innovators* depends directly on a strategy for expanding the market share; in direct correlation with the innovation experience, product innovations, availability of a partner from another branch or a competitor, lack of technical staff; (strongly influenced) by the access to shops on the market.

6. IA of enterprises, *innovating their services* is directly dependent on the number of partners; in direct correlation with the desire to expand activities in a region with higher standard of living. It is strongly influenced by the availability of human resources when preparing strategies and in innovation projects, by the availability of new corporate clients on the market. The influence of the quality of law services, provided by the local authorities is insignificant.

7. For the activities of the local authorities it is important to take into consideration the following established relationships:

- Providing vacant plots for localizing, as well as availability of management and technical staff *influence the experienced innovators.*
- Achieving a higher living standard in the region, facilitating the access to raw materials and availability to human resources with inexpensive labour cost *influence the technological innovators.*
- The availability of staff for manufacturing and technical staff *influences the product innovators.*
- The availability of technical staff and the access to shops on the *market influence the process innovators.*
- Achieving higher standard of living in the region, availability of qualified human resources for implementing innovation projects, developing the local business environment and the level of legal services, provided by the local authorities *influence the innovators in services.*

References

1. Andreeva, M. et al. Study of innovation alternatives for business survival and development. Published under project FNI-2011-FBM-2, University of Ruse, Ruse, 2011.ISBN 978-954-8675-26-0.
2. Antonova, D. Tehnologichni inovatsii i post-industrialno obshtestvo. Sbornik VI Mejdunarodna nauchna konferentsia “Menidjmant i injenering”, volume 1(104), Tehnicheski universitet, Sofia, June 2003, p. 336-341, ISSN 1310-3946.
3. ARC Fund. Innovations BG – 2010. The Bulgarian Innovation policy – opportunities for the next decade. Applied research and communication foundation, Sofia, p. 17, ISSN 1313-1052.
4. ARC Fund. Innovations BG – the Bulgarian Innovation in European Union. Applied research and communication foundation, Sofia, 2006, p. 17, ISBN 954-9456-08-0.
5. Kunev, S., D. Antonova, S. Ruskova. Algorithm for factor determination of innovation activeness of machine-building SMEs (the case of Bulgaria, example of Ruse region). IN: Proceedings "The 2012 International Conference on Logistics and Maritime Systems", Bremen, Germany, University of Bremen, 2012, pp. 293-301
6. Kunev, S. Vliaeshti faktori varhu inovatsionnata aktivnost na MSP – aprobirane na metodicheski podhod. “Izsledvane na inovatsionni alternative za biznes otseliavane i razvitie (avt. Kolektiv). Proekt FNI 11-FBM-02. Ruse, Primax, 2012, pp. 204-227. ISBN 978-954-8675-26-0.
7. Kunev, S. Metodicheski podhod za izsledvane na vliaeshti faktori varhu inovatsionnata aktivnost na malki i sredni predpriatia. Sbornik IX Mejdunarodna nauchna konferentsia “Menidjmant i injenering”, Tehnicheski universitet, Sofia, 19-22 June 2011, p. 685-692, ISSN 1313-7123.
8. Kunev, S. Osnovni harakteristiki na inovatsionnata aktivnost pri biznes orientirani ikonomicheski edinitsi. Sbornik VIII Mejdunarodna nauchna konferentsia “Menidjmant i injenering”, volume 3(313), Tehnicheski universitet, Sofia, June 2010, p. 336-341, ISSN 1310-3946.
9. Antonova, D., S. Kunev. Potentialities of Small Business Structures in Machine-building Industry for Inventions of Knowledge. Proceedings of the 5th HSSS Conference, Xanthi, Greece. Hellenic Society for Systemic Studies, 2009

10. Kirova, M. P., Methods for Evaluation of the Innovation potential. // Journal of Entrepreneurship & Innovation, Issie1, Year 1, November'09, pp. 30-40, ISSN 1314-0167
11. Chow, A. W., B. D. Goodman, J. W. Rooney, C. D. Wyble. Engaging a corporate community to manage technology and embrace innovation. IBM SYSTEMS JOURNAL, VOL 46, NO 4, 2007,pp.639-650
12. Damianov, D. Model za izmervane stepenta na innovativnost I innovacionna activnost na producti, technologii I procesi za avtomatizirani proizvodstva. VI Mejdunaroden congress "Mashini, tehnologii, materiali", 18-20.02.2009, Tom 1, ISSN 1310-3946, p. 26
13. David R. Low, Ross L. Chapman and Terry R. Sloan. Inter-relationships between innovation and market orientation in SMEs. Management Research News, Vol. 30 No. 12, 2007,pp. 878-891
14. Ruskova, Sv. Otsenka efektivnostta na innovaciite.// Sp. "Mashini, tehnologii, materiali", 2009, kn.3-4, pp.32-35, ISSN 1313-0226
15. Den Hertog, P, Gjalt de Jong. Randstad's business model of innovation: Results from an exploratory study in the temporary staffing industry. Innovation: management, policy & practice, Volume 9, Issue 3–4, October–December 2007, pp. 351–364
16. European Innovation Scoreboard 2008. Comparative analysis of innovation performance. European Commission, January 2009. < ISBN 978-92-79-09675-4
17. Oslo Manual – Guidelines for collecting and interpreting innovation data (3rd ed.). OECD, 2005. ISBN 92-64-01308-3 – No. 54261 2005
18. Doloreux, D. Quebec's Coastal Maritime Industrial Cluster: (Not) Innovative and (Locally) Embedded? Journal of Small Business and Entrepreneurship 21, no. 3 (2008): pp. 325–344
19. Cohen, J. W. (1988). Statistical power analysis for the behavioral sciences (2nd edn). Hillsdale, NJ: Lawrence Erlbaum Associates
20. Pallant, J. "SPSS Survival Manual". Allen Unwin. 2005
21. Tabachnik, B. & L. Fidell, Using multivariate Statistics. Allyn and Bacon/Pearson Education Company, USA, 2006
22. Zjelev, S. Marketingovi izsledvania. Plovdiv, Trakia-M, 2002.
23. Mishev, G., St. Tsvetkov. Statistika za ikonomisti. Univ. izdatelstvo "Stopanstvo". Sofia, 1998.
24. Smallbone, D., D. North, Ch. Kalantaridis. Adapting to peripherality: a study of small rural manufacturing firms in northern England. Entrepreneurship and regional development. Taylor and Francis Ltd., 1999. ISSN 1464-5114
25. World Bank. Understanding foreign direct investment. Washington, USA, 2000
26. Zomer, H., N. Nikolov, A. Voikova. Ikonomika. Sofia, Tilia, 2000.
27. Mirchev, A. Proizvodstven menidjmant. Varna, Princeps, 1996.

INVESTIGATING THE PROCESSES OF ADOPTION AND DIFFUSION of Product Innovations in Depositing and Credit Granting Services

Milena Todorova[1], Diana Antonova[2]

[1]University of Ruse 'Angel Kanchev', 8 Studentska str., Ruse, Bulgaria, mtodorova@uni-ruse.bg

[2]University of Ruse 'Angel Kanchev', 8 Studentska str., Ruse, Bulgaria, dantonova@uni-ruse.bg

The present research concerns identification and estimation of key factors influence on the adoption and diffusion of product innovations in depositing and credit granting services. The accent is on the financial co-operations and their services in depositing and credit granting compared to the same type of services offered by commercial banks in Bulgaria. In conclusion are suggested particular actions facilitating the adoption of the financial co-operations and accelerating the diffusion of their product innovations, as well as of similar innovations in the banking sector in Bulgaria as a whole.

Key words
Adoption and diffusion, Product innovations, Deposits and credit granting services, Financial cooperatives, Commercial Banks.

1. Objective and tasks of the investigation

The objective is to investigate the adoption and diffusion of product innovations in depositing and credit granting services, offered by financial cooperatives[1] as an alternative to those realized by commercial banks, as well as the adoption of the financial cooperatives themselves in the Ruse Region, Bulgaria. The focus is on determining key factors, influencing to the highest degree the flow of these processes, with the purpose of improving their management.

Objectives of the investigation:

1. Developing methods and conceptual frame of the investigation for adoption and diffusion of product innovations in the field of depositing and credit granting services performed by financial Cooperatives.
2. Developing a profile of consumers, adopting the depositing and credit granting cooperatives and their services and comparing this profile to that of the entities which have not adopted this form of depositing and credit granting institution[2] through conducting field research by a structured survey form.
3. Developing an applied model for controlling the processes when depositing and credit granting services are performed by financial cooperatives.
4. Approbation of the model proposed concerning its significance and applicability.

[1] For the sake of brevity the term „financial cooperatives" will be accepted, although it is not synonymous to the term „depositing and credit granting cooperatives".

[2] The term „financial institutions" will be used synonymously with „depositing and credit granting institutions", although there are content differences between them.

2. Subject and object of investigation

The subject of investigation includes the processes of adoption and diffusion of product innovations in the field of depositing and credit granting by financial cooperatives as an organizational innovation for the Region of Ruse.
The object of investigation comprises the depositing and credit granting institutions in the Region of Ruse in Bulgaria, including financial cooperatives and commercial banks.

Specific features of financial cooperatives compared to the commercial banks:

- The European Associationof Cooperative Banks(EACB) defines the cooperative as „autonomous association of individuals volunteering to unite for the sake of satisfying economic, social and cultural needs with the help of a jointly owned enterprise, managed on the basis of democratic principles" [1].
- In contrast to the banks as capital entities, following one singular aim: to realize a profit and to distribute it depending on the participation of capital [2], the depositing and credit granting cooperative aims mainly at developing its members though mutual aid, solidarity and autonomy.[3]
- In contrast to commercial banks, promoting their activities with the aim of attracting new clients and resources [4], the financial cooperatives depend entirely on interpersonal communication between their members to attract new members. In relation to the main purpose of the cooperatives for mutual help and the fact that they serve only their members and are not public entities under the Law of co-operations [5], they are not allowed to do any advertising.
- Financial cooperatives offer higher real return from deposits, compared to bank deposits, which follows from the main principles of organization and the key goal to improve services and aid the activities of the members.[3]
- At the same time, there is less flexibility in the remaining conditions on deposits, compared to bank deposits, since commercial banks work in conditions of increased competition between each other for the resources they would attract from depositors and look for various ways of ensuring competitive advantages. [6]

3. Methods of investigation

The stages through which the investigation goes are as follows:

1. Formulating a conceptual model of the investigation
2. Formulating the main thesis and hypotheses: H0, H1, H2 and H3
3. Survey: - Defining the restricting terms - Defining the general population and the volume of the sample - Developing and structuring of the survey form - Forming teams and distributing tasks - Pilot survey - Conducting the real survey
4. Data processing through descriptive statistics: - Calculating relative shares - Crosstab method
5. Inferring a consumer profile in three fields: - General profile of the users of depositing and credit granting services in Ruse Region - Differentiated profile of users who have adopted financial cooperatives and their services by comparison with those of commercial banks - Differentiated profile of consumers who have not adopted them.
6. Formulating sub- hypotheses: $H_{1.1}$; $H_{1.2}$; $H_{1.3}$; $H_{1.4}$ *and* $H_{3.1}$.
7. Processing data through statistical methods: - Correlation analysis - Regression analysis (standard multiple regression)
8. Checking the sub-hypotheses $H_{1.1}$; $H_{1.2}$; $H_{1.3}$; $H_{1.4}$ and $H_{3.1}$ *Rejecting* $H_{1.1}$; $H_{1.2}$ *and* $H_{3.1}$; *confirming* $H_{1.3}$; $H_{1.4}$ *Formulating sub-hypotheses* $H_{1.5}$; $H_{1.6}$; $H_{2.1}$; $H_{2.2}$; $H_{2.3}$; $H_{2.4}$; $H_{2.5}$; $H_{2.6}$; $H_{3.2}$; $H_{3.3}$ and $H_{3.4}$
9. Developing an applied model for investigating adoption and diffusion of innovations in the field of depositing and credit granting services, and those offered by financial cooperatives in particular
10. Expert evaluation of the applied model and the hypotheses and sub-hypotheses in it

11. Confirming/rejecting the hypotheses and sub-hypotheses in the model applied
12. Approbated model for investigation of adoption and diffusion of product innovations in the sphere of depositing and credit granting services, offered by the financial cooperatives.

In relation to the survey conducted it is necessary to make the following specifications:

- *One restrictive term f*or the survey follows from the Law for cooperatives in Bulgaria, according to which a cooperative is "open for membership of individuals 16 years of age. Those who are 16 are not forbidden to participate and agree with its Code book". [5]
- The general population which determines the volume of the sample includes the people residing in the Municipality of Ruse, who are of age to work or above this age. According to NSI data from the last census in 2011, the population in these groups is147 320 people.[7]
- *The sample size* for the current investigation is *384 people*, living on the territory of the Municipality of Ruse. The limiting error is assumed to be up to 5%. Confidence is 95%. [8]

4. Conceptual model

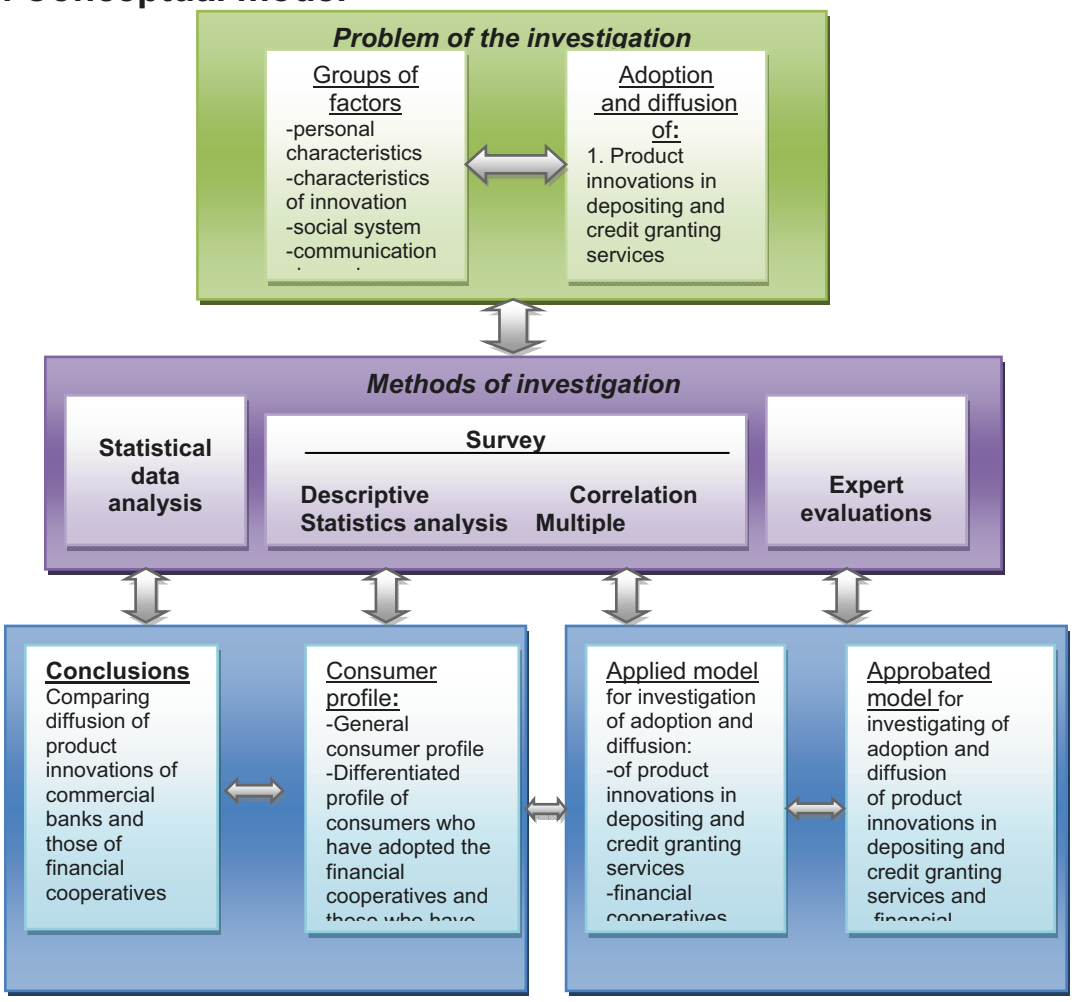


Figure 1 Conceptual model of investigation of the processes of adoption and diffusion of product innovations in depositing and credit granting services

The conceptual model shown on fig. 1 displays the logical frame of the investigation for achieving the goal set. It includes three levels: (1) the main problem, related to identifying the

key factors influencing adoption and diffusion of product innovations in depositing and credit granting services and those offered by financial cooperatives in particular; (2) methods used and (3) results sought for achieving the goal set. The connections between the different methods and results, as well as between the investigation results themselves are shown.

5. Formulating the main thesis and the investigation sub-hypotheses

Main thesis: the processes of perception and diffusion of financial cooperatives and the product innovations proposed by them flow more slowly in comparison with the adoption and diffusion of similar innovations, implemented by commercial banks. This difference is based on the inability to use best the communication channels for informing and influencing potential users, including advertising and distribution of promotion materials by the financial cooperatives, due to existing legislative restrictions.

Main hypotheses of the investigation:

H0: Enhancing the awareness of potential consumers of the existence of financial cooperatives and their activities would lead to increasing their readiness to become members, thus improving the adoption and diffusion of their services.

H1: The adoption and diffusion of innovations in depositing and credit granting services depends directly on the characteristics of innovation (relative advantage, visibility, compatibility, divisibility and complexity) and the awareness of the potential consumers about them.

H2: The adoption and diffusion of product innovations in the sphere of depositing and credit granting services and of financial cooperatives depends directly on the degree of personal innovativeness of the potential users, which is determined by the readiness for risk taking, the interest in novelty and change, the potential to act as opinion leaders concerning depositing and credit granting services, the time necessary for adoption and the source of information of crucial importance to the user.

H3: The demographic and social economic profile of the consumers of depositing and credit granting services influences indirectly the adoption and the rate of diffusion of innovations in this sphere through the level of personal innovativeness.

Table 1. Logical connection of the investigation hypotheses with the object of investigation

Groups of factors		Hypotheses of the research		
		H 1	H 2	H 3
Perceived innovations characteristics [9,10,11]	Visibility	H1.1		
	Complexity	H1.2		
	Relative advantage - profitability	H1.3		
	Compatibility	H1.4		
	Relative advantage - quality of service and individual approach	H1.5		
Characteristics of consumers' personality [10, 11, 12, 13,]	Demographic and social characteristics			H 3.1, H 3.2, H 3.5
	Consumer personal innovativeness		H 2.1, H 2.2, H 2.6	H 3.3, H 3.4
Awareness degree			H 2.3	
Communication channels [10, 11, 14, 15, 16, 17, 18]			H 2.4, H 2.5	
Perceived risk [9, 10]		H 1.6		

6. Checking the main thesis through statistical data analysis

Table 2 Growth of deposits offered by commercial banks and by financial cooperatives in Ruse Region compared to 2005.

By 31.12.	2006	2007	2008	2009	2010	2011
Growth of the number of bank deposits	23,70%	23,44%	35,45%	36,70%	41,39%	53,34%
Growth of the number of financial cooperatives deposits	2,59%	5,29%	6,99%	8,48%	10,94%	12,58%

From the data shown in Table 2 [19] we can conclude that the distribution of deposits offered by commercial banks in Ruse Region is considerably slower than that old deposits offered by financial cooperatives for the same region and period, which confirms the main thesis of the investigation.

7. Profile of consumers of deposit and credit granting services in Ruse Region

After processing the data from the survey through the methods of descriptive statistics[3], we have prepared a general and a differentiated profile of consumers, who have adopted financial cooperatives and their services (were or are members of such cooperative) compared to users who have not accepted those services (have not been members of DCC). Of the people surveyed *17,7% have adopted the financial cooperatives and their services while 82,3% have not. Of the latter only* 8,2% would be interested if necessary. The conclusions from the analysis are as follows:

Demographic profile:
- Among the consumers surveyed, who have adopted the credit cooperatives and their services, women occupy a larger share than men (56% to 44%), while for those who have not adopted men and women have almost equal share.
-Those who have adopted financial cooperatives and their services are mostly (58,86%) at the age of 50 – compared to 43.03% of those who have not adopted them. The share of the non-adopters of the financial cooperatives in the age group 18 to 25 years of age is twice as large as that of the consumers who have adopted the financial co-operations.
- Of those users who have accepted the financial cooperatives most have higher education completed or a scientific rank (51,47%), compared to those who have not accepted financial cooperatives (38,29%).
- The share of those who are developing their own business and working freelance is higher for the respondents who have adopted financial cooperatives (25%) compared to the non-adopters (12,97%).
- Those respondents who have adopted the financial cooperatives have higher income compared to those who have not accepted them.

Behavioral profile:
- When using depositing and credit granting services the consumers do not easily build loyalty to the supplying organization but mostly seek financial benefit and possibly higher security and convenience.

[3] The constructed conceptual model for investigating the processes of adoption and diffusion of product innovations in deposits and credit granting services has been verified in financial co-operations and commercial banks in Ruse region, Bulgaria. The statistical analysis has been made according to a methodology connected with the program product SPSS, version 14.0, licensed to RU "Angel Kanchev". [20], [21], [22], [23], [24]

- For both groups of respondents, when making decisions to use innovations in the sphere of depositing and credit granting services, it is most important that the service is clearly stated and accessible and the outcome of its use is specified and visible, which reduces their insecurity.
- Considerable differences are noticed in relation to the influence of the opinion and experience of the others, which is stronger for those respondents who have not adopted the credit cooperatives while for those who have adopted them it is weaker.
- Both of the groups surveyed use mostly credits for real estate and renovation. For the respondents who have adopted the financial cooperatives, the share of those who use credit to start their own business and for working capital for their existing business (14,71%) is higher than the share of those who have not adopted the financial cooperatives (8,54%).
- The most important reasons for adopting the financial cooperatives and their services are the more favourable terms for deposits and credits, including greater economic benefit.
- The most important reasons for not adopting the credit cooperatives and their services are distrust in comparison to trusting the banks and generally negative attitude and distrust to any financial institutions.

Personal innovativeness:
- The readiness for risk taking for those consumers who have adopted the financial cooperatives is higher (30,88%) in comparison to those who have not adopted them (12,66%), with the same tendency for the readiness for accepting change and novelty (41,18% against 24,37%).
- A greater part of those consumers who have adopted the financial cooperatives and their services have the potential to be opinion leaders in this field (39,71% compared to 19,30% of those who have not adopted them).
- Concerning the autonomous decision making – the share of respondents who have not adopted the financial cooperatives mostly affected by the "word-of-mouth" channel of communication is higher (40,82%) in comparison to those who have adopted them (27,94%).

8. Applied model for adoption and diffusion of product innovations in depositing and credit granting services

Based on the information from the survey, correlation and regression analyses have been carried out on the factors, influencing the processes of adoption and diffusion of product innovations in the sphere of depositing and credit granting services in Ruse region. Four dependent variables have been investigated. The results from the regression analysis for each of them are as follows:

1. „Readiness for adoption of product innovation in depositing and credit granting services" - 46,5% of the changes in the depending variable are due to the independent variables included in the regression model*:* „Degree of distrust in depositing and credit granting institutions in general" (individual contribution - 7,51%); „The potential of consumers for opinion leadership concerning depositing and credit granting services" (3,96%); „Significance of advertising" (3,76%) and „Significance of "word-of-mouth communication" (2,25%). The remaining (29,02%) is the overlapping influence of factors in the model over the dependent variable.

2. „Readiness for adoption of financial cooperatives" - 69,1% of the change in the dependent variable are calculated through the factors included in the regression model: „Significance of attention and individualized approach in services" (individual contribution 5,66%); „Knowledge of the financial cooperatives and their services" (4,80%); „Degree of (in)compatibility with the consumers' habits and views" (3,17%); „Significance of (un)profitability of the terms for depositing and credit granting services" (2,59%) and „Consumer's potential for opinion leadership on depositing and credit granting services", which is only 0,24%. The remaining 52,64% express the joint influence of the factors included in the model.

3. „Knowledge of the financial cooperatives and their services" - 47,8% of the change in the dependent variable are calculated through the factors included in the regression model: „Readiness for adoption of financial cooperatives" (20,16%) and „Consumer's potential for opinion leadership on depositing and credit granting services" (13,4%). The joint influence of the factors included in the models 15,86%.

4. „Consumer's potential for opinion leadership on depositing and credit granting services"- 44,1 % of the change in the dependent variable are calculated through the factors included in the regression model: "Knowledge of the financial cooperatives and their services" (individual contribution 8,58%); „Monthly income of consumers" (2,56%); „Readiness for adoption of product innovation in the sphere of depositing and credit granting services" (2,16%); „Readiness for risk taking" (2,07); „Readiness for accepting changes" (0,52%) and „Educational degree" (0.30%). The joint influence of the independent variables mentioned is 27,91%.

On Figure 2 is shown a general applied model for adoption and diffusion of product innovations in the sphere of depositing and credit granting services, particularly those offered

by financial cooperatives in Ruse Region, Bulgaria. Statistically significant correlations between the different variables, included in the regression model are shown.

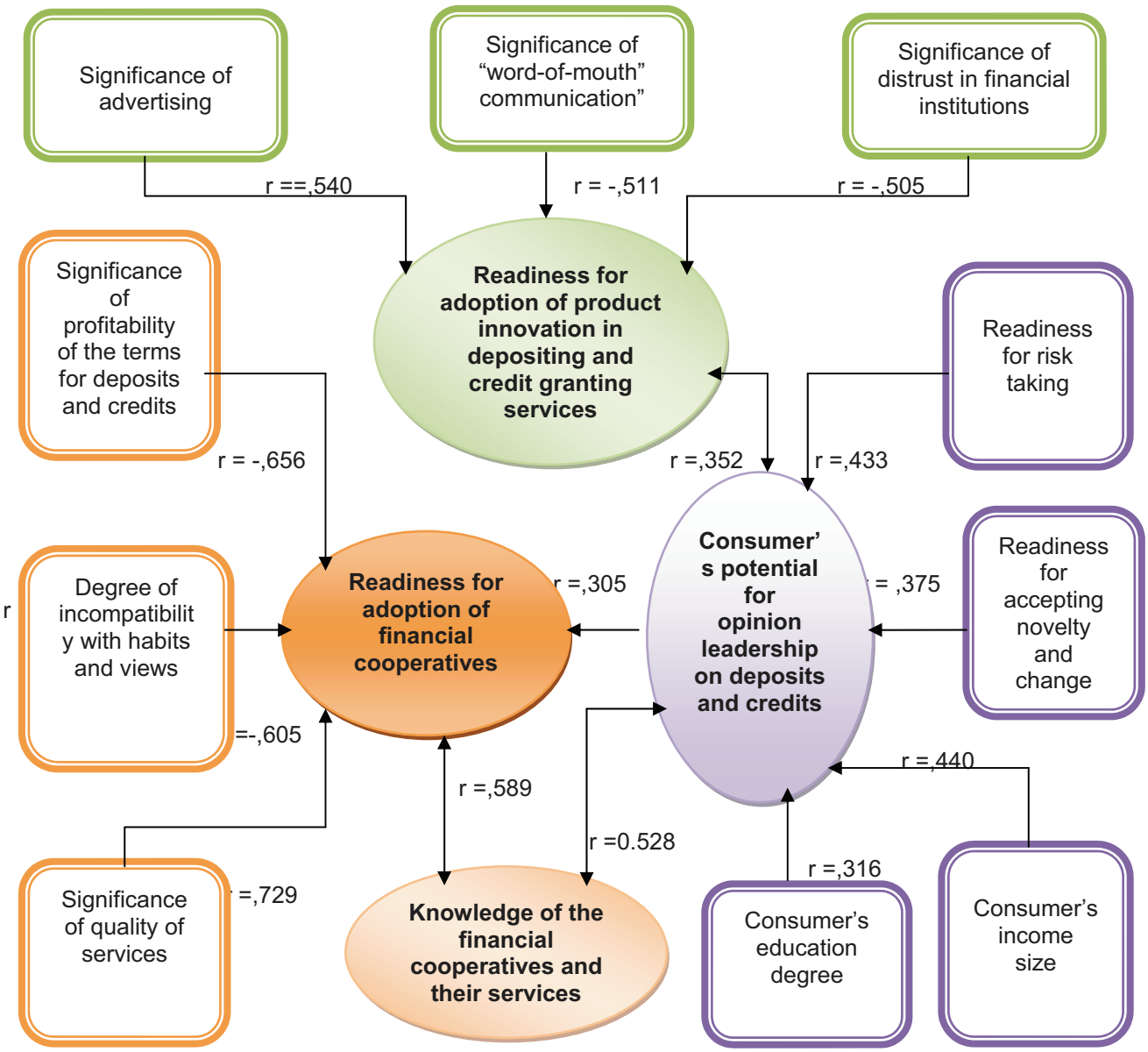


Figure 2 General applied model for adoption of product innovations in depositing and credit granting services, particularly those offered by financial cooperatives

9. Approbation of the applied model through expert evaluation

The expertise was conducted through a personal interview [14], [24], [25], [26], [27] of seven experts in the field of depositing and credit granting services, two of whom are from a financial cooperative and the remaining five occupy different positions in commercial banks in Ruse Region. The checklist contains all hypotheses and sub-hypotheses expressing statistically significant correlation connections between factors and evaluation for the degree of expert's agreement with the respective hypothesis/sub-hypothesis. The evaluation is in per cent (%), which allows easy calculation of arithmetic average value. This hypothesis /sub-hypothesis/ for which the arithmetic average value is equal or higher than 50 % is considered confirmed.

Table 3: Results from the approbation of the applied model through expert evaluations

Hypothesis/ sub-hypothesis	Degree of agreement – average expert evaluation
0: Enhancing the knowledge of potential consumers about financial cooperatives and their activities would lead to increasing their readiness to become members, thus improving the adoption and diffusion of their services.	**54,3%**
H 1.3: The more significant the lucrative terms for depositing and credit granting services are for the consumers (concerning access and interest rate), the higher their readiness will be to adopt the financial cooperatives (become their members) provided the cooperatives inform them and emphasizes on the profitability.	**70 %**
H 1.4: Taking action for reducing the incompatibility of financial cooperatives with the habits and views of the users would lead to increasing their readiness for membership in the cooperatives and using their services.	**54,3%**
H 1.5: Emphasizing on the service quality (regarding individualized approach) would lead to increase of the readiness for adoption of the financial cooperatives by the potential consumers.	**77,14%**
H 1.6: The higher degree of general distrust of users with the financial institutions is related to their low readiness to adopt innovations in deposits and credit granting services, offered by a specific institution. Directing the efforts of financial institutions to increasing the users' trust in them would lead to increasing consumers' readiness to adopt innovations offered to them in this area.	**62,14%**
H 2.1: Consumers with higher potential to influence others concerning using depositing and credit granting services (i.e. they are opinion leaders), are more willing to adopt financial cooperatives and their services.	**61,42%**
H 2.2: The users with higher potential to influence others concerning using depositing and credit granting services are looking for information in this area more actively and are better acquainted with the financial cooperatives.	**70 %**
H 2.3: Users who are better acquainted with the financial cooperatives have a greater potential to be opinion leaders in the field of depositing and credit granting services.	**77,14%**
H 2.4: The higher degree of significance of advertising is characteristic for consumers with higher personal innovativeness concerning innovations in the sphere of depositing and credit granting services. Consequently, emphasizing on advertising activities would lead to increasing the readiness for adoption of innovation in depositing and credit granting services on the part of these users.	**82,14%**
H 2.5: "Word-of-mouth" communication is more significant for consumers with lower level of personal innovativeness concerning innovations in depositing and credit granting services. That is why, taking into account inter personal communications and emphasizing on them would aid the increase of readiness for adopting such innovations even by not so strongly innovative users.	**68,57%**
H 2.6: The higher the potential of a consumer for opinion leadership concerning depositing and credit granting services, the more inclined he is to adopt innovations in this sphere. Identifying and stimulating those consumers would help the increase of readiness of other users to adopt these innovations.	**72,85%**
H 3.2: The potential for opinion leadership concerning the use of depositing and credit granting services and innovations in this sphere is higher for users with higher income.	**78,57%**
H 3.3: The more the user (member of a cooperative) is willing to take risks and accept changes, the higher his potential to become opinion leader concerning the use of depositing and credit granting services and to influence others in their adoption of innovations in the field of these services.	**67,85%**
H 3.4: The higher the user's readiness to adopt innovations in the field of depositing and credit granting services, the higher his potential for becoming a leader of opinion in this sphere.	**82,86%**
H 3.5: The potential for opinion leadership regarding the usage of deposits and credits and innovations in this field is bigger for consumers with higher educational degree.	**70,7%**

In result of the approbation through expert evaluations, the dependencies put into the applied model are confirmed. This gives grounds to consider the approbated model for adoption of product innovations in the sphere of deposit and credit services, in particular those of financial cooperatives and their services, has the same likeness as the applied model shown on Figure 2 and is applicable in regional and branch context.

10. Conclusions

(1) For accelerating the diffusion of services of financial cooperatives, it is necessary to increase the level of readiness for their adoption on individual level by the potential users through increasing their knowledge about this form of organization. Emphasis should be put on the quality of service and the profitability of terms concerning deposit and credit granting services, as well as on reducing the perceived incompatibility with the habits and views of the potential users. All this should decrease the level of the perceived risk.

(2) For the financing cooperatives which have no chance to use mass media communications and advertising, as well as distribution of promotion materials, it would be good to identify members with high potential for opinion leadership concerning the use of deposit and credit services. They are mainly highly qualified people with income higher than the average, more apt to accept changes. They are more interested and actively seek for information while at the same time they are people with power in their environment. They could aid to the highest degree the attracting of new members through interpersonal channels for communication of the type “word-of-mouth”.

(3) For reaching faster diffusion of product innovations in the sphere of deposit and credit granting services it is necessary to increase the readiness for their adoption from the potential users on individual level. For this purpose it would be good to emphasize the increase of trust in the financial institutions in general through applying techniques for image balance.

(4) It is also necessary to form a clear idea in the consumers’ minds of the specific results from the use of innovations in the deposit and credit granting services and the terms for them, i.e. to increase the “visibility“ of the innovation.

(5) The communication means for reaching the more innovative consumers should be the advertising and for the less innovative ones the emphasis should be on the interpersonal channels of communication. For all users it is extremely important to have face-to-face communication with the employees of the financial institutions in their office, since it could contribute to reducing the insecurity and increasing the readiness for adoption.

References

1. http://www.eacb.eu/en/home.html 03.05.2013
2. VANDJAL, J., M. Letonja, Commercial Banks and SMEs: Case of Slovenia, Etrepreneurship and innovation, issue 1, 2009, Editor Ruse University, Bulgaria, ISSN 1314 – 0167 (print)
3. http://www.popkasa-rs.com/ 04.05.2013
4. SARIISKI, Gr., sp. "Ikonomika", Svetovnata kriza I bankoviyat sector v Bulgaria, 09.04.2010
5. ZAKON ZA KOOPERATSIITE, Obn. DV. br. 113/ 28 Dec. 1999
6. TODOROVA, □., Spetsifiki na funktsioniraneto na vlogovo-kreditnite kooperatsii v Bulgaria, Nauchni trudove, vol. 50, Ikonomika I menidzhmunt, RU “Angel Kanchev”, ISSN1311-3321, s. 156-159, Ruse, 2011
7. http://censusresults.nsi.bg/Census/Reports/2/2/R14.aspx?OBS=RSE27 04.05.2013

8. www.raosoft.com/samplesize.html 04.05.20113
9. HARISON, □., Marketing na finansovite uslugi, Klasika I stil, Sofia, 2004
10. ROGERS, Everett M., Diffusion of innovations, Free Press 2003
11. RUSKOVA, S., Research of the Motivational Factors Affecting the Different Categories of Consumers according to the Rogers' model, Etrepreneurship and innovation, issue 4, Editor Ruse University, Bulgaria, November, 2012, ISSN 1314 – 0167 (print)
12. PERNER, Lors, Consumer Behaviour: The PSYCHOLOGY OF MARKETING, Business University of Southern California, Los Angelis, 2009
13. ROEHRICH, G. / Consumer innovativeness. Concepts and measurements, Ecole Supe´rieure des Affaires, BP 47X, 38040 cedex 9 Grenoble, France, Journal of Business Research 57 (2004) 671–677
14. ARMSTRONG, G., Philip Kotler - Marketing: an Introduction – 11th Edition, Prentice Hall, 2012
15. STEFFENS, P.R., Murthy, D.N.P., University of Queensland, Australia, The influence of innovators and imitators, Mathematical and Computer Modelling 16(4), 11-26, 1992
16. VELEV, Ml., Marketingovi komunikatsii, Softreid, Sofia, 2001
17. WRIGHT □., Clinton Upritchard and Tony Lewis A Validation of the Bass New Product Diffusion Model in New Zealand; Marketing Bulletin, 1997, 8, 15-29, Article 2
18. WRIGHT □., Clinton Upritchard and Tony Lewis A Validation of the Bass New Product Diffusion Model in New Zealand; Marketing Bulletin, 1997, 8, 15-29, Article 2
19. Statisticheski godishnitsi NSI – 2006 - 2012
20. MANOV, A.,. Statistika s SPSS. Trakiya - M. Sofia. 2001
21. MISHEV, G., Ts. Tsvetkov, Statistika za ikonomisti, Sofia. UNSS – 1998
22. PALLANT, Julie SPSS Survival Manual, Australia, 2005
23. TABACHNIK, B. & L. Fidell, Using multivariate Statistics. Allyn and Bacon/Pearson Education Company, USA, 2006
24. ZHELEV, S., Marketingovi izsledvaniya za marketingovi resheniya, Trakiya – M, 2000
25. BANCHEV, P. Marketing, Akademichno izdatelstvo "Tsenov", Svishtov, 2006
26. BANCHEV, P., Pazarni prouchvaniya, izd. Faber, V. Turnovo, 2010
27. KUNEV, S. (2011), Methodical approach for study of influential factors on innovation activeness of small and medium enterprises. Proceedings 9th International Scientific conference "Management and Engineering", volume 2(122), Technical University, Sofia, 19-22 June 2011, p. 685-692, ISSN 1313-7123.

POTENTIAL CLUSTERS IN TR41 REGION

Yasin Dalgıç[1], Emine Arslan Pauli[2], Dr. Mehmet Sait Cülfik[3], Jülide Alan[4]

[1]*Bursa Eskişehir Bilecik Development Agency, Osmangazi, Bursa, Turkey,* yasin.dalgic@bebka.org.tr

[2]*Bursa Eskişehir Bilecik Development Agency, Osmangazi, Bursa, Turkey,* emine.arslan@bebka.org.tr

[3]*Bursa Eskişehir Bilecik Development Agency, Osmangazi, Bursa, Turkey,* Mehmet@bebka.org.tr

[4]*Bursa Eskişehir Bilecik Development Agency, Osmangazi, Bursa, Turkey,* julide.alan@bebka.org.tr

In today's world, where the knowledge spreads amazingly fast and it is an undeniable necessity to integrate with change and innovation for competition, communication and cooperation among the firms has become an obligation. Although clustering, which aims to increase profitability of the firms and provide sustainability through collaboration, is a new phenomenon in Turkey, we experience massive attention from both public and private sector to this issue. Besides the ongoing incentive programs conducted by public and private sector to stimulate cooperation among institutions focusing on clustering, potential clusters are not well defined; especially in local areas. We aimed to bring this issue to light in the scope of manufacture sectors of TR41 Region, where Bursa, Eskişehir and Bilecik are located. Using registered sectorial employment data, application of three-star-analyses in this region shows that while automotive, textile, machinery, furniture sectors are concentrated in Bursa, Eskişehir has concentration on ceramic, electrical equipment, railway and aviation and Bilecik stands out with ceramic and marble industries.

Keywords
Clustering, TR41 Region, Registered Employment, Three-Star-Analysis

1. Introduction

The degree of competitiveness among firms has increased with the spread of globalization all over the world. Although this effect has been in case especially from the beginning of 20th century more obviously, the roots of sectorial cooperation aiming to increase degree of competitiveness go back to older days. First systematic researches in this field can be attributed to one of the giants of the economic thought, Alfred Marshall, who examined the sectorial concentration among firms in accordance with geographical aspects.

Sectorial concentration has been studied over different concepts: growth poles, forward and backward linkages, agglomeration economies, economic geography, urban and regional economics, national innovation systems, regional science and industry centers, social networks [1]. All of these notions have tried to explain the type of relationship among the firms and the players in the economic environment.

The analytic evaluation of the sectorial concentration has changed significantly after Michael E. Porter, who has studied the regional concentrated sectors in terms of clustering and competitiveness perspective. Porter defines clustering as "geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions in a particular field that compete but also cooperate." [2]. This definition takes the sectorial concentration to a more complicated notion: clustering is not only a geographical and sectorial concentration; it is also a structure that should contain support bodies (universities, industry and commerce bodies, media, finance organizations, governmental bodies etc.) and organic relations which help firms to increase their competitiveness power. So, clusters are not organizations where only goods and services are traded; they are also organic bodies in which knowledge and technology are produced and outspreaded [3].

The advantages of the clustering to firms can be counted as knowledge and technology sharing, more effective and quality based production, networks which attract more qualified foreign firms, competition superiority and lobbying which firms may not have otherwise. So, increased competitiveness and sustainability of the firms are strongly related with their cooperation and collaboration with other firms under a clustering organization.

Clusters are not only good for firms; it has also advantages for national competitiveness. Being aware of this reality, a lot of countries supports these kinds of organizations and many of them have glaring clusters. Silicon Valley (information technology) and Manhattan Region (finance) in US [4], Shaoxing Region (Zheijang province-textile) in China [5], Castellon Region in Spain (ceramic) [6], Hessen Region in Germany (automotive) [7] are a few of regions where the clusters have international dominance in their sectors.

2. Clustering in Turkey and TR41 Region

Major studies and directed policies on sectorial concentration in Turkey date back to 1960s, after the establishment of State Planning Organization (SPO). Organized industrial zones and small industrial zones are not only the first fruits of the growth policies focused on industrialization; they are also primitive types of clustering structures in Turkey.

More advanced researches and policies based on these works heavily increased after 2000s. "Regional Development Policies in Turkey, Sector and Region Concentrations (2005)" work of Turkish Industry and Business Association with SPO can be counted as the one of the first systematic national based clustering; whereas "Development of a National Clustering Policy for Turkey" project, which was supported by European Union, was the first project that is carried out in all over the country and potential clusters were expressed. The other work, "Regional Competitiveness Operational Program", which was conducted by Industry and Commerce Ministry, aimed to map regional sectorial concentrations in terms of NUTS 2 Regions of the country [8].

In all of these works, it is expressed that TR41 region has more or less the same sectorial concentration: textile, automotive, clothing, machinery, plastic sectors are found to be prior sectors; but the concentration in the scope of province level was not well explained in these researches.

The administrative structure of Turkey generally forces governmental bodies and private sector actors to take actions under provincial scale. This issue necessitates that analysis of clustering should be taken into consideration more micro and local perspective, on the province base. The governmental support mechanisms to private sector is also structured on a development level scale in Turkey and the level of development of the provinces can be very different from the other nearby cities, even they are in the same NUTS 2 region. For example, Bilecik in TR41 region is ranked 3rd degree of development level, while Bursa and

Eskişehir are ranked in the 1st level. In consequence, support rates by government of the incentives may differ very much according to the characteristics of the province. Defining potential clusters in local areas will also help to utilize some of specific government supports. Many of ministries provides huge amount of grants to clustering efforts of private sector. Having an analytical approach to state local sectorial potentials will strengthen the shareholders of the specified sector in term of applying for these government incentives.

Putting forward the local concentration of sectors on provincial base will provide opportunities to provinces and indirectly to regions to evaluate and stimulate the local potentials. So it is important to investigate and put forward the strength and the level of sectorial concentration on the province basis to get full benefits of clustering in local areas, which is the main purpose of this study.

2.1 Methodology

This study uses three-star-analysis to determine potential sectorial clusters in the provinces of TR41 Region. This method is one of the most commonly used approaches, especially in EU Area by the European Cluster Observatory [6], a center that works as an access point to cluster observatories and other leading cluster resources throughout the world and leaded by the Center for Strategy and Competitiveness at the Stockholm School of Economics in Sweden.

This method is based on sectorial data analysis and easy to apply for every region where the data is available. The data used in the analysis can change in accordance with the purpose but the common assessment is the use of sectorial employment data. The analyses for the provinces of TR41 Region are also conducted by using sectorial employment data. The employment data stands for the registered employment data for each provinces and it comes from the Social Security Institution. It is adjusted according to NACE Rev.2 classification. Potential clusters are determined on the basis of size, dominance and specialization parameters.

Size stands for the employment share of sector “i” in total employment of sector “i” in the country. Dominance is found by taking the ratio of the employment in sector “i” in the province over the total employment in the province. Lastly, specialization shows the power of the sector in the province on the national level and it is the ratio of employment in sector “i” in the province over the total employment share of sector “i” with respect to total employment in the country.

- *Si: Total employment in sector “i” in the province*
- *S^t: Total employment in the province*
- *T^i: Total employment in sector “i” in Turkey*
- *T^t: Total employment in Turkey*

Each parameter takes one star if the value is greater than specified threshold level. Sectors which have one star from each parameter will have three stars in total and these sectors are defined as “potential clusters”. The threshold level of each parameter was specified through the workshops in each province. The common idea was in the workshops was to evaluate main sectors and then evaluate the potential clusters in the provinces. This approach led to have a large list of sectors for each province but finalization and aggregation of sectors give us the results below.

- *K^p: Threshold level for the parameter*
- *One star if Dominance: $(S^i/S^t) \geq K_1^p$*
- *One star if Size: $(S^i/T^i) \geq K_2^p$*
- *One star if specialization: $\{(S^i/S^t)/(T^i/T^t)\} \geq 1$*

2.2 Results

Three-star-analyses are conducted both for the two and four division of NACE Rev. 2 classification. The main purpose of this approach is to determine the main sectors and subsectors so that the analysis are more precise. The results of three-star-analyses with respect to NACE Rev.2 two division classification for Bursa, Eskişehir and Bilecik are presented in the Table 1, 2, and Table 3.

Table 1 Three-star-analyses for Bursa (NACE Rev. 2, two-division)

Sector	Dominance	Size	Specialization
Manufacture of basic metals	0,02	0,06	1,27
Manufacture of machinery and equipment n.e.c.	0,04	0,13	2,75
Office adm., office support and other bus. support act.	0,03	0,05	1,12
Manufacture of rubber and plastic products	0,02	0,06	1,25
Manufacture of chemicals and chemical products	0,01	0,10	2,05
Manuf. of fabric. metal prod., exc. machine. and eq.	0,06	0,06	1,91
Manufacture of furniture	0,03	0,15	3,20
Manuf. of motor vehicles, trailers and semi-trailers	0,07	0,38	8,24
Manufacture of textiles	0,12	0,17	3,70

Note: Threshold levels for Bursa, NACE Rev.2, two division; dominance: 0,01, size: 0,05 and specialization: 1.

The results of tree-stars-analysis for Bursa show that machinery, furniture, textile and automotive stand out with cluster potential. Although office administration and office support activities have an important weight in employment in the region, it is more appropriate to classify this sector as support to other sectors; but not a “potential cluster” alone. In addition, chemistry, plastic and metal production sectors also mainly operate in order to provide inputs especially for automotive and manufacture of machinery; so again the tendency to classify these input provider sectors under the cluster structure of automotive and machinery will not be wrong.

Table 2 Three-star-analyses for Eskişehir (NACE Rev. 2, two-division)

Sector	Dominance	Size	Specialization
Other mining and quarrying	0,02	0,04	3,31
Manufacture of other non-metallic mineral products	0,05	0,03	2,58
Manufacture of other transport equipment	0,02	0,08	6,40
Manufacture of electrical equipment	0,04	0,06	5,21
Manuf. of motor vehicles, trailers and semi-trailers	0,02	0,03	2,42
Sports act. and amusement and recreation act.	0,01	0,03	2,72

Note: Threshold levels for Eskişehir, NACE Rev.2, two division; dominance: 0,01, size: 0,03 and specialization: 1.

Manufacture of other non-metallic mineral products, electrical equipment and other transport equipment sectors are thought to have cluster potential in Eskişehir. Production of other non-metallic mineral products is mainly concentrated on ceramic sector. Mining and quarrying is mainly turns out to be a input providers sector son not powerful enough to be classified as a potential cluster. Electrical equipment production (mainly white goods production) and other transport equipment (mainly manufacture of railway locomotives, air and spacecraft machinery) strongly occur as other potential clusters in Eskişehir.

Manufacture of motor vehicles, although have three stars in results, does not seem to have a high level of cluster potential by stand-alone compare to ceramic, railway and aviation, and white goods sector. Sports and amusement activities can also be thought as supportive industry and the sectorial concentration weight of this sector mainly comes from the fact that Eskişehir is a university-student city.

Table 3 Three-star-analyses for Bilecik (NACE Rev. 2, two-division)

Sector	Dominance	Size	Specialization
Manufacture of basic metals	0,04	0,01	2,73
Civil engineering	0,08	0,03	2,92
Other mining and quarrying	0,03	0,02	5,47
Manufacture of other non-metallic mineral products	0,26	0,05	14,60
Manufacture of paper and paper products	0,01	0,01	3,28

Note: Threshold levels for Bilecik, NACE Rev.2, two division; dominance: 0,01, size: 0,01 and specialization: 1.

Bilecik, which stand especially for non-metallic mineral products and marble industries, is one of the main ceramic production centers of the country and this feature is clearly seen in the results. Second more specialized sector seems to be civil engineering; but the main reason for the sector to be in front is that heavy construction activities (railway and motorways) that is carried by government during the data provided. Being aware of this fact, in the following periods and years after the construction activities stop, the weight of the sector will probably fall; so it should not be completely true to evaluate this sector as a "potential cluster". Production of basic metals and paper products are also comes after ceramic and marble industries and their weights are also not very high compare to them.

3. Conclusions

Sectorial concentration has an increasingly attractive phenomenon in national and regional policies and it is not wasteful. Today's economic map of the world is dominated by what Porter calls "cluster": critical masses and they affect competitiveness within countries as well as across borders [9]. Their contribution to competition and economic welfare is thought to be an undeniable reality so that countries, even there is not a critical mass of economic activities, try to form strategic sectors through incentives and supports.

In Turkey, the situation is not very different; there are many of support mechanisms of governmental organizations and more of them are on the way. It becomes a regional policy as well as national so that economic actors in many regions try to form sectorial cooperation organizations in order to benefit from these aids.

Although there are many works leaded by different types of organizations to evaluate regional critical sectorial masses in Turkey, there is not a study that can lead to clustering structure on provincial bases. This study defines the critical masses, or namely potential clusters in the scope of TR41 region provinces-Bursa, Eskişehir and Bilecik. Using the well-known three star-analyses based on registered employment data, it is found that automotive, textile, machinery; furniture sectors are concentrated in Bursa. Eskişehir has concentration on ceramic, electrical equipment, other transport equipment (railway and aviation) and Bilecik stands out with ceramic and marble industries in manufacture.

These results are also strongly correlated with what regional shareholders and authorities expect; but many of the revealed sectors in the study are very high volume sectors; especially in production and exports. Due to this fact, especially textile, machinery and automotive sectors, which will be the next scope of this study, may need to be evaluated

deeper, on the basis of four-division classification of NACE. Only after these evaluations, more precise and accurate potential clusters can be expressed.

References

1 Porter Michael. On competition. Optimist Press 2008, p253.
2 Porter, Michael. Competition and economic development: local clusters in a global economy. Economic Development Quarterly, Feb 2000, Vol. 14 Issue 1, p15. http://edq.sagepub.com/content/14/1/15.full.pdf+html
3 Krugman P. Geography and trade. MIT Press. 1991:1-142
4 Cansız, Mehmet. Clustering policies and applications in Turkey. Umit Press, Ankara 2011, p41.
5 Cangel, Ayça. Clustering examples in the world: Competition and clustering, URAK 2009, p48.
6 Amaros, J L, Feliu C. Transforming traditional industry into a leader: The tile industry in Castellon. Instituto de Tecnologia Ceramica. Copenhagen 16-17/10/2006.
7 Lagendijk, Arnoud. Good practices in SME Cluster initiatives. Lessons from the 'Core' regions and beyond. Centre for Urban and Regional Development Studies, 8 November 1999, p100. http://www.ru.nl/publish/pages/514805/lag99-adapt2.pdf
8 Alsaç, Filiz. Clustering as a Regional Development Tool: for Cluster Support Mechanism Suggestion for Turkey. Expertise Thesis, 2010.
9 Porter, Michael. Clusters and new economics of competition. Harvard Business Review, November-December 1999, p78.

ENTREPRENEURS AND REGIONAL INNOVATION DEVELOPMENT: CASE FOR WEST-AFRICAN NATION'S DEVELOPMENT

Ogungbemi Akinleye A

National Centre for Technology Management, Niger Delta University, Wilberforce Island Amassoma, Bayelsa state ogungbemi2k3@yahoo.com

Abstract

Most African nations especially, the West African region has so far being viewed as one of the weak economies of the world and that are still struggling towards the development of sustainable process and means towards the development. Small and Medium Enterprise especially the manufacturing, owning to the importance of manufacturing to national development, has not been fully fostered towards national development. Though, much clamor for increase of innovative ideas, procedures and products development and sustainable entrepreneurship programs has been on increase to enhance the developing nations to compete favorably among its peers or even with the developed nations. Also appropriate focuses has been place on the sustainability of the SMEs in the achievement of effective and adequate competitiveness as a means of providing the west African ailing economies remedies with emphasis on macroeconomic stabilization. Though developing nation's entrepreneur and SMEs programs/ projects faces a lot of challenges ranging from high rate of early enterprise mortality, shortage of skilled technical manpower, financial indiscipline, poor management practice and low entrepreneur skills, as these hindered the development and sustainability of the programs. Although most entrepreneurs in West African regions, fails to recognize the concept of effective collaboration with the focus on facilitating and managing business processes and also support systems from the region. This paper provides an insight towards the sustainability of entrepreneur activities in west African nations especially in the areas of manufacturing development, owing to the vast natural raw materials available, with the discussion anchoring around local manufacturers which has not been really encourages in meeting the desired aims of trade and investment liberation, a major source of export via the concept of effective collaboration as part of the strategy.

Keywords: collaborative Network, Small and Medium Enterprise, Manufacturing, Sustainable environment

1.0 INTRODUCTION

Most African nations especially, the West African region has so far being viewed as one of the weak economies of the world and that are still struggling towards the development of sustainable process and means towards the development.

The West African nation's needs to concentrate their respective energies on their areas of maximum comparative competitive advantage in a way of moving from guide trade knowledge to knowledge based. One through improved processed by adding more values.

Small and Medium Enterprise especially the manufacturing, owning to the importance of manufacturing to national development, has not been fully fostered towards national development. Though, much clamor for increase of innovative ideas, procedures and products development and sustainable entrepreneurship programs has been on increase to enhance the developing nations to compete favorably among its peers or even with the developed nations.

Keeping in mind that different SMEs will require different policy instruments, one of the major improvements would be policies that target technology-follower SMEs. One option for governments would be the marriage of the technical centres with economic advisory agencies that specialize in SMEs (Callan and Guinet, 2000).

Inyang and Enuoh (2009) gave the importance of the role an entrepreneur gives to an economy as the agent of the economic transformation in the society on employment and wealth creation.

2.0 RESEARCH METHODOLOGY

Data for this paper were derived from secondary sources: previous researches and analyses of scholars; government documents; newspaper/magazines as well as journal articles that are related to the subject as the study involved an extensive literature review which critically focused on the present status, problems and prospects of entrepreneurship development, effective collaborations as part of the roadmap to wealth creation, employment generation and strengthened of the west African nations, As It lays down the rules of entrepreneurship development and the critical steps to acquiring the best route to regional development.

3.1 THE CONCEPT OF ENTREPRENEURS AND SMES

Entrepreneurship is more about people than about firms, institutions and programmes (Riverin,xxxx). Kayne (1999) provides The Kauffman Center definition of entrepreneurship:

Entrepreneurship is the ability to amass the necessary resources to capitalize on new business opportunities. The term is frequently used to refer to the rapid growth of new and innovative businesses and is associated with individuals who create or seize business opportunities and pursue them without regard for resources under their control. They build something from practically nothing and usually reinvest earnings to expand their enterprise or to create new enterprises. Other words that characterize entrepreneurship include innovative, creative, dynamic, risk-tolerant, flexible and growth-oriented.

Small and medium sized firms (SMEs) are vital to a nation's economy (Heneman, et al. 2000; Ariyo, 2005, Ovadje 2010); they produce a high proportion of national output and provide an even greater proportion of employment (Foreman-Peck et al., 2006, Ovadje, 2010)

SMEs on the other hand, provide the basis for entrepreneurial activities and to sustain entrepreneurial activities, there is need to build, grow and sustain the SMEs as to have successful entrepreneurial system in the economy.

Entrepreneurship is an instrument through which through which entrepreneur converts valuable and technological information into products and services (Kirzner, 1997, Hussain et al, 2011)

As Entrepreneurship Development refers to the process of enhancing entrepreneurial skills and knowledge through structured training and institution-building programmes (Osemeke, 2012), this gives insight to SMEs development as SMEs operators are entrepreneurs in another sense.

3.2 WEST AFRICAN ECONOMIC STATUS

3.2.1 Economic Status

During the period 1991-2001, all ECOWAS Member States recorded a 2.8 % annual economic growth associated with a low rise of 0.3 % of GDP per capita and a low industrial growth rate (-1.5 % to 2.0 %), significantly lower than the region's population growth. The region recorded a GDP growth in constant decline, of 6.7 % in 2003, 6 % in 2005; 5.7 % in 2006; 5.6 % in 2007 and 5.1 % in 2008. At the same time, inflation eroded the little economic progress of the region with a rate of 4.2 % in 2000, attaining 8 % in 2001; an average of 9.9 % over the period 1999-2003; 7.1 % in 2006 and 6.3 % in 20089. Generally, the region's economic performance remains too inadequate (low GDP growth rate, extremely high inflation, etc.) to hope to have positive impact on the socio-economic conditions of the populations. The economy of ECOWAS during the 1999-2006 periods was mainly drawn by the recovery of the first economy of the region, i.e., Nigeria. This economy was particularly stimulated by the high cost of oil between 2001 and 2006, and by an appreciable growth of some national economies (Benin, Cape Verde, Ghana and Senegal) (West African common industrial policy, 2010). This shows poor data view of the regions and also poor development existing in the region.

3.2.3 SMEs Status

Adelaja (2000), expresses the nature of most African nations SMEs as they exist in the form of sole proprietorship and partnerships, simple management structures, most times informal relationships between employers and the workforce, most majorly labor intensive, simple technologies and limited access to financial capital among many others mentioned.

SMEs especially the manufacturing sector in the West African region has so far being contributing little towards the growth of their respective countries owing to respective challenges in their respective countries. Most often, the West African or developing nations often neglect the importance of SMEs to their national economy as part of efforts of poverty eradication, wealth and job creation and also rural development so as to introduce a balance in respective regions in the countries.

Using Nigeria as a case study, Small-scale businesses represent about 90% of the industrial sector in terms of the number of enterprises. They also account for 70% of national industrial employment if the threshold is set at 10 – 50 employees, contribute 10% of manufacturing output and a meager 1% of gross domestic product (GDP) in 2001 (Ajayi, 2002, Adegbite et al, 2006)

4.0 ENTREPRENEURS AND THEIR IMPORTANCE

The entrepreneurial landscape in Africa ranges from a multitude of micro-enterprises that provide marginal employment for a single individual to a small number of large corporations employing hundreds of people; an assortment of businesses span these extremes. The configuration includes informal and formal sector businesses, traditional and modern, indigenous and foreign-owned enterprises geographically dispersed in rural and urban areas. The majority are micro and small-scale enterprises (MSEs) that consist of one to three employees (Daniels et al. 1995, Kibera and Kibera 1999, Jalloh and Falola 2002), mostly in the informal sector.

According to Grimm et al (2011), entrepreneurs of small and micro investments/firms achieve relative high marginal returns to capital but with low re-investment rates. The nature of SMEs especially in the West African sub-region has been faced with series of challenges ranging from the ownership issues to government and financial constraints. UNDP (1999) gave a definition of entrepreneurship development as the process of enhancing entrepreneurial skills and knowledge through standard training and institution building programmes. This has from key towards the development of positive attitude by the developing nation towards strengthened of their national economies with the view of understanding the importance of entrepreneurs in the development of national economies.

The experience of entrepreneurs in some of countries has also shown that entrepreneurship remains fragile and its contributions to economic development rather small (Xheneti and Smallbone ,2008). Furthermore Xheneti and Smallbone ,2008 articulate Government as one of the main actors in establishing the necessary institutional arrangements for durable development or productive entrepreneurship in post communist economies .

Osemeke, 2012 highlights the threads running in various definitions expresses by some authors on entrepreneurs as the ability to identify business opportunities, the ability to be able to harness the necessary resources to use opportunities identified, the ability and willingness to initiate and sustain appropriate actions towards the actualization of business objectives.

4.2 COLLABORATIONS NEED

Inyang and Enuoh, 2009 gave an insight into what may be the stepping stones for effective entrepreneurial settings in an economy as Entrepreneurial competencies, which therefore, include those clusters of related knowledge, attitudes, and skills which an entrepreneur must acquire through managerial training and development to enable him produce outstanding performance, and maximize profit, while managing a business venture or an enterprise

New processes and procedures of doing old things, and automation have revolutionalized the manufacturing industry and multiplied productivity in the industrialized nations, as; SMEs in

Nigeria and the sub West African region cannot acquire modern machines that help reduce processes (Ohuabunwa, 2010).

According to Holmstrom et al (), the promise of process integration between organizations too often remains unfulfilled and as to make rapid progress new approaches are needed. This provide avenue of integrating a collaborative pattern to developed most SMEs especially in the west African region as this will go a long way to push the region up in the area of competitive advantages.

Zoltan and Varga, 2004 gave the effect of collaboration as it does possess a positive impact on technological changes bringing the best to entrepreneurial activities.

With the establishment of intervention agencies using the case of Nigeria as a typical example, with the function of to remove constraints on entrepreneurs and expand the opportunities available to them by providing information and needed training, financial assistance, which are considered germane to entrepreneurial development (Osemeke, 2012), the need for the regional collaboration will bring a meaningful impact on the growth of trade and technological expansions in the west African region.

To be entrepreneurial, it requires that the entrepreneur must be creative, especially in relation to strategic decision-making (Osemeke, 2012).

4.3 INNOVATION AND INNOVATION POLICIES

Small firms are playing an ever-increasing role in innovation, driven by changes in technologies and markets. Some spin-offs and high growth firms are having remarkable success. However, the broad bulk of small firms are not capitalizing on their advantages (OECD, 2010).

Reich (1989) gave the five types of entrepreneurs needed by various economies of the world as the paper and product entrepreneur and how they innovate to develop economies. The WAN should put in place strategies for developing the two types of entrepreneurs.

As part of the strategies of developing innovation in the nation's entrepreneurial system especially the SMEs sectors the need by the government to provide adequate environment and institutions to provide and sustain the elements of innovation competences as proposed by Abernathy and Clark (1985).

However because of the heterogeneity of the SME population, any policy to increase their innovative capacities must be targeted to meet the needs of a variety of user groups, have different objectives, and use multiple approaches and tools (Callan and Guinet,2000).

One of the polices introduce in the West African region was the WACIP in 2010 that proposed means of industrializing the region which will bring about the best in the contribution of entrepreneurs from the region especially in the manufacturing sectors and which will also provide avenue and ease collaboration within the countries.

CONCLUSIONS

In order to sustain effective collaboration among small and medium size business especially in the West African region, the need to concentrate and strengthen of the three Cs of being

coherent, consistent and comprehensive as proposed authors. The real chance of creating environments in which new and small businesses can flourish creating the expected wealth and job creation in the West African region is of importance as it will create an avenue for regional development and growth through exploiting each other's core competencies and be competitive in the marketplace.

REFERENCES

1. Adegbite S.A, Ilori M.O, Irefin I.A, Abereijo I.O, and Aderemi H.O.S, , Evaluation of the Impact of Entrepreneurial Characteristics on the Performance of Small Scale Manufacturing Industries in Nigeria, 2006,Journal of Asia Entrepreneurship and sustainability, Vol III, Issue I

2. Adelaja, The Importance of Small and Medium Scale Industries in a developing/ underdeveloped Economy: Nigeria case study, 2000, Proceedings of 6th Africa-USA International Conference on Manufacturing Technology.

3. Ajayi, O.A. : "Development of Small Scale Industries in Nigeria". 2002, Being paper presented at Workshop on Grassroots Advocacy and Economic Development. September 11-13.

4. Ariyo, D.."Small firms are the backbone of the Nigerian economy". 2007, www.AfricaEconomicAnalysis.org. Last assessed:

5. Foreman-Peck, J., Makepeace, G & Morgan, B. "Growth and profitability of small and medium-sized enterprises: Some welsh evidence." Regional Studies, 2006,. 40, 307–319

6. Grimm M, Gubert F, Koriko O, Lay J and Nordman C.J, , Kinship-tiers and Entrepreneurship in Western African, Journal of Small Business and Entrepreneurship, forthcoming, 2011, [DOI:10.1080/08276331.2013.771854]

7. Heneman, R. L., Tansky, J. W. & Camp, S. M. "Human resource management practices in small and medium-sized enterprises: Unanswered questions and future research perspectives." Entrepreneurship: Theory & Practice, 2000., 25, 11-25.

8. Hussian M.F, Afzal A, Asif M, Ahmad N and Bilal R.M, , Impact of Information, Technology and Economic Growth on Entrepreneurship, American International Journal of Contemporary Research, 2011, Vol 1, No 1, Pp 45-51

9. Inyang B.J and Enuoh R.O, , Entrepreneurial Competencies: the Missing Links to Susseccful entrepreneurship in Nigeria, International Business Research, 2009, Vol 2, No 2, www.ccsenet.org/journal.html

10. Kayne,J, State Entrepreneurship Policies and Programs, Kauffman Centre for Entrepreneurial Leadership, 1999, Missouri

11. OECD , *SMEs, Entrepreneurship and Innovation*, OECD Studies on SMEs and Entrepreneurship, OECD Publishing, 2010

12. Osemeke, , Entrepreneurial Development and Interventionist Agencies in Nigeria, International Journal of Business and Social Science, 2012, Vol 3, No 8

13. Ovadje F, , The Adoption of Formal HRM Practices by Small Firms in Africa, Journal of Language, Technology and Entrepreneurship in Africa, 2010, Vol 2, No 2

14. Xheneti, Mirela and Smallbone, David , The role of public policy in entrepreneurship development in post-socialist countries: a comparison of Albania and Estonia. *EBS Review*, 2008, 1(24), pp. 24-37. ISSN (print) 1406-0264

15. Zoltans J. A and Varga A, , Entreprenuership, Agglomeration and Technological Change, Discussion Papers on Entrepreneurship, Growth and Public Policy, 2004, Max Planks Institutes, Germany.

16. Riverin, N. Policies for developing entrepreneurship skills and culture. Strengthening entrepreneurship innovation & and economic development at the local level in Croatia - An Active Review. Zagreb, Croatia, OECD, USAID, LEEDS program 2007**:** 97-114.

17. Abernathy, W.J., and K.B. Clark 'Innovation: Mapping the Winds of Creative Destruction',*Research Policy*, 1985, 14, pp. 3-22.

18. Callan B, and Guinet J, Enhancing the Competitiveness of SMEs through Innovation, OECD Conference of Ministers responsible for SMEs and Industry Minister, 2000, Italy
19. Jalloh, A. and Falola, T. (eds) 2002 Black Business and Economic Power (Rochester, NY: Universityof Rochester Press).
20. Kibera, F. N. and Kibera, L. W. Female entrepreneurship in small scale enterprises in Kenya, in Kinunda-Rutashobya, L. and Olomi, D. R. (eds), African Entrepreneurship and Small Business Development, 1999 ,(Dar es Salaam: DUP Ltd) pp. 227–247.

BUILDING CONTEMPORARY URBAN SPACES OF KNOWLEDGE AND INNOVATION
Lessons from Australian practice

Tan Yigitcanlar[1]

Queensland University of Technology, 2 George Street, Brisbane, Australia,
tan.yigitcanlar@qut.edu.au

In the era of global knowledge economy, urban regions that are seeking to increase their competitive edge, become destinations for talent and investment, and provide prosperity and quality of life to their inhabitants have little chance achieving their development goals without forming effective knowledge-based urban development strategies. This paper aims to shed light on the planning and development of the knowledge-based urban development phenomenon with respect to the construction of knowledge community precincts aimed at building contemporary urban spaces of knowledge and innovation. Following to a thorough review of the literature on knowledge-based urban development, the paper undertakes policy and best practice analyses to learn from the internationally renowned Australian knowledge community precincts, from Sydney, Melbourne and Brisbane, to better understand the dynamics of knowledge community precinct development practices. The paper provides a discussion on the study findings and recommendations for successfully establishing contemporary urban spaces of knowledge and innovation.

Keywords
Knowledge-Based Urban Development; Knowledge Community Precinct; Knowledge Generation, Innovation; Australia.

1. Introduction

The changing and challenging conditions of the 21st century have been significantly impacting our economy, society and built and natural environments[1,2,3]. Today innovation and generation of knowledge—mostly in the form of science, technology and arts—are seen as a panacea for the adaptation to changes and management of challenges[4,5]. Building contemporary urban spaces that concentrate on innovation and knowledge generation to support knowledge economy and society formation, thus, has become a priority for many nations and cities. Concepts like 'knowledge city' and 'knowledge precinct' are coined as places where citizenship undertakes a deliberate and systematic initiative for founding its development on the identification and sustainable balance of its shared value system and bases its ability to create wealth on its capacity to generate and leverage its knowledge capabilities[6]. In recent years, the term knowledge precinct in its most contemporary interpretation evolved into 'knowledge community precinct (KCP)', which is a mix-use post-modern urban setting—e.g., flexible, decontextualized, enclaved, fragmented—including a critical mass of knowledge enterprises and advanced networked infrastructures, developed with the aim of collecting the benefits of blurring the boundaries of living, shopping, recreation and working facilities of knowledge workers and their families—i.e., knowledge community[7]. In the literature this type of development—a place containing economic

prosperity, environmental sustainability, just socio-spatial order and good governance—is referred as a knowledge-based urban development (KBUD)[8].

Successful examples of KBUD is generally achieved through strategic asset-based planning, which is a strategic planning approach grounded in focusing on the positive endogenous attributes and assets in order to become competitive, attract new resources and bring about the desired outcomes[9]. Mostly driven by global market forces a KBUD requires a strategic asset-based planning approach that includes flexible planning regulations. Hence, in this paper, we aim to provide a clear understanding on the planning and development processes of the KBUD phenomenon with respect to the construction of KCPs—particularly in the Australian context. In order to do so, the paper, first reviews the key literature on KBUD and strategic asset-based planning thoroughly. The paper, then, undertakes policy and best practice analyses from Australia to shed light on the planning and development processes of KCPs and learn from the success stories—i.e., Sydney's Australian Technology Park, Melbourne's Parkville Knowledge Precinct, Brisbane's Kelvin Grove Urban Village. Based on the learnings from the literature and global best practices, the paper provides a discussion to better understand the nature and dynamics of KCPs.

2. Knowledge-Based Urban Development

The concept of knowledge economy—grounded by endogenous growth theory[10,11]—emerged from an increasing recognition of the requirement for the generation, circulation and use of knowledge within modern economies, however, in recent years, increasing attention has been paid in emerging economies to make the transition to knowledge economy. Thus, making the knowledge economy phenomenon a fairly global one[12,13]. In the era of global knowledge economy, the world is increasingly becoming integrated, and knowledge is becoming the driving force for economic growth, societal development, and improvement of the competitiveness of not only industrial system and firms[14], but also urban regions[15].

Lever[16] demonstrated the correlation between economic growth and the extent of the knowledge base in European cities, suggesting urban regions that are centres of growth are also centres of knowledge. What this means is, the competitive advantages of urban regions are no longer based on their natural resources or cheap labour, but are increasingly viewed in terms of their knowledge resources and exploitation of these knowledge assets[17]. How well an urban region respond to the challenge of knowledge economy depends on how well actors exploit new knowledge in the form of new product or process innovations, making use of their intangible assets, such as skills and creativity[14].

As Asheim[18] puts forward, since the beginning of the century strong evidence has been presented substantiating an argument for an urban turnaround that is taking place. Traditional focus on urban regions and development mainly concern of 'business climate'—launching policy measures intending to attract new business to support the growth of industries—has been changing in recent years towards also providing a strong 'people climate' to attract and retain the talent in urban regions to form knowledge bases—i.e., analytical (science-based), synthetic (engineering-based), symbolic (art-based)[18,19]. Urban regions are now being viewed as having a specific role to play in creating the prosperous knowledge milieus—hence establishing 'spatial climate'—and in the management and humanisation of knowledge and setting the scene for enabling conditions—establishing 'governance climate'[20,21,22]. This broadened perspective, makes knowledge-based development underpinning growth trajectories of urban regions[8,23].

Knight[20,24] sees knowledge-based development of urban regions—also referred as knowledge-based urban development (KBUD)—as the transformation of knowledge resources into local development to provide a basis for sustainable development and also a

social learning process as a way for citizens to inform and become informed about the nature of changes occurring in their city. Kunzmann[25] gives KBUD a more operational perspective as a key planning approach that provides an important collaborative development framework for all parties—i.e., public, private, academic, community—in the development of future strategic and knowledge-intensive urban and regional policies for attracting and retaining knowledge workers and knowledge-intensive industries and also for the nurturing of knowledge cities—and their nucleus of KCPs.

Perry[26] points out to the differing perspectives of KBUD as she identifies the three dimensions to KBUD as process, product and acquisition, where in each case the relative importance of knowledge and space alters. In process-driven KBUD, knowledge is central and subject to change as a result of external pressures; whilst in acquisition-driven KBUD, knowledge itself is only a small part of KBUD processes, embedded in a wider set of economic, social, and cultural processes, and; in product-driven KBUD, much like the process-driven KBUD, urban is only implied and peripheral and place is central to the concept of the knowledge city. However, only a combination of all three dimensions into a more holistic KBUD vision can deliver desired outcomes.

Van Wezemael[27] emphasises on the heterogeneous context of KBUD due to its multidisciplinary and multi-faceted nature—which is a complex and fuzzy concept—limiting its globally widespread inception. He suggests KBUD to reach beyond a neoliberal agenda of economic progress, and be viewed as a multiplicity and offer a rich potential to seek for alternative urban becomings. Further dwelling on the idea of alternative urban becomings and combination of KBUD perspectives, Maldonado and Romein[28] argue that a sustainable KBUD only rests on a proper balance between: (i) economic quality, which depends on a good business climate to produce prosperity; (ii) socio-spatial quality, which is based on a good people climate for all people, and; (iii) organizational quality, which depends on coherence and consensus in the urban region, as well as a good interaction between main stakeholders to deliver concrete projects and initiatives.

In line with Maldonado and Romein's[28] argument, Yigitcanlar[5] defines the KBUD: as the new development paradigm of the knowledge economy era that aims to bring economic prosperity, socio-spatial order, environmental sustainability, and good governance to cities; and produce a city purposefully designed to encourage the generation, circulation and use of knowledge in an economically secure, socially just, environmentally sustained and well-governed human setting—i.e., knowledge city (and its nucleus of KCPs). Correspondingly, KBUD is concerned of economic, societal and spatial (both built and natural environmental) development along with institutional development as an enabler of the former three.

KBUD's economic development perspective aims to place endogenous knowledge assets in the heart of economic activities as it sees knowledge as a locally embedded strategic and vital resource rather than exogenous, imported and supplementary[16,29], and build a knowledge economy within an urban region producing prosperity achieved through strong 'macro-economic' and 'knowledge economy foundations'. KBUD's socio-cultural development perspective aims to increase skills and knowledge of residents as a mean for individual and communal development and societal high-level of achievements [1,30], and build a knowledge society within an urban region producing social equity achieved through strong 'human and social capitals', and 'diversity and independency'. KBUD's environmental and urban (enviro-urban) development perspective aims to promote conservation, development and integration of both natural and built environments, work towards building a strong spatial network relationship between urban development and knowledge clusters while driving an urban and environmental development that is ecologically friendly, high quality, unique and sustainable[24,31], and build a knowledge milieu producing sustainability in an urban region achieved through 'sustainable urban development' and 'quality of life and place'. KBUD's institutional development perspective aims to democratise and humanises

knowledge, institutionalises interdisciplinary collective learning processes and knowledge-based organisations, play a critical role in the orchestration of the development by bringing together actors, stakeholders and sources to prepare a civic vision, plan strategically, organise and facilitate necessary knowledge-intensive bases and activities[20,32], and build a knowledge governance producing enablers for KBUD in an urban region achieved through strong 'governance and planning' and 'leadership and support'. These four development perspectives form the KBUD pillars—economy, society, environment, governance.

Implementation of KBUD requires a planning approach that is strategic and asset-based. In this context, asset-based planning is put forward in parallel to the communicative rationality and strategic planning approach. In this type of planning, instead of pursuing a traditional need-based planning approach, it purports communities to be planned by considering their endogenous assets and emphasising the strong and positive aspects of their developable assets[33]. One of the most important components of this planning is the community involvement in identification, management and utilisation of the assets. Traditionally, asset-based planning approach has been widely used, particularly, in urban regeneration and poverty alleviation projects. In the global knowledge economy era, this asset-based approach has been also utilised in the strategic planning domain, thus making, 'strategic asset-based planning' a planning approach that places its focus on urban assets as the key value to be driven to sustain competitive advantage and prosperity[34]. This planning approach is now heavily employed in KBUD projects—including planning of KCPs.

In line with the strategic asset-based planning endeavours, fundamental urban assets are categorised as below. This capital system and asset categorisation provides some useful insights on the effective asset management planning process and helps to delineate best strategies to endow these assets for the community and the city. In fact, not being much different from the traditional strategic spatial planning approach, it specifically highlights the main constituents of economic, social, cultural, environmental and institutional resources available—in line with KBUD framework—and helps to designate the key stakeholders. Thus, the asset categories—of symbolic, social, human, heritage and cultural, natural, environmental and infrastructural, financial, knowledge, and relational that are derived from [34,35,36]—are used in the next section to investigate Australian KCP initiatives.

3. Australian Practice

3.1 Australian Technology Park, Sydney

Being the largest city in Australia, Sydney—internationally recognised as a Global City—is one of the main actors in the global economy. While, the city is dominated by finance and insurance, business and property services, there are a number of sub-centres specialised in creative industries, health and biotechnology fields. Particularly higher quality of academic and research facilities around these sub-centres have facilitated the emergence of business hubs as a consequence of the KBUD movement. Australian Technology Park (ATP) has been one of the successful examples of KCP creation in terms of planning, funding, implementation and operation as a triple helix approach. First ATP master plan was prepared in 1994 and ATP officially opened in 1996. The precinct has developed gradually according to the corporate plan of ATP and in 2005 a new master plan was prepared. The construction works had been continued until 2010 and now it is nearly completed and fully functional. The precinct covers 14 ha area. There are over 100 of ICTs and biomedicine organisations on the site employing over 2,000 people[37]. Due to close proximity to Central Spine of Sydney and Redfern neighbourhood, the precinct also has a wide range of business, entertainment,

culture and recreation services. Surrounding and nearby dwellings provide various residential options to ATP's knowledge workers and their families.

Asset identification and valuation: Symbolic assets: Being the largest city in Australia, Sydney—internationally recognised as a Global City—is one of the actors in the global knowledge economy. ATP is located on the southern part of the Central Spine of Sydney and is marked as catalyst for excellence in research and technology development. This KCP is particularly well known in the South East Asia region and has good connection with Asia-Pacific markets[31].

Social assets: ATP has already had a civic characteristic due to renovated heritage buildings and as being close to the busy Redfern train station. There are plans to develop cultural and exhibition facilities in and around the precinct to attract local and research communities and further develop the precinct as a more vibrant hub.

Human assets: Due to the world-class education and research institution of Sydney, there is no significant shortage of qualified workforce in the R&D sector and the city itself also has a tick service sector[38]. Sydney attracts knowledge workers from all over the world particularly Central and South East Asia regions.

Heritage and cultural assets: The precinct was developed on an old manufacturing site—i.e., locomotive workshops and goods stores—and shown as one of the most significant areas for renewal in the Sydney City Strategic Plan[39]. There are other important heritage sites around this area, which are being planned for conservation and incorporation with the precinct. ATP has a cosmopolitan urban environment due to significant culture mixture of the inhabitants—particularly areas around the CBD—where community tolerance is quite high. This is one of the reasons for an elevated migration movement.

Natural, environmental and infrastructural assets: Sydney is located close to a number of environmentally significant areas, which has been protected by the state and local governments, and has a good infrastructure to support urban services and growing demands of the population. The precinct takes place next to Redfern train station and has a very good public transport and pedestrian network.

Financial assets: Federal and state governments fund the R&D endeavours. The incubator facilities are designed for spin off SME technology firms as direct support. Sydney has adopted an economy strategy to develop ICT and biomedical sectors by involvement of the stakeholders. This enables firms to access governmental and private funds from various institutions, which ATP firms also benefit.

Knowledge assets: University of Sydney and University of Technology Sydney support a number of SMEs on ICTs and biomedicine in the area[39]. However, the marketing strategy for ATP as a prime business real estate limits attracting and growth potential of innovative firms due to higher location costs.

Relational assets: ATP has been developed as a mutual initiative of the private sector, government and universities; the current management—i.e., The Redfern–Waterloo Authority, semi-governmental firm—of the precinct has been following proactive approach to further development of the area emphasising the sustainability concept. Particularly, making the precinct sustainable is the virtue governed by the collaboration of the state government, precinct management and the tenants.

Asset management plan, implementation and performance monitoring: In the regional strategy plan, ATP is listed as a knowledge asset and shown as one of the magnet infrastructures considering its proximity to the major transport route and knowledge cluster—R&D facilities and universities—, support to an existing centre, and ability to reduce environmental impact. The main planning theme for this sub-region is to connect ATP precinct to Green Square development site. In the same plan, the Redfern-Waterloo Authority has been authorised for preservation and revitalisation of heritage buildings,

implementing residential (including affordable housing) and business development, improvement of public transport network (Redfern station and airport connection), provision of safe and functional civic spaces, and implementing ecologically sustainable development through urban renewal[39]. This approach is also adopted for the other sub-regional authorities to support innovation and strengthen the industry clusters. Additionally, the master plan of ATP was amended in 2005, and ATP management published the targets for sustainable practices in the precinct in energy conservation, reducing waste production and water consumption[37]. Relocation of one of the national broadcasting companies is expected to foster the media industry presence in/around the area. The regional plan details urban form and function related issues in and around the precincts without specifying any performance criteria. On the other hand, ATP management provides targets for sustainability related information for benchmarking purposes.

3.2 Parkville Knowledge Precinct, Melbourne

Considering the metropolitan characteristics of Melbourne, a number of specialised activity centres have proliferated particularly around world-class education and research institutions. Parkville knowledge (medical and bioscience) community precinct is an outcome of this trend and of the organic synergy between health research facilities around University of Melbourne. Even though investment and development of the precinct has been ad hoc basis, it has been purported that coordination and integration between other research institutions and industry can bring more effective results for the Parkville KCP. Among other initiatives from Melbourne, Parkville comes forward with its organic development as a specialised knowledge sector and the global reputation in cancer research. It is expected that the developments advised in 2005 Parkville Precinct Strategy Plan will be completed by 2016.The precinct covers around 550 ha area. In 2006, there were approximately 1,800 people living in the Parkville precinct and over 23,000 people were involved in health (14,362 ppl.) and education (5,113 ppl.) activities in the precinct[40].

Asset identification and valuation: Symbolic assets: Melbourne is the second largest Australian city, famous for arts, culture, sports and entertainment scenes. Parkville is located on the Northern section of Melbourne CBD and has a strong biomedical sector recognised globally. Similar to Sydney, it has good connections with the Asia-Pacific markets.

Social assets: Parkville KCP has followed a relatively more organic development path to become a learning, healthcare and biomedical hub in the region. The precinct highly benefits from the social and cultural activities of the adjoining University of Melbourne.

Human assets: Melbourne has globally recognised education and research institutions and attracts a large number of international tertiary education students[40]. The opportunity of international university graduates—who completed their minimum two-year studies in Australia—migrating as skill-workers makes accessing to qualified labour force easier. The city itself has a mature service sector. Likewise Sydney, Melbourne—internationally recognised as a Knowledge City—attracts knowledge workers from all over the world particularly from Central and South East Asia regions[21].

Heritage and cultural assets: The University of Melbourne campus is a heritage site and the precinct also has other heritage sites in the close proximity[40]. The precinct and its surrounding area inhabit many people with various cultural backgrounds and community tolerance is quite high. Melbourne is one of the most culturally vibrant cities in Australia—in a big competition with Sydney—, where integration of immigrants to the community is highly successful.

Natural, environmental and infrastructural assets: The University of Melbourne campus and surrounding urban fabric have provided a unique urban characteristic to the precinct, which

enhances the residential amenity as well. Due to its proximity to the city and higher densities around the precinct have also supported a mixed-use development organically[40]. The precinct has well-connected public transport, pedestrian and cycling networks allowing good accessibility to the area[41].

Financial assets: State government promotes the area by providing incentives to the new firms and also maintaining the existing healthcare facilities. The University of Melbourne provides research facility and researcher supply to the businesses, and bridges graduates and firms, which benefits the companies located at the precinct[41].

Knowledge assets: The University of Melbourne, Bio21 Institute, the Royal Melbourne Hospital and Royal Children's Hospital, relocated the Royal Women's Hospital are prominent institutions that have elevated the growth potential of the precinct[41]. There are a number of SMEs located in the precinct having significant number of biomedical patents and producing medicines.

Relational assets: With support from the state government, City of Melbourne and the University of Melbourne, Parkville has become one of the successful examples of triple-helix collaboration. Particularly the University of Melbourne and regional hospitals in the area has facilitated a synergy between the university, healthcare facilities and the firms that invest in biosciences R&D[41].

Asset management plan, implementation and performance monitoring: The strategy document of the city[40] outlines the needs of becoming a world-class knowledge city, role of universities in creating synergies in urban context, and effective ways of collaboration to cultivate city-based learning. In addition to this, Victorian Government prepared a strategic plan for Parkville precinct giving details of policy options and implementation strategies. Plan explains the role of the precinct as the major cluster of medical and biotechnology research, education and healthcare. It clearly states, collaboration to drive innovation within the Precinct is vital to its ongoing status as a world-class biomedical precinct, and its contribution to high levels of health, social and economic benefits for the State[41]. The precinct's connection to CBD, key infrastructure and research facilities has been shown as the prominent competitive advantage in cancer research and these also facilitate a biotechnology precinct in close proximity. In terms of implementation, the growth requirements of the existing research facilities and start-up firms are planned to be met either through rezoning irrelevant uses in the precinct—even though it is hardly possible when highly developed status of the precinct is considered—or encouraging urban development of mixed-use areas in close vicinity[41]. City of Melbourne employs several benchmarking tools—including RMIT Global University Cities Index and MACKi's the Most Admired Knowledge City Awards—to evaluate the performance of the city and its KCPs[40].

3.3 Kelvin Grove Urban Village, Brisbane

Kelvin Grove Urban Village (KGUV) is a proof of commitment of the Queensland Government and Brisbane City Council to 'Smart State' initiative and considered as an alternative solution to sprawling urban form. This is a joint initiative of the Queensland Government and the Queensland University of Technology (QUT). This has also been the foundation of the QUT's Kelvin Grove Campus This multi-award winning project was planned in 2001 and construction started in 2002. The precinct covers about 16 ha area and is only 5 km distance to Brisbane CBD. Until now more than $1 billion was spent for this mixed-tenure, medium density, inner city planned knowledge community. As of 2008, KGUV inhabits around 4,000 people from all age groups (being mostly young professionals) in approximately 2,000 individual dwelling units.

Asset identification and valuation: Symbolic assets: KGUV is located at the inner city of Brisbane with close proximity to the CBD, which is the third largest city in Australia. Even though Brisbane is not as globally famous as Sydney and Melbourne, the city has been recognised as one of the emerging global cities considering the growth in population and economy. The two brands of the state—i.e., Smart State, Sunshine State—reflect the symbolic strengths of the city, which are investing on knowledge and the perfect weather.

Social assets: Cultural and performing arts activities attract local inhabitants and tourists to the precinct. There is a mixture of people from different age groups and cultural backgrounds in the precinct considering the international student and researcher flow and local inhabitants.

Human assets: Brisbane has a growing skilled workforce considering the contemporary immigration trend. QUT is the only education and research institution facilitating R&D activities and business development in the precinct. However, the other two large universities of the city are within 10 km distance.

Heritage and cultural assets: Albeit limited in numbers, the heritage remainings of indigenous people and former military barracks have been preserved in the precinct area. Brisbane has been one of the focal points of international students and immigrants in Australia; therefore, there is an increasing openness and tolerance between the existing inhabitants and newcomers.

Natural, environmental and infrastructural assets: Compact urban development concept—i.e., urban village—is adopted as design principles, which has been recognised with a national design excellence award. KGUV is a master planned community and reflects characteristics of both traditional Queenslander style urban fabric and modern research facilities with surrounding amenities. The precinct has a convenient public transport and non-motorised transport network, however, its connection to the CBD has been considered as rather weak[7].

Financial assets: State government played an important role in initial investment of the precinct and then the management has been handed to a QUT-based firm. There are no direct incentives to the firms at the moment, but state government has been investing in hard and soft infrastructures, and also in branding of the precinct.

Knowledge assets: Creative industries and health are the main sectors that are aimed to be located in the precinct. While the former is developing consistently, the latter requires more time, support and effort to grow. No apparent success stories recorded from the precinct yet. However, on paper quality accommodation, recreation, urban design, research facilities and infrastructures make it an ideal KCP model.

Relational assets: KGUV is a joint initiative of Queensland Government and QUT, with support and involvement of the Brisbane City Council. At the moment, QUT is responsible for development and marketing of the precinct.

Asset management plan, implementation and performance monitoring: In the regional plan, adaptation to knowledge economies are covered in support for business centres and employment policy sections, which clearly advocates creation of key KCPs considering the urban sustainability principles and creating highly skilled jobs and employment diversification opportunities[42]. KGUV project is a good example of ‘Smart State’ of the Queensland Government and is regarded as a social experiment in Australian urban design due to ambitious implementation of the new urbanism principles[43]. Quality of the urban space—i.e., medium density, mixed-use development, accessibility to the services by non-automobile means and attractive civic environments—is detailed in the master plan. Housing diversity and provision is another topic highlighted as a wide range of demographics has been included in the accommodation options including student accommodation, disability support options, aged accommodation, and people living in government assisted housing via the

Brisbane Housing Company[43]. QUT has provided education and research infrastructure for the creative industries and health, and is responsible for the development and marketing of the KGUV precinct. The health research is local and provides clinic level services. Queensland applies performance based planning on all levels of planning and implementation practices, and measure the success by desired regional and environmental outcomes, which set out a generic achievement statement at the regional scale or a performance indicator at the local scale. While the regional outcomes are very similar to the concerns mentioned in the Smart State initiative, environmental outcomes are related to the building structures and impact assessment of the construction.

4. Discussion

KCP cases that we explored in this paper to better understand the planning and development characteristics and processes provide us rather interesting findings.

First of all, even though each case to a certain degree has unique characteristics, there are a lot of similarities observed. For example, all cases include a government-led initiation process. Developing a 'good business climate' is seen as the primary driver of such development. In most of them a triple-helix model partnership is occurred. Central urban areas are chosen as physical locations for the precincts—proving the claims of the literature of knowledge generation is generally being an urban phenomenon. Even if all precincts are aiming to facilitate endogenous assets for knowledge generation and community development, in almost all cases, policies for attracting exogenous talent and investment exist. In most of these developments a great value to the innovation and knowledge generators—i.e., knowledge workers—are given. Besides, in some of them forming knowledge communities even comes before generating knowledge—i.e., KGUV—further highlighting the importance of 'good people climate'. In global and Australian cases a special attention is given to the natural and built environments to attract and retain talent from the city/region or abroad—investing on a 'good spatial climate'. Management of KBUD and also knowledge-based activities of the precincts are practiced fairly well all across the case studies—establishing a 'good governance climate'.

Secondly, in addition to commonalities among the case studies, each precinct has its own unique qualities. In the case of KGUV a top-down model, despite the bottom-up planning tradition, is followed. ATP was a regeneration project of an inner city Sydney railway hub and government played a central role for the orchestration of the development. Melbourne's Parkville is the only organic development case in contrast to the other two cases. An extension of University of Melbourne Parkville now merged with the inner Melbourne providing a true KCP.

Thirdly, in the Australian cases, when compared with other European and Asian examples, first thing we notice is the effects of the tyranny of distance, which made international connections. Albeit, the beauty of knowledge economy comes with the advanced ICT that gaps most of the problems caused by the distance, limited proximity and face-to-face knowledge exchange mostly restricts the impact area of the Australian knowledge industry and businesses to the Asia-Pacific region. Another challenge Australian cities and hence KCPs are facing is the standing of the country in the knowledge economy rankings, and even worst having a development paradigm shift away from knowledge economy prioritisation—i.e., considerations on the abolishment of Smart State strategy of Queensland and further investing on the traditional sectors of Australia such as mining, agriculture, tourism, construction. In the case of ATP, the planning and development process was top-down, nonetheless, a semi-government firm managing this process. The development was originally planned as a knowledge precinct and not including any residential and

recreational/cultural facilities, and now moving towards to be converted into a KCP, these facilities are tried to be located either on site or nearby. Focusing on the physical precinct boundary, the precinct is a relatively small scale one, however, when the blurring boundaries with the surrounding Sydney's rich urban amenities considered, the precinct can be considered quite well integrated with the city centre. Parkville knowledge precinct is contrary to other examples is a bottom-up and organic development, and a natural growth of the University of Melbourne's industry collaboration around the campus. Having plans to further expand and become a globally acknowledged KCP, the development is now seeking a more comprehensive approach to coordinate/integrate KBUD endeavours. KGUV is a unique case aimed to develop a true knowledge community with a top-down approach. Started very ambitious project, however, later on due to potential political complications/rivalry strong support behind the development is pulled off, leaving the university to manage and promote the development pretty much by itself. Even there was no creative industry in the region, QUT initiated the research education in the sector at the precinct, which is to surprise becoming one of the strongest in Australia. Urban form related strategies of the precinct are prominent and the design quality of the precinct is widely recognised.

Lastly, the limitations of this study and the analysis are apparent, and hence, require planning to undertake a more in-depth prospective study. Thus, although the findings of this research revealed useful insights for Australian KCP development, the study results should be taken into account by considering the limitations—i.e., case selection, data collection/availability, and potential bias of qualitative analysis.

5. Conclusion

In this paper, we explored the literature and current successful practices to shed light on the planning and development processes of the KBUD phenomenon with respect to the construction of KCPs. Firstly, the literature has underlined the usefulness of strategic asset-based planning approach for the knowledge-based development of such precincts and provided an analysis framework to qualitatively investigate globally successful Australian practices. Secondly, in general, the have revealed that despite to their branding and characteristic differences, KCPs do provide space for knowledge generation and place for knowledge communities—thus establish contemporary urban spaces for knowledge and innovation. More specifically, such precincts are initiated with the lead of public sector, but received support from either industry or academy or both down the track—i.e., triple-helix model. The investigated KCPs cases from Australia are exemplar initiatives with their salient characteristics showing varying degrees of uniqueness. All cases highlight the importance of central urban locations as home for such precincts in order to benefit from the rich socio-cultural amenities of the city they are placed in. All cases not only demonstrate the importance of economic, social and spatial measures for a KBUD success, but also underscore the role of governance. Lastly, Australian cases, still with room for further development, have the potential to set standards for other cities seeking similar achievements in establishing contemporary urban environments.

References

1 Frane, A., Tomsic, M., Ronecevic, B. & Makarovic, M., (2005). The challenges of sustained development. Budapest: Central European University Press.
2 Claessens, S., Dell'Ariccia, G., Igan, D. & Laeven, L., (2010). Cross-country experiences and policy implications from the global financial crisis. Economic Policy, 25(62), 267-293.

3 Malecki E., (2007). Cities and regions competing in the global economy, Environment and Planning C, 25(1), 638-654.
4 Asheim, B., (2007). Differentiated knowledge bases and varieties of regional innovation systems, Innovation, 20(3), 223-241.
5 Yigitcanlar, T., (2011). Redefining knowledge-based urban development, Int. J. Knowledge Based Development, 2(4), 340-356.
6 Carrillo, J., (2010). Knowledge-based value generation. In K. Metaxiotis, J. Carrillo, & T. Yigitcanlar, (Eds.), Knowledge-based development for cities and societies, Hersey, PA: IGI-Global, 1-16.
7 Yigitcanlar, T., Velibeyoglu, K. & Martinez-Fernandez, C., (2008). Rising knowledge cities, J. Knowledge Management, 12(5), 8-20.
8 Yigitcanlar, T., (2009). Planning for knowledge-based development, J. Knowledge Management, 13(5), 228-242.
9 Indovina, F., (2010). On strategic planning and associated issues. In M. Cerreta, G. Concilio & V. Monno (Eds.), Making strategies in spatial planning knowledge and values. London: Springer.
10 Aghion, P. & Howitt, P., (1998). Endogenous growth theory. Cambridge: MIT Press.
11 Romer, P., (1990). Endogenous technological change, J. Political Economy, 98(5), 71-102.
12 Cooke, P., (2002). Knowledge economies. London: Routledge.
13 Huggins, R. & Strakova, L., (2012). Knowledge-based economic development in emerging regions, Regional Studies, 46(7), 961-975.
14 Konstadakopulos, D., (2003). The emerging knowledge-based economies of the Atlantic regions, J. Transatlantic Studies, 1(1), 59-86.
15 May, T, & Perry, B., (2011). Contours and conflicts in scale, Local Economy, 26(8), 715-720.
16 Lever, W., (2002). Correlating the knowledge-base of cities with economic growth, Urban Studies, 39(5/6), 859-870.
17 Johnston, A., (2011). The economic performance of UK cities, 1995-2005, European Planning Studies, 19(12), 2095-2108.
18 Asheim, B., (2012). Innovating. In Yigitcanlar, T., Metaxiotis, K., & Carrillo, J. (Eds.), Building prosperous knowledge cities, Northampton, MA: Edward Elgar, 3-23.
19 Florida, R., (2002). The rise of the creative class. New York: Basic Books.
20 Knight, R., (2008). Knowledge based development. In T. Yigitcanlar, K. Velibeyoglu, & S. Baum (Eds.), Knowledge-based urban development, Hersey, PA: IGI-Global, xiii-xviii.
21 Yigitcanlar, T., O'Connor, K. & Westerman, C., (2008). The making of knowledge cities, Cities, 25(2), 63-72.
22 Romein, A., Fernandez-Maldonado, A. & Trip, J., (2011). Delft blues, Int. J. Knowledge-Based Development, 2(2), 148-165.
23 Vazquez-Barquero, A., (2007). Endogenous development. In A. Scott & G. Garofoli (Eds.), Development on the ground, London: Routledge, 23-43.
24 Knight, R., (1995). Knowledge-based development, Urban Studies, 32(2), 225-260.
25 Kunzmann, K., (2008). Spatial dimensions of knowledge production. In T. Yigitcanlar, K. Velibeyoglu, & S. Baum (Eds.), Knowledge-based urban development, Hersey, PA: IGI-Global, 296-300.
26 Perry, B., (2008). Academic knowledge and urban development. In T. Yigitcanlar, K. Velibeyoglu, & S. Baum (Eds.), Knowledge-based urban development, Hersey, PA: IGI-Global, 21-41.
27 van Wezemael, J., (2012). Directions for building prosperous knowledge cities. In T. Yigitcanlar, K. Metaxiotis, & J. Carrillo (Eds.), Building prosperous knowledge cities, Northampton, MA: Edward Elgar, 374-382.
28 Maldonado, A., & Romein, A. (2010). The role of organisational capacity and knowledge-based development. Int. J. Knowledge-Based Development, 1(1), 79-96.
29 Nguyen, T., (2010). Knowledge economy and sustainable economic development. Munich: de Gruyter Saur.
30 Ovalle, M., Marquez, J. & Salomon, S., (2004). A compilation of resources on knowledge cities and knowledge-based development, J. Knowledge Management, 8(5), 107-127.
31 Yigitcanlar, T., (2010). Making space and place for the knowledge economy, European Planning Studies, 18(11), 1769-1786.
32 Yigitcanlar, T., and Lonnqvist, A., (2013). Benchmarking knowledge-based urban development performance, Cities, 31(1), 357-369.

33 Mathie, A., & Cunningham, G., (2003). From clients to citizens. Development in Practice, 13(5), 474-486.
34 Velibeyoglu, K., & Yigitcanlar, T., (2010). An evaluation methodology for the tangible and intangible assets of city-regions. Int. J. Services Technology and Management, 14(4), 343-359.
35 Carrillo, J. (2002). Capital systems. J. Knowledge Management, 6(4), 379-399.
36 Friedmann, J. (2007). The wealth of cities. Development and Change, 38(6), 987-998.
37 ATP (2011). Annual Report. Sydney: Australian Technology Park (ATP).
38 COS (2008). Sustainable Sydney 2030. Sydney: City of Sydney (COS).
39 DOP (2008). Sydney City: Draft Subregional Strategy. Sydney: Department of Planning (DOP).
40 COM (2008). Future Melbourne. Melbourne: City of Melbourne (COM).
41 DOH (2005). Parkville Precinct Strategic Plan. Melbourne: Department of Health (DOH).
42 DSD (2009). South East Queensland Regional Plan 2009-2031. Brisbane: Department of State Development (DSD).
43 Carroll, J., Adkins, B., Foth, M., & Parker, E. (2007). The Kelvin Grove Urban Village, International Urban Design Conference, Gold Coast.

THE ROLE OF THE SMALL AND MEDIUM SIZED ENTERPRISES (SME) WITHIN THE REGIONAL DEVELOPMENT OF THE SLOVAK REPUBLIC, OF THE REPUBLIC OF SERBIA AND OF THE REPUBLIC OF TAJIKISTAN

Mgr. Jan Janać, PhD.[1], Ing. Osim Mamatkulov, PhD.[2], Mgr. Katarína Rentková, PhD.[3]

[1]Department of Economy and Finance, Faculty of Management Comenius University in Bratislava, Odbojarov 10, 820 05 Bratislava, the Slovak republic, jan.janac@fm.uniba.sk

[2]Department of Economy and Finance, Faculty of Management Comenius University in Bratislava, Odbojarov 10, 820 05 Bratislava, the Slovak republic, osim.mamatkulov@fm.uniba.sk

[3]Department of Economy and Finance, Faculty of Management Comenius University in Bratislava, Odbojarov 10, 820 05 Bratislava, the Slovak republic, katarina.rentkova@fm.uniba.sk

The article focuses on the analysis and the definition of the subject-matter and the role of the Small and Medium Sized Enterprises (SME) in the context of its influence on the regional development. SMEs represent one of the "driving engines" and determinants of the economy. Their achievement is directly proportional to the regional success where they are located.

The article consists of 3 case studies that analyze SMEs in connection with regional development and its maintenance in the Slovak republic, the Republic of Serbia and the Republic of Tajikistan. In the conclusion and discussion we applied the comparative method.

The objective of regional corporations and States should be the maintenance of SMEs and this has many reasons. SMEs encourage and increase the attractiveness of a region; they contribute to the growth of competitiveness of a region and lower the regional unemployment. Another strength of SME is their attachment to a region (e.g. in the sector of tourism or specialized enterprises). According to numerous statistics the SME represent the agent of stability in the region. This report is an analysis performed in various States that have different perception of the role of SME, as well as tools used for their maintenance.

The case studies include recommendations that can be applied in individual States and the results will be used in lectures as their provide characteristics and comparison of tools of maintenance for the development of regions via SME in three different States.

Keywords

Regional development, Small and Medium Sized Enterprises (SMEs), support of development

1. Introduction

The regional development is influenced by many factors that act differently depending on the region. To ensure the effective and harmonized regional development, the systematic approach is needed. Every region is unique and differs from the other by the level of economic development, living standards of its inhabitants, unemployment rate and by employment possibilities. The differences between regions could be eliminated by increasing the investments in the regions, decreasing the differences in the living standards, building up the infrastructure or by the strengthening the economical and social cohesion. Small and Medium Sized Enterprises are one of the factors influencing the regional development. Their role in the development of the advanced market economy is irreplaceable.

2. The Slovak Republic

The Slovak republic represents the country which is characterized by its diversity, but mainly by the disparities between the regions. The statuses of the regions, the business environment as well as the possibilities for the regional development are influenced by the historical evolution and by the administrative system of the country. The business environment is formed by the legislative intervention originating from the economical development and its structure. Demographical factors have also certain influence in the matter.

2.1 The Business environment and the structure of the economy

The independent Slovak republic came into existence on the 1st January 1993 as the sovereign democratic state with the parliamentary form of the governance. With the expanse of 49035 m^2 and with 5 404 322 inhabitants (reported on the 31.12.2011), 48.6% of which are men and 51.4% women, Slovak republic constitutes one of the smaller European states. In regard to its advantageous position (geographically in the middle of the Europe), the Slovak republic is described as the bridge of the European Union (EU) to the east. The Slovak republic represents the important transit point for the market of non-European Union countries.

The economy of the Slovak republic is integrated within the frame of the global world economy. The Slovak republic is the member of GATT/WTO and from 2001 also OECD. In 2004 The Slovak republic became the member of the NATO. Since 1st May 2004 the Slovak republic is the Member-State of the EU, therefore it takes part in the Single European Economic Area. The integration efforts of the Slovak republic within the area of the European Economic and Monetary Union were concluded on the 1st January 2009 when the currency of the Slovak republic was changed into the uniform European currency – the Euro.

The conditions for business activities are strongly influenced by the economy, however from the macroeconomic point of view it can be stated that the Slovak republic belongs among the countries which are interesting for investments possibilities. On one hand, the investors could be afraid of the impact and the outcome of the ongoing debt crisis in the Eurozone. On the other hand, the perspective macroeconomic development of the Slovak republic would have the positive impact on the investors, based on the data of the Statistical Office of the Slovak republic and the Ministry of Finance of the Slovak republic.

In 2011, the economy of the Slovak republic achieved the accretion of 3.3% of the Gross domestic product (GDP), even though the inter-annual decrease of 0.9 percentage point was recorded in comparison with 2010. The GDP (in common prices) was 69 058.2 millions Euros (94.552 billion USD) which was also linked to the accretion of the gross output to

5.1%. The Slovak economy is strongly oriented to the export and it could be stated that the Slovak economy is one of the most open economies among the EU countries. The share of the foreign trade turnover on the GDP was rated at 175.6%. The biggest share on the GDP (in common prices) was produced by the industry (29.5%) and the smallest one by the financial and insurance activities (3.1%), the agriculture, forestry and fishery (2.9%) and the art, entertainment, recreation and other activities (2.8%). In 2011, the inflation rate was 3.9%. The unemployment rate recorded by the Statistic Office of the Slovak republic was 13.5% that represented about 367 900 unemployed persons. In the Slovak economy, the average monthly salary was 786 Euros with the nominal inter-annual accretion of 2.2%. The real salary decreased by 1.6%.

From the point of view of the analysis of the Slovak entrepreneurial environment, it is important to note the ranking of the World Bank "Doing Business". Within the ranking of "Doing Business 2013", the Slovak republic took 46th place out of the 185. GNI per capita was recorded in an amount of 16070 Dollars. [4] In the Slovak republic (until 31.12.2011), the entrepreneurial environment was created by 556 206 business subjects, from which 153 181 were the enterprises (legal persons) and 402 325 were natural persons – entrepreneurs.

Among the strengths of the Slovak republic belong advantageous geographical position, positive macroeconomic results, relative political stability, the labor power (superior and sufficient, low costs in relation to the high labor productivity), improvement on the infrastructure, EU Membership (the Euro currency, EU legislation and rules directed to state aid to SME, support in business, support and improvement of the approach of the SME to finances, regional development, decreasing the regional disparities, the wide possibilities in support utilization).

The regional development is executed mainly by the common European policy called The Cohesion Policy. This Policy is based on the seven-year-planning-system and is governed by adopted objectives. The administrative structure of the Slovak republic is regulated by the law. The Slovak republic comprises of 8 Departments (or Districts) which are then divided into 79 counties. There is a specific division of regions for the purposes of the Cohesion policy realization, in other words for the support of the regional development via structural instruments of the EU. Through the Regulation (EC) No 1059/2003 of the European Parliament and the Council of the 26 May 2003 on the establishment of the common classification of territorial units for statistics (NUTS), was adopted the basic structure of NUTS. This structure was based on the three-level division of the regions. The analysis of the Slovak regions shows the notable disparities [3]:

- The income of inhabitants, the average nominal salary – in 2011, the income of inhabitants in particular departments differs notably. In the Bratislava Department, the income is 1001 Euros (1301.3 USD); in Prešov Department is 608 Euros (790.4 USD). In comparison to 2010, the income increased in all departments.
- The unemployment rank – in 2011, the unemployment rank in the Bratislava department was about 5.8%. The highest unemployment rank was noted in the Košice department, 19.6%. In comparison to 2010, the unemployment rank decreased in all departments, except in Košice Department where the unemployment increased from 18.3% to 19.6%.

2.2 The Small and Medium Enterprises (SMEs)

The definition of the SME in the Slovak republic is similar to their definition in the other EU countries. The micro-enterprise is the entrepreneurial unit in which less than 10 employees are employed and the revenue of which is less than 2 million Euros (2.6 million USD). The Medium enterprise is the entrepreneurial unit in which less than 50 employees are employed and the revenue of which is less than 10 million Euros (13 million USD). The medium size

enterprise is the entrepreneurial unit which is characterized by the fact that this unit has between 50 to 249 employees and its revenue is less than 50 million Euros (65 million USD).

In the EU, the SME represent more than 98% European enterprises and ensures more than 67% of the jobs. The SME represents the important element of the EU economy, the important "driving engine" of the European economical growth and the opportunity to create maintainable jobs. About 85% of all new jobs in the EU (from 2002 to 2010) were created by the SME. In the EU, 32.5 million of people act as self-employed persons.

Table 1 SME business activity indicators in 2011 [1]

	No. f enterprises			Employment			Value Added		
	Slovakia		EÚ-27	Slovakia		EÚ-27	Slovakia		EÚ-27
	Value	%	%	value	%	%	bln.Eur	%	%
Micro	49440	78,4%	92,2%	129841	13,4%	29,6%	2	10,7%	21,2%
Small	10831	17,2%	6,5%	208196	21,5%	20,6%	4	19,2%	18,5%
Medium	2296	3,6%	1,1%	224945	23,3%	17,2%	5	22,3%	18,4%
SMEs	*62567*	*99,2%*	*99,8%*	*562982*	*58,3%*	*67,4%*	*12*	*52,2%*	*58,1%*
Large	494	0,8%	0,2%	403141	41,7%	32,6%	11	47,8%	41,9%
Total	63061	100%	100%	966123	100%	100%	23	100%	100%

These numbers are the estimations for 2011 based on the numerical data from the Structural Business Statistics Database (Eurostat) for 2005 – 2009 period. These estimations were recorded by the Cambridge Econometrics society. The data concern "entrepreneurial economic" that consist of the industry, building industry, finances and services (NACE Rev. 2 section B to J, L, M, and N). The data do not concern the enterprises acting in the area of agriculture, forestry, and fishery or non-market services such as education or health care. The positive fact about using the Eurostat data is that the statistics from different countries were synchronized and thus they are comparable. The negative point is that the data issued by the national offices can differ from those issued by the Eurostat.

For the small and medium enterprises is typical their high number, however that is at the expense of the very small enterprises (micro-enterprises); especially the group of the medium enterprises reports above-average contribution to the employment (23.3% in comparison to 17.2% within the EU) and to the added value (22.3% in comparison to 18.3%). [1] However, all in all, the SME sector contributes to the added value and to the employment less than the European average. It could be the consequence of the industrial structure of the Slovak economy.

The small and the medium enterprises employ about 70% of the Slovak employable inhabitants, but their participation on the GDP is only 30%. One of the reasons for this low level of participation is the low percentage of their internationalization. The problems concerning the internationalization of the Slovak enterprises are e.g. lack of financial background, unfamiliarity with the potential offered by the countries (mainly the developing countries), and misgivings of expanding. [3] The small and medium enterprises represent the inseparable part of the regional policy and regional development planning. Their main objective is, via available instruments and finances, to ensure the sustainable development and regional growth and to eliminate the regional disparities. The adequately chosen business strategy is important for strengthening the development of the small and middle sized companies.

The companies are functioning in the highly competitive environment. It is improbable that the free trade or the market mechanism could have any influence on balancing out the regional disparities which means that the poor regions could have been even poorer. For this reason, the planning and programming of the regional development seems important also in relation to the support for the small and middle enterprises. The regional support on enterprises should be oriented towards the development and improvement of the economical

structure and creation, stabilization of endangered jobs in regions by using the State or other structural aid. The Slovak republic as the EU Member State is involved in many SME support programs but also in the regional development program.

3. The Republic of Serbia

After the breakdown of the big Yugoslavia in 1992 and after the subsequent social riots that lead to the war in Croatia, Bosnia and Herzegovina, the West Balkans States entered the economical and social crisis. In 1993, previous Federal Republic of Yugoslavia (nowadays Serbia and Montenegro) suffered the greatest hyperinflation in the world history, more than 300% on the daily basis. The biggest paper money was 500 billion Dinars. In that period, the average monthly salary was not more than 10 German Marks.

On 14 December 1995 the Contract of Deyton ended the war and subsequently the process of stabilization of the Serbian economy begun. The peace was violated again because of the riots in Kosovo. On 24 March 1999 the NATO commenced the bombarding of Serbia which continued until 11 June 1999. Serbia found itself in a very complicated situation. The infrastructure was destroyed and the budget was totally spent. In 2000, the governance of Slobodan Milošević was thrown down and the democratic opposition started new reforms in the financial and social sectors.

3.1 The entrepreneurial environment and economical structure of the economy

If the financial and economic crisis had not taken place, the economy of the Republic of Serbia would have developed positively since 2000. This statement is demonstrated by many macroeconomic parameters: in that period, the average growth of GDP was 3.26%; the GDP per capita increased 4.27 times (in 2001 the GDP per capita was 1531 USD and in 2012 6539 USD per inhabitant). In 2001, the GDP increased from 11.4 billion USD to 48.5 billion USD (in 2012). [5]

From the point of view of the analysis of the Serbian entrepreneurial environment, it is important to note the ranking of the World Bank “Doing Business”. Within the ranking of “Doing Business 2013” the Republic of Serbia took 86th place out of 185. GNI per capita was recorded in the amount of 5.680 USD. The Republic of Serbia is ranked among 10 economics that have adopted the biggest number of reforms. The study executed in 2011 ranked the Republic of Serbia on the 95th place. [4]

But the problem of the Serbian economy is the high level of unemployment. In 2012, the unemployment was at record-breaking 25%, and the notable decrease of this number is not expected in the near future. The Republic of Serbia is constantly trying to fight against these economic problems, but so far, its effort and methods did not prove to be effective.

The Republic of Serbia has very good presuppositions for the future. The benefits of the country are the good geographical position and advantageous environment for investments. Despite its proximity to the EU, the average net salary is less than 400 Euros/month (520 USD/month) which is one of the most important reasons for the influx of the foreign investments. In addition, the Republic of Serbia has the Agreement on the free trade with Russia. According to this Agreement, it is possible to export great variety of goods to Russia, but not all of them. Serbia is the only country that has this type of agreement with Russia. Thanks to the good relations with Russia, Serbia has another advantage in form of another pipeline from Russia to the EU would lead across Serbia. The pipeline´s name is “South stream” and its northern part would pass through Serbia.

Serbia can be divided into four units: Beograd, Vojvodina (the autonomous region), the Southeast Serbia and the West Serbia. During the former Yugoslavia, Vojvodina (the

northern part of Serbia) had the autonomy which was derogated by the regime of Slobodan Milošević. After the renovation, Vojvodina uses the status of the autonomous region of Serbia. It has its own Government and Parliament, but it does not possess the ultimate sovereignty.

Within the regional development, the most important place is dedicated to the counties (regions that have more than 10,000 inhabitants). After the government of Serbia, the next State level institution is the county and its organs. The Serbia has 198 counties and many of them do not have enough financial strength to invest into the infrastructure and developing projects. This is why the differences between the regions are more and more noticeable.

Similarly to the other central European States, the Serbia is also strongly centralized State. The Beograd region, the capital city region, creates about 40% of the total GDP, whereas the Vojvodina creates only 26%. The central and the south Serbia creates together 34% of the GDP which clearly shows the regional disparities. [] More important fact showing the regional disparities is that in Beograd and its region, the GDP per capita is 80% higher than the total Serbian average.

3.2 The Small and Medium Sized Enterprises

The organizational structure consists of micro, small and medium-sized enterprises (SME) and entrepreneurs. Classification of legal entities is similar to the Slovak classification and corresponds to size (the number of employees) as follows: micro enterprises (up to 9 employees), small enterprises (10-49 employees), and medium-sized enterprises (50-249 employees). Entrepreneurs (sole traders, physical persons doing business independently) are included in micro enterprises.

Table 2 SME development indicators [8]

	SMEs		Large companies		Non-financial sector		Share of SMEs %	
	2010	2011	2010	2011	2010	2011	2010	2011
No. of enterprises	318 540	319 304	504	498	319 044	319 802	99.8	99.8
No. of employees	814 585	786 873	412 966	418 404	1 227 551	1 205 277	66.4	65.3
GVA (mil. dinars)	817 417	878 245	645 309	712 483	1 462 726	1 590 729	55.9	55.2
Investments (mil. dinars)	275 915		219 093		495 008		55.7	

In 2011, entrepreneurial sector included 319 304 business entities (99.8% of enterprises), with 786 873 employees. This sector generated 5 200 dinars of turnover and 872.2 bn. Dinars of gross added value (GVA). Compared to 2010, employment dropped by 3.4%. There were no significant changes in the SME sector´s structure. In 2011, SME sector´s structure is held by micro enterprises (307 430).

Table 3 SME business activity indicators in 2011 by size of enterprises [8]

	Micro		Small		Medium		SMEs	
	value	%	value	%	value	%	value	%
No. of enterprises	307 430	96.3%	9 656	3.0%	2 218	0.7%	319 304	100%
No. of employees	358 992	45.6%	195 602	24.9%	232 279	29.5%	786 873	100%
GVA (mil. dinars)	338 042	38.5%	254 516	29.0%	285 687	32.5%	878 245	100%
Turnover per enterprise (mil. dinars)	6.7		164.9		702.9			

A decreasing trend in the number of medium-sized enterprises is observable and it continued also in 2011. Analyses of the business conditions indicate some problems that have been existing for many years:

- Limited production and economic resources – increased the dependency of this sector on the external sources of financing.
- Insufficient internationalization and low level of competitiveness.
- Unfavorable structure of the SME and entrepreneurs sector by business activities.

Serbia made a significant progress in the restructuring of SME policy and activities on regionalization because SME and entrepreneurs sector have an important impact at the State economy. SME Policy was reformed. The regional development element was added at this policy and the Serbian Agency for the Development of Small and Medium-sized Enterprises was transformed to the National Agency for Regional Development. That was an important step that 1) started activities in cooperation with the local agencies and 2) prepared activities for the use of EU regional development funds.

4. The Republic of Tajikistan

The Republic of Tajikistan is a country situated in the central Asia. The Republic of Tajikistan has been independent since 1991. Nowadays, the Republic of Tajikistan is the member of The Society of Independent States (SIS). After the Republic of Tajikistan gained its independence, the civil war broke out and it lasted from 1992 and 1997. At the moment, the situation in the country is stabilized. The Tajikistan is one of the smallest States in the Asia (7 011 556 inhabitants, expanse: 143 100 km^2). The Republic of Tajikistan has good foreign economic relations with the neighboring States, but also with the EU, the USA and the international financial organizations. The Tajikistan is the member of e.g. the European Bank for Reconstruction and Development (EBRD), the Organization for Economic Co-operation and Development (OECD) and International Monetary Fund (IMF). [11]

4.1 The entrepreneurial environment and the structure of the economy

In 2012, the GDP was more than 7.5 billion USD that represents the increase of 7.5% in comparison to 2011. In 2012, the GDP structure was: goods production - 42.3%, service production - 46.1% and the taxes - 11.6%. The GDP per capita level was 1008 USD.

In 2012, The Tajikistan foreign trade was more than 5.1 billion USD that represents the increase of 15.1% in comparison to 2011. The trade balance was negative and represented more that 2.4 billion USD. The Tajikistan had the foreign trade with 102 countries, including 10 SIS countries and 92 others countries. The character of the Tajikistan entrepreneurial

environment is describes also by World Bank evaluation "Doing Business". Within the "Doing Business 2013" rating, the Republic of Tajikistan was on the 141st place. GNI per capita was 870 USD. [4]

According to official data, the amount of economically active inhabitants was 2.187 millions. 2.133 millions were employed in different sectors of economy and 54.7 thousand people had the official status of being unemployed that represents 2.1% of economically active inhabitants. According to unofficial data, the total amount of inhabitants migrating into the neighboring states represents 1.5 million inhabitants. In 2002, the partial and total unemployment represented 40% of the economically active inhabitants.

4.2 The Small and Medium Sized Enterprises

Between 1990 and 2012, the Tajikistan adopted the important number of legislative acts on the regional development and on trade layers. These legal acts became the legal base for the creation and protection on the entrepreneur rights, not only in cities, but also in the rural areas.

The small sized enterprises are the trade organizations in which the share on the capital of the Republic of Tajikistan, the bodies of the Republic of Tajikistan, public and religious organizations, charity and other funds, does not excess 25%, the share of the one or more legal bodies which are not subjects of the small enterprising, does not excess 25%. The average amount of employees, during accounting period, does not excess the following limits (small sized enterprises):

- in the industry, building industry and transport – 100 persons;
- in the area of agriculture, science and technology – 60 persons;
- in wholesale – 50 persons;
- in retail and consumers services – 50 persons;

The bodies of small sized enterprises are considered to be the individuals dealing with the entrepreneurial activity without the creation of legal body.

The development of the small sized enterprises is stimulated by the tax privileges on the goods production and on the services or by the advantageous loans. In the Tajikistan, the State aid for small sized enterprises is executed in many ways. The financing of the State and local programs to support the small business is executed annually from the State budget, local budget and other resources.

Small and middle sized enterprises have to face many problems. The main problem of the small sized enterprises is their low resource base – materials, technology, and finances. Basically, it is the creation of the new wide sector of economy almost from scratch.

There are several factors which objectively restrain the enterprising and foreign investments:

- limited access to the sea (inland country);
- distance from the developed world centers;
- lack of accessible oil and gas resources;
- natural and geographical State division into regions;
- low capacity of the domestic market.

Within the last 20 years, the capital of the country decreased significantly. The actual production level and the level of human capital is still higher than in other poor countries with the similar GDP level (1000 USD per person). The public policy does not ensure sufficiently the effective utilization of the productivity and human potential of the country.

In the Tajikistan, there are 6517 SMEs, the bigger part of which has more than 50 employees (6262 that represents 96%) and they are classified as the small and middle sized enterprises. In average, one small sized enterprise falls per 1000 inhabitants. In comparison, in the developed European countries 30 enterprises fall to 1000 inhabitants. The individual business is carried out by 99200 persons.

Within the entrepreneurial activities, the entrepreneurs of the Tajikistan are very restricted because of the lack of electricity (mainly in the winter period) and gas. The problems in passenger and goods transport between the regions and abroad represent a big problem as well. About 82% of SMEs do not use the bank accounts while trading. The recent opening of the national bank market for foreign bodies could ameliorate this situation. The monopoly activities of the national insurance companies that do not have sufficient capital prevent the employers from using their services.

It is well known that the decrease of the income of inhabitants provoked the important deterioration of consumption structure. The incomes are aimed at obtaining of basic goods and services. The same applies for the small sized enterprises. In the area of the small sized enterprising, the important negative changes have begun. If the ongoing process continues without any changes in the area of the social security, the existence of the small sized enterprises will be endangered. The country prepares National Development Strategy until 2015 whose aim is the achievement of new development objectives. One of the priorities is the development of private sector and the attraction of foreign investments. It is estimated that the development of private sector and enterprising, mainly micro-enterprises and small size enterprises, would ensure the maintenance of economic growth and create new conditions. The main goal is to increase the employment and income, create new jobs, decrease the motivation leading to work migration.

The analysis of the present enterprise status shows the existence of economic, administrative and legal restrictions. These restrictions prevent the creation and strengthening of the enterprise role in the area of the sustainable development in the country. The basic restrictions are:

- imperfection of the tax system, lack of tax stimulus;
- insufficient financing of State and local SME support programs;
- primitive mechanisms on financial and credit assistance against small enterprises risk;
- restricted access of small sized enterprises to the production facilities and to the possessions of the enterprises in restructuring;
- lack of responsible social protection and entrepreneurs security;
- low level of employee professionalism and insufficient experiences in the different areas of modern enterprising, restrictive comprehension of trade principles including the principles of modern management, financial and marketing analysis;
- unfavorable conditions on granting credits formed by higher interest rate;
- lack of access to information on local and foreign resources of credits.

When creating the program of sustainable development in the Republic of Tajikistan for the following 10 years, it is necessary to create the favorable conditions for functioning and development of enterprise, to strengthen the entrepreneur positions, mainly for SMEs. The solving SME problems can be distinguished into four main directions:

- To change the government psychology regarding the small sized enterprises. The change of mind regarding the behavior of the small sized enterprises, especially about not pay taxes and their part in the grey economy;
- The tax reform and simplification of tax system;
- To clarify and explain the buy and sell of goods;

- To support the investments into the small sized enterprises for those inhabitants who do not trust banks or the State. It is be possible that lot of money would come back into the economy, because many people keep their money “under their mattress or pillow”.

In the Republic of Tajikistan, people should live according to the same principles as people in all civilized countries; the State serves the needs and demands of the society and not vice versa. The law making process and decision-making mechanism should be aimed to further development and increase of the amount of SMEs.

5. Conclusions

The SMEs contribute to flexibility, competitive environment and innovating activities. In regard of the huge amount of the enterprises, in every analyzed economy, they may cause the unemployment decrease. The SMEs create the middle class which is the base of the emerging democratic society. The above mentioned shows that the most developed system for functioning of SMEs has the Slovak republic which has the best opportunities for financing SMEs given its membership in the EU, among other things. However, in comparison to EU-27, this sector is in the Slovak republic still in the developing stages and the critical points in which the Slovak republic should make some changes were identified. The role of SMEs in regional development is influenced by the entrepreneurial environment in its entirety. If the entrepreneurial environment shows instability (frequent contradictory economic and legislative measures), it is possible to create strategic entrepreneurial plans and objectives for the extended period of time. Frequent legislative changes have the negative impact on the stability of the entrepreneurial environment. In addition, the SMEs do not possess sufficient capacity to deal with these changes. The above mentioned problems have negative impact on the functioning of the SMEs and slow the regional development. The Republic of Serbia implemented many important changes that support the existence and activity of SMEs; however, it will take some time to start up this sector. In case of the Republic of Tajikistan, much more radical legislative changes are needed; however, the potential of this country is growing and partnerships in the area of the SME development could rise especially in agriculture, building the heat power plants, hydro power plants, building the roar infrastructure which is of strategic important in the country.

References

1 *Small and medium-sized enterprises (SMEs)*. Fact and figures about the EU´s Small and Medium Enterprise (SME) http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/index_en.htm
2 National Agency for Development of Small and Medium Enterprises. State of small and medium enterprises in the Slovak Republic. http://www.nadsme.sk/en/content/state-small-and-medium-enterprises
3 Rentkova, K.: *European cohesion policy applied to the development of regions and municipalities of the Slovak Republic.* Dissertation Theses. 144 p. Comenius University in Bratislava. 2012
4 The World Bank and the International Finance Corporation. *Doing Business 2013.* http://www.doingbusiness.org/~/media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB13-full-report.pdf
5 Statistical Office of the Republic of Serbia. . http://webrzs.stat.gov.rs/WebSite/Public/PageView.aspx?pKey=61
6 Erić D. - Beraha I., - Đuričin S., - Kecman N., - Jakišić B.: *Financing MSP in Serbia*, Belgrade: Institut ekonomiskih nakua, 2012. ISBN 978-86-80315-94-2

7 Stevanović, T. A.: *Export-Import improvement plan based on means of international trade center*, In: Magazine for business economics, entrepreneurship and finance. Novi Sad: FABUS, 2012. ISSN 1820-6859
8 Ministry of Finance and Economy, Ministry of Regional Development and Local Self-Government, National Agency for Regional Development. *Report on the Small and Medium-Sized Enterprises in 2011.* ISBN 978-86-84199-33-3
9 The National Bank of Tajikistan. *Macroeconomic Review of the Republic of Tajikistan*. http://www.nbt.tj/files/Monetary_policy/macroek_obzor/macro_obz_4kv_2011_en.pdf
10 Agency on Statistics under President of The Republic of Tajikistan. *Macroeconomic Indicators*. http://www.stat.tj/en/macroeconomic-indicators/
11 Ministry of Foreign and European Affairs of the Slovak Republic. *The Republic of Tajikistan. Economic review of the Republic of Tajikistan*. www.mzv.sk
12 Sysáková, V. – Šlahor, L.: *Peniaze a bankovníctvo*. Bratislava: Kartprint. 2010. ISBN 978-80-88870-89-0
13 Komorník, J. a kol.. *Finančný manažment*. Bratislava: Kartprint, 2011. ISBN 978-80-88870-97-5

ONE REVIEW AT INNOVATIVE POLICY AND STRATEGY IN MONTENEGRO

Prof. Aleksandar Vujovic, Ph.D.[1], Ljiljana Bozovic[2], Marko Backovic[2], Ivan Radojicic[2]

[1]Faculty of Mechanical Engineering, University of Montenegro, European Centre for Information and Innovation Montenegro
[2]Directorate for small and medium entrepreneurship Montenegro, European Centre for Information and Innovation Montenegro
Trg Vektra bb – 81000 Podgorica

Abstract:

This paper has purpose and represent authors striving and engagement at the project of developing Center for Information and innovation in Montenegro and improvement national policy and strategy in the field of small and medium entrepreneurship. This paper contains some results and experience from many years engagement in project which was established and financed from European union funds. There are many review, results and conclusion which is relate to possible direction for strengthening national policy and strategy. Here are one interesting approach and analysis about innovation and state in certified organization in Montenegro. That is interesting from the aspect of possible direction for improvement situation in this area.

Keywords:

innovation, certification, improvement

1. INTRODUCTION

The model of economic development based on competitiveness and innovation is gaining increasing importance in recent years. This process was especially strengthened by the latest crisis. Process of globalization and radical technological change in the end of XX century has created a new reality in which the innovation is one of key elements of competitive advantage of business systems and national economy.

Montenegro in the scope of investment in research and technological development, as well as in relation to the degree of innovativeness of enterprises, maintain the existing situation which, from the standpoint of dynamic changes in the world, have average intensity of improvement of development. Slightly link between scientific research, educational and economic spheres, has negative effects on human resources development, technological development and the export competitiveness.

In Montenegro, in the frame of strategies for small and medium-sized enterprises had defined action plan for carrying out the tasks, which are defined activities, the holders, terms of realization of individual activities. Activities are related to the implementation of projects in the following areas: institutional support (improvement of regional/local business centers, cluster formation, the formation of business incubators), elimination of barriers to business, education (through projects Student Entrepreneurship, private sector development, selection of the best

companies, activities for the realization Strategies of lifelong entrepreneurial learning, education start up businesses and entrepreneurs in the growth and development).

Through this material I would like to represent my opinion about:
- innovative policy and strategy in Montenegro and in relation with region,
- current situation in research, innovation and technological development,
- some possible direction for improvement in area of science, technology and innovation and
- developing innovation system in certified company in Montenegro.

2. RESEARCH, INNOVATION AND TECHNOLOGICAL DEVELOPMENT

Common starting point of the fundamental mechanisms for achieving the development strategy of Montenegro is a complex concept of competitiveness of the state and national economy. The main mechanisms for increasing the competitiveness of the complex and technological developments are moving the compliance orientation society based on knowledge that supports the policy development of human resources, labor and the labor market, development of information society, strengthening the competitiveness of economy and regional development that would reduce regional differences in development.

Small and medium enterprises in our environment take precedence in leadership projects. Such a situation is hardly transferred to our conditions due to the fact that they are completely different types of small and medium enterprises as well as companies founded on knowledge generated at universities and technology incubators.

Montenegro, generally, have small and medium enterprises engaged in production and simple services. Their interest in investing in projects of technological development is practically negligible. To stimulate them to invest in research, the state should support industry-oriented, market-feasible projects.

Inadequate access to external financing and a variety of credit lines is a common problem in all small and medium enterprises. The problem is more acute for funding scientific research, because of the potential risk that these investments carry.

One of the weak points of the research in Montenegro and poor transfer of research data on the market. Principles of industrial management, which includes confidential and fully available to scientific data, may be one of the indicators of how to motivate the financing of the industrial sector.

Montenegro belongs to the group of countries that have started (and have recognizable and significant results) to create legal and institutional framework in the field of innovation and motivation of small and medium enterprises (SME), but its a long way in the implementation of legal norms and creating a national program to encourage innovation. Creating links between SME and scientific research institutions is in the early stages, with clear and strong initiatives from the side of university for improvement this relation and impact . There are examples of inter-company networks or clusters. An important part is encouraging innovation and effective protection of the knowledge and assistance for the transfer of knowledge. The issue of intellectual property protection is imposed as one of the fundamental questions that must deal with the institutional and legal level.

Questions of intellectual property derived through research funded from public funds are in the early stage from the aspect of legal document support. It is necessary for training staff at the

State Administration for the provision of basic advisory services to clients, scientists, development of internal regulations, and adequately represents the scientific community in regulating intellectual property rights at national and international level. All scientific research institutions which create knowledge products or intellectual property, should establish the bodies, procedures and regulations that will regulate the management of intellectual property - from the aspect of law by the project, the rights to login and check the justification of patents, technology transfer (transfer of rights of any third party, contracting for technology licenses), to ensure financial resources for the protection of intellectual property (especially patents) and other.

3. SOME POSSIBLE DIRECTION FOR IMPROVEMENT IN SCIENCE, TECHNOLOGY AND INNOVATION FIELDS

Developing of national policy for developing science, technology and innovation (NTI) in the developing country, is characterized with next:

- non-real expecting which are represented through striving to the radical exchanging,
- adoption of developed technology and imitation condition in high developed country,
- law level of adoption of knowledge,
- law level of communication and systematic interoperability,
- lack of indicators for measurement efficiency of process in NTI,
- lack of information about NTI process especially in innovation area,
- lack of data base with significant data …

This and other similar condition, or maybe some other specialties, represent advantages or disadvantages and ambient of NTI development in Montenegro. In the sense of science and innovation developing, it can be selected different direction. In this material it is presented just some of the directions which can be adopted with aim to improvement NTI condition in Montenegro and in relation with regional policy and strategy in similar condition.

Technological development in Montenegro and innovative solution, are mostly related with small and medium enterprise. In this sense, science and research must be strong linked with organizational and industry development, technology and innovation through strong communication between organization which are responsible for this area.

Science and research must be focus in direction of following, servicing and strengthen capacity in entrepreneurship and innovation.

Strengthening of capacity in entrepreneurship should be conducted through next:

- strengthening of process of investing in small and medium enterprise in abroad,
- strengthening cooperation between small and medium enterprise from abroad with similar and familiar enterprise in Montenegro,
- incising through push our economy to the world of technology and innovation, which requires preparation staff as well as technological infrastructure. For the realization of this goal, it is necessary to measures reorganization and modernization of existing technology through adequate credit and transfer lines, tax, etc. in the development activities,
- strengthening of possibility for using international funds,
- developing of sustainable, knowledge based economy and decision based on fact and clear indicators,
- strengthening of initiatives in direction of developing woman entrepreneurship,

- strengthening developments based on incremental improvement and not at radical changes,
- stimulation and giving some allowance and benefits for company which are oriented on developing and applying of knowledge,
- developing of virtual entrepreneurship through establishing virtual centers for entrepreneurship which offer possibilities for business analyses, redirection, electronic trading and other. Through these centers it should be possible developing of the role of people with handicap to make stronger impact in sense of entrepreneurship.

Strengthening of capacity in sense of innovation should be realized through:

- strengthening of mechanism for intellectual property protection,
- strengthening of mechanism for follow up of innovative solution (developing of data base, communication in and out of Montenegro …),
- strengthening of mechanism for promotion,
- strengthening of mechanism for awarding, stimulation, allowance and similar through developing the national model for encourage innovation,
- creation of policy for developing innovation which are firstly based on quality human potential and other.

Based on presented necessity from the previous paragraph, science and research work and his improvement should be developing in next direction:

- encouraging trade oriented science and research activity,
- establishment and development social research centers and developing “technological parks” like we will be in position to improve cooperation between university and company,
- encouraging of scientific and researcher mobility through stimulation of sustain research work,
- envisage of possibility for strengthening developing some science institute in private sectors,
- developing of “research clusters”,
- involving (in the position of leaders) company in scientific project,
- strengthening of activity for establishing position of “knowledge manager” in our company,
- provide to the student more knowledge about innovation and entrepreneurship,
- encourage of developing innovation not just in area of technical innovation but in business innovation and market innovation.

Like I say above, one of the very important aspect when we are talking about this themes, are indicator for measurements the level of goodness of process of NTI. Here I would like to point out some of the possible indicator for measurements science and research process from the aspects of innovation and technology development. Here are next:

- students mobility (number, place and orientation, which area of research…)
- unemployment rate from the aspect of gender, fields, age …)
- data about unemployment people with high education in relation with unemployment people with secondary school,
- rate of people who are working on position which are not originally based on they main skills,
- rate of students (age, number, gender, fields …) which are going on post-graduated master and doctoral studies,
- rate of students (age, number, gender, fields …) which are, during the post-graduated studies, change they original fields of interest and other.

This and other indicators should give some useful information which we must use for improvement activities in NTI processes.

4. ONE ASPECT OF INNOVATION IN CERTIFIED BUSINESS SYSTEMS

Here I would like to present one aspects of state of innovation in the organization which have implemented some of the international standards from the ISO series. That is very interesting to point out, because most of the company in Montenegro (especially in the actual business condition and clearly orientation and striving to European integration) tend to implement (or have implemented) some of the standards from ISO series. In the next few diagrams I would like to present some indicators of orientation of certified company to innovation as well as the development and implementation of innovation. Under the certified companies, it is means organization which have a certified management system based on ISO 9001, HACCP, ISO 14001, ISO 27001 or ISO 18001. Here we have significant results which arise from significant sample of 97 company with more than 10000 employees. All of those company is from Montenegro.

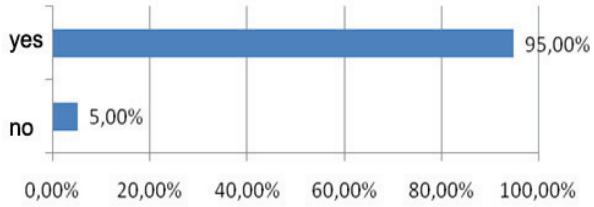


Figure 1. Investing in modernization of business systems

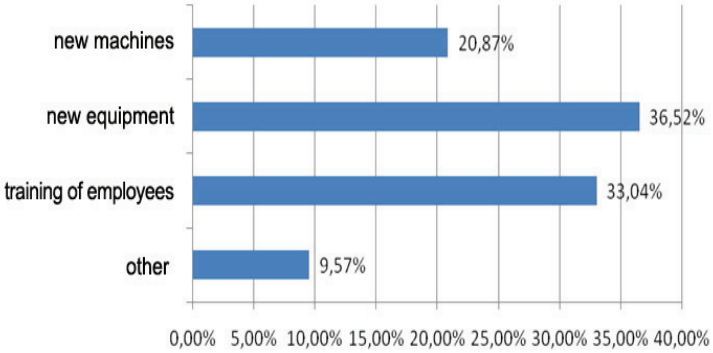


Figure 2. Type of investing in modernization of business systems

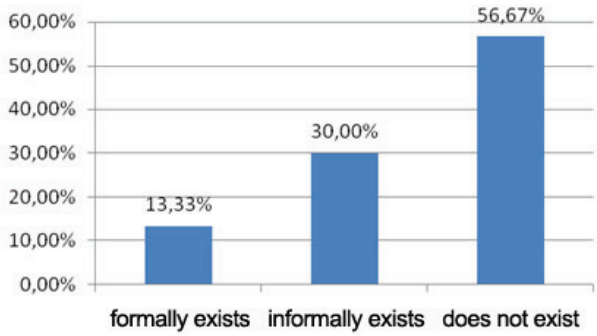


Figure 3. Existence of person/department responsible for innovations

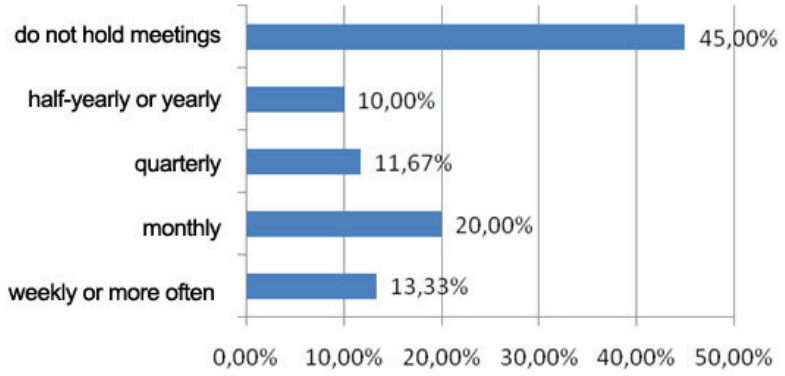


Figure 4. Frequency of holding the meetings whose aim are innovations

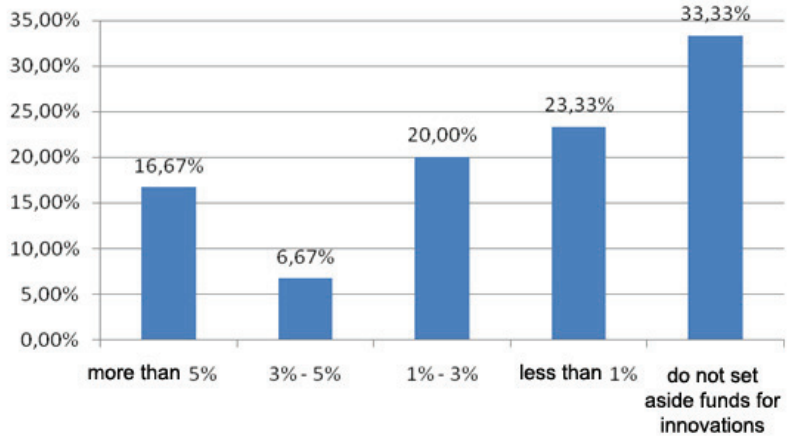


Figure 5. Funds that are set aside for innovations

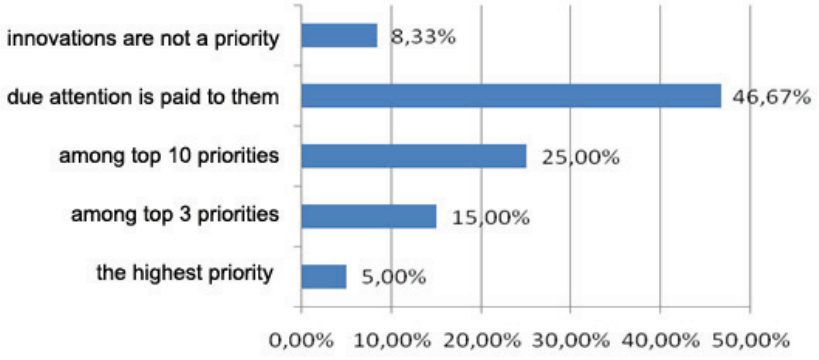


Figure 6. Place of innovations in strategy of business systems' work

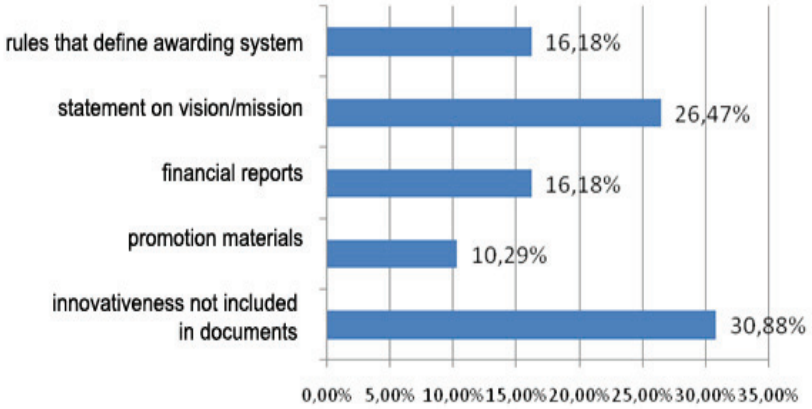


Figure 7. Documents that include innovativeness

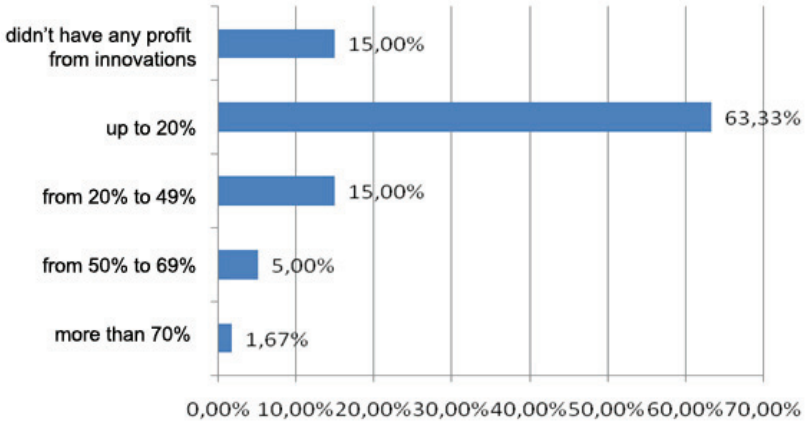


Figure 8. Share of income from innovations in total income of business systems

Business system, which does not recognize the necessity of constant changes and importance of creating innovative products/services in today's time of rapid dynamics of development and big competition, can expect to lose the market rather rapidly. For that reason, constant development and investments in innovativeness need to become a priority of each business system which tends to be competitive and assume its place in the market.

Majority of Montenegrin certified business systems invest in modernization and recognize the significance of innovativeness, but they do not pay sufficient attention to it. Namely, in case of 80% of business systems, innovations are not among 3 main priorities and in case of 41,17% none of teh documents of business systems does not contain the concept of innovativeness. In addition, it is noticeable that there is a slight investment in innovations - even 56,66% sets aside less than 1% of profit, which is indeed little in comparison to successful global business systems which set aside more than 5% of profits only for the development of innovations. Investments in innovations must provide concrete results and affect the indicators of business success. In 78,33% of interviewed business systems, the income from innovations is less 20% of total income of business systems, and there was no income from innovations in 15% of business systems.
Business systems, mostly do not have a developed innovation system, which is reflected in the fact that in 56,67% there is no person/department responsible for managing the innovations,

and even in 55% business systems there are no meetings whose aim is to devise innovations or if they are held, it is once half-yearly, which is certainly insufficient. Significant item of innovation processes are innovation meetings whose aim should be to devise innovations and improve business processes. Regular holding of such meetings encourages creativity of there employees, and the ideas are aimed to areas important for development of business systems. So, we can conclude that most of Montenegrin business systems have a lot of space for improving their innovativeness. By the increase of innovation capacities and improvement of innovation processes of business systems, we create the predispositions for development of a bigger number of new products/services, and thus the chance for their better commercialization.

5. **CONCLUSION**

Process of developing innovation in Montenegro is on the great exams, specially if we consider clearly and permanently effort for entry to European Union. Area which is refer on development of innovation is select like one of most important area for developing and improvement. In this sense, effort in field of establish centre and department which are work alone or in frame of larger unit, was increase. In the part of education was made so much. Establishment of innovation oriented class in primary and secondary school and on the University, now is reality. It is very important to point out that in the part of science and research work it was made large step forward in sense of implementation research which are oriented on innovation.

Creating links between SME and scientific research institutions in Montenegro is in the early stages, with clear and strong initiatives from the side of university and SME for improvement this relation and impact .

Technological development in Montenegro and innovative solution, are mostly related with small and medium enterprise. In this sense, science and research must be strong linked with organizational and industry development, technology and innovation through strong communication between organization which are responsible for this area.

Strengthening of capacity in sense of innovation should be realized through:

- strengthening of mechanism for intellectual property protection,
- strengthening of mechanism for follow up of innovative solution (developing of data base, communication in and out of Montenegro …),
- strengthening of mechanism for promotion,
- strengthening of mechanism for awarding, stimulation, allowance and similar through developing the national model for encourage innovation,
- creation of policy for developing innovation which are firstly based on quality human potential and other.

One of possible way for strengthening of mechanism for development innovation is certification of management systems according to ISO norm. Research was proof that certified company have not systematic approach for innovation development, but they have clear orientation in this way and obligation to develop innovation like they be in position to be effective efficiency.

6. LITERATURE

[1] **Schenkel A.,** *“Conceptualizing and Exploring the Organizational Effects of ISO 9000:*

Insights from the Oresund Bridge Project", Total quality management, Vol 15, No. 8, 1155 - 1168, October 2004.

[2] **Casadesus M., Karapetrovic S.,** *"An Empirical Study of the Benefits and Costs of ISO 9001: 2000 Compared to ISO 9001/2/3: 1994",* Total Quality Management, Vol. 16, No. 1, 105–120, January 2005.

[3] **Diaye M.A., Greenan N., Robin S.,** "*Innovations organisationnelles, entrée dans l'emploi et carrières salariales*"**,** Reflets et Perspectives, XLVI, 2007/2 - 3.

[4] **Zdravko Krivokapic, Aleksandar Vujovic, Sasa Petrovis, Jelena Jovanovic, Sanja Pekovic,** Research results of innovativeness in certified business systems, 6th International Quality Conference, June 2012, Kragujevac

[5] **Krivokapić Z.,** *Sistem menadžmenta kvalitetom, Mašinski fakultet Podgorica, 2011.*

[6] **Petrović S.,** *Magistarski rad: Analiza inovativnosti i inovacija u sertifikovanim organizacijama, Mašinski fakultet Podgorica, 2011.*

[7] **Vujovic A.** "Poboljšavanje performansi poslovnih sistema na bazi sistema menadžmenta primjenom alata vještačke inteligencije", Univerzitet Crne Gore, 2008

[8] **Young Kima,, Vinod Kumarb, Uma Kumarb**, "Relationship between quality management practices and innovation" Journal of Operations Management 30 (2012) 295–315

A SET COVERING HEURISTIC FOR LOGISTIC CENTERS

Stefanos Katsavounis[1], Maria Mikela Chatzimichailidou[2], Moyses Moyseos[1], Marko Makipaa[3]

[1]Democritus University of Thrace, Polytechnic School, Department of Production and Management Engineering, 12 Vas. Sofias Str, Xanthi, Greece, skatsav@pme.duth.gr

[2]Democritus University of Thrace, Polytechnic School, Department of Civil Engineering, 12 Vas. Sofias Str, Xanthi, Greece, mikechat@civil.duth.gr

[3]University of Tampere, School of Information Sciences, Department of Computer Sciences, 4 Kalevantie Str, Tampere, Finland, marko.makipaa@uta.fi

Economic crisis reinforces the increasing interest concerning cost reduction and implies the need of a new perspective. Effective technological and algorithmic approaches establish a solid, decisive and clear background for several and plentiful decision and optimization problems. Efficient and high performance solutions affect many industrial and regional development occasions by driving researchers to design more sophisticated and applicable models. The well-known set covering problem, belonging to the category of *NP*-Complete decision problems, models a large scale of inherent problems in the matter of logistics. In this paper, a heuristic approach is introduced, concerning the pertinent problem of the establishment of a logistic centers network in terms of Graph Theory. Our ultimate effort is focused at first on determining a shortest covering path from a starting depot and finding the minimum number of logistics centers, in order to better serve all the points of a given distribution network. We then examine the impact of capacity referring to these centers on the feasibility of the solution space. The procedure is completed with an illustrative numerical example providing satisfactory solutions in the real world problems.

Keywords

Set Covering, Graph Theory, Heuristic Algorithm, Logistics Centers

1. Introduction

Network design and paths were firstly considered as a single-criterion approach, and in transport networks, mainly, such criterions were the minimization of total distance or duration or cost. Yet, the complexity of real-world scheduling problems conveys the need of a multi-criteria analysis.

Network problems, from the multi-criteria perspective, were initially stated in 80's by Current [1] during his research on multi-criteria design of transportation networks. Later, ReVelle, Current and Cohon [2] analyzed the problem of location-distribution in multi-criteria design of transportation networks. There is an abundance of literature work regarding service allocation, which led to the merge of location-distribution models with network design problems. Another interesting category of problems is the one related to covering again in bounds of location-distribution.

The incentive of such papers is to find optimal (or near optimal) location patterns on the basis of realistic constraints. Some of the objectives may be the decision on the minimum number of logistics centers, i.e., these are service centers in the presented paper, the number of demand-points that each service center will serve, the levelling and the maximum capacity of each service center. To aid decision makers, there are some criteria, which support the user for avoiding subjectivity. Some criteria are [3]:

- cost: for new logistic centers, for monthly operating costs or storage costs
- response times: by setting up another depot, the response period will be reduced due to the reduced size of the catchment areas
- technological demands: vehicles, machinery and handling equipment
- customer convenience
- share of services in the public interest – fire-fighters, emergency services
- energy requirements
- geographical considerations
- economic importance
- social considerations – solution to unemployment
- importance of the hub: as a transit hub, resources, raw materials, customers

Thus, allocation tasks need to be assessed and evaluated by taking into account a considerable number of criteria, since they are problems of a multiple criteria nature. Concerning logistics, the problem of tasks' allocation lies in selecting an optimal number of logistics centers to be properly located on the basis of a multiple criteria evaluation [3].

In the area of facilities' location the most usual statement is to minimize costs of distribution and solve the problem concerning complex logistics lines, so as to better cover, as much and as good as possible, an amount of given demand-points, waiting to be served. The problems dealt with here belong to the category of combinatory tasks of discrete optimization. We can use two different approaches [3]: the first one is by examining all possible options, which is time-consuming, and the other, a more common one, is by using heuristic methods. The result is a suboptimal solution that may be significantly far from the optimal solution and by this note that coverage and service are not identical [4].

In service centres allocation, the "covering" term denotes the maximum distance or maximum time, within which the demand of a service can be satisfied, starting from certain points of services [1]. If we make an extension of "covering" to network design problems or paths, a demand-point is covered, if it is on the path or approximates as close as possible the main path.

Covering constraints in network optimization problems responded to a significant drawback of traditional single-criterion models: the incapability to satisfy both effectiveness and levelling in service provision [5]. This element reinforced the social character of various models that aid and simulate everyday social manners and finally contribute to regional design and development. The construction of transportation networks is an example and it correlates with accessibility.

The Shortest Covering Path Problem was originally formulated by ReVelle, Current and Cohon [2]. They assert that in a given network it is vital to define the shortest path, which begins from a predetermined and stable starting point and ends to a vertex, i.e., endpoint. In their problem definition they made the following assumptions, which can be customized depending on the given problem: (1) There is demand in each point-vertex, (2) all points of demand should be served, (3) the demand is considered covered if the vertex is also covered, (4) the flow between the vertices is performed without any capacity limitation, (5) all vertices have non-negative values, (6) there are no budget constraints. In the same study [2],

it is noted that we can also examine only a cluster of the vertices, possibly included in the shortest path.

We usually use network models, which assume that demands arise and facilities can be located, only on a network composed by nodes and links [4]. Graph Theory is a powerful and suitable approach in order to model such problems. Clustering module, as a basic tool in Graph Theory, convergences multi-supply center problems into single supply center problems [6]. Another conclusion been drawn by the literature [7] is that very few heuristics are found to attribute effectively for cost and non-cost problems.

The problem introduced in the present paper pursues at first to find the shortest path between a start (mainly a central depot) and an endpoint and as for the points, which are not on the path, to be within a predetermined maximum distance from one of the vertices of the shortest path. A predefined set of points includes all candidate service-points, mainly under the criterion of geographical position, regarding their location and the work load, usually determined by the logistics agency. Then an additional constraint is added concerning an upper limit, representing capacity or level of service, in order to counterbalance the load of service centers. The cardinalities of subsets of demand-points served by each service-point should not exceed this limit. The methodology described in the following uses terms of Graph Theory.

2. Definitions, Notations and Problem Formulation

Let a directed network $N=(V,E,d)$, where $G=(V,E)$ a graph of N. The set V includes the vertices of the graph, with cardinality $n=|V|$, whilst E includes pairs of elements of V. Two nodes i and $j \in V$ are adjacent if $(i,j) \in E$. Node i is the predecessor of j and node j is the successor of i. The set of adjacent nodes to a node $i \in V$ is denoted by $\Gamma(i)$, i.e., $\Gamma(i)=\{ j \in V : (i,j) \in E \}$.

We define a positive function d at each edge $(i,j) \in E$, $d:(i,j) \in \mathrm{E} \rightarrow d_{ij} \in R^{+}$, representing the distance $d_{i,j}$ of edge $(i,j) \in E$. We also assume that $d_{i,j}=d_{i,j} \forall (i,j) \in E$. Every vertex in N is a demand-point. The first vertex is defined as the starting point and the last vertex as the endpoint. Q is pre-defined as the subset of V containing the candidate service-points, $Q \subseteq V$.

Let $p=(v_1,v_2,...,v_k)$ be the path including the set of service-points that cover all the demand-points. We define:

$S'_q=\left\{z : z \in V, d_{q,z} \leq T\right\}, z \notin p$, the set of demand-points that can be covered by a service-point q. The cut of two sets S'_h, S'_j with $h,\ j \in p$, is not necessary to be the null set, which means that a demand-point may belong to two or more different service-points.

$S_q=\left\{z : z \in S'_q, d_{q,z}=\min\left\{d_{v,z} \leq T\right\}, v \in p\right\}$, the set of demand-points that can be covered by a service-point and having the minimum distance among all the alternative service-points that satisfy the minimum distance criterion. Under this consideration, it is obvious that S_i sets, $i=1,2,...,|p|$, are disjoint sets.

In terms of a mathematical expression, given:

- a network $N=(V,E,d)$
- the maximum desired distance T between a service-point and a demand-point and
- the maximum number M of demand-points that a service-point can serve,

The problem is to find the minimum cardinality covering set $p=(v_1,v_2,...,v_k)$, $v\in Q$, so as to satisfy the following constraints for $z\in V, q\in p$:

$$p=(v_1,v_2,...,v_k), v\in Q:|p|=\min \quad (1)$$

$$d_{q,z}\le T \quad (2)$$

$$|S_q|\le M, \forall q\in p \quad (3)$$

The process used to solve the aforementioned problem belongs to branch and bound algorithms with depth first tree search. Primarily, we sought to find the set p that covers the first constraint, taken into account the maximum distance T. Let p be the covering set according to the previous explanation and S_q the set of vertices that are served by the vertex $q\in p$. During the creation of such S_q sets we take into account that each demand-point should be served by the nearest vertex of p.

The second constraint defines that the cardinality of every set S_q does not exceed an upper limit, that is $|S_q|\le M$. This balancing process is feasible if the product of size M and the cardinality $|p|$ of the covering set is less than the number of demand-points [1]:

$$|p|\times M<\sum_{q=1}^{|p|}|S_q| \quad (4)$$

In this case the algorithm has to repeat the steps, driven only by the first constraint, by separating large clusters to smaller. The iteration process stops, when the number of extra service-points satisfies the second constraint. Another approach to this methodology, taking into account the capacity of every demand-point, will be discussed in the conclusion.

For every set S_q in which $|S_q|>M$ the choice of a vertex $i\in S_q$ that it is going to be removed and be placed to another one S_h, if such exists, is the vertex that corresponds to the minimum increase of distance between vertex q and all the vertices $h\in p:|S_h|<M$. The selection during this iterative process is made according to the following formula [1]:

$$d_{h,i}-d_{q,i}=\min\{\{d_{h,i}-d_{q,j}\},\ h\in p:|S_h|<M \text{ and } d_{h,j}\le T\}\, j\in S_q$$

Thus vertex i is included to the set S_h that corresponds to the minimum increase of distance relatively to its initial allocation. However, this is feasible only if $\exists|S_h|+1\le M: d_{h,i}\le T$. The proposed greedy methodology does not guarantee the balancing, in case of such exits, since the searching is limited only to these service-points, which serve less than M demand-points. An efficient methodology is discussed in the conclusion.

3. Algorithm Description

On the following, a brief but illustrative step enumeration of the algorithm presents how these definitions and notations function in practice.

The following notations are interpreted as follows:

- m : number of alternative solutions
- $B_q, q = 1,2,...,m$: family of alternative solutions
- $C(i_q)$: nominated points to expand the S_q set, $i_q \in C(i_q) \subseteq \Gamma(i_q)$
- α : the starting point
- D : sum of distances of the best covering set until the current state of time
- $W(S_k)$: total distance of S_k set
- k : cardinality of covering set

First part of the algorithm, satisfying (1) and (2)

► *Initialization:*

Read n, k, α, Q, T, M and distances. Create $S'_q, \forall q \in Q$

Set $m \leftarrow 0,\ k \leftarrow 1,\ S_k \leftarrow i_k\ , C(i_q) \leftarrow \Gamma(i_q),\ \forall q = 1,2,...,n,\ flag = \text{TRUE}$

► *Branch and Bound:*

while $(C(i_k) \cap S_k \neq \varnothing)$ AND $(flag)$

{ $x \leftarrow i_k$,

Choose z so that $d_{x,z} = \min\{d_{q,x} : q \in C(i_k) \cap S_k\}$

while $(W(S_k) + d_{x,z} \leq D)$

{ $C(i_k) \leftarrow C(i_k)$ - z , $k \leftarrow k$+1, $S_k \leftarrow z$, $i_k \leftarrow z$

If $(i_k == z)$

{ if $\forall v \in \text{V}, \exists y \in S_k : d_{y,v} \leq T$

If $(W(S_K) \neq D)$

$\{D \leftarrow W(S_k),\ m \leftarrow 0\ \}$

$m \leftarrow m+1,\ B_m \leftarrow S_k$

}

}

► *Backtracking - check for termination:*

Set $C(i_k) \leftarrow \Gamma(i_k),\ k \leftarrow k-1$

If $k < 0$ $flag = \text{FALSE}$

}

► *Export sets of alternative shortest paths:*

B_i , $i = 1,2,...,m$, where m is the number of solutions

► *Creation of demand-points sets:*

Let $p = \{\alpha, v_1, v_2, \ldots, v_k\}$ be a shortest path, $\forall v \in Q : \forall z \in V \quad \exists q \in p : d_{q,z} \leq T$

$$\forall q \in p:\ S_q = \left\{ z : z \in S'_q, d_{q,z} = \min\left\{ d_{v,z} \le T \right\}, v \in p \right\}$$

Second part of the algorithm, satisfying (3)

If $\left|S_q\right| \le M, \forall q \in p$ then END

else

{ Let $p' = \left\{ v_l, v_m, \ldots, v_u \right\}$ be the p-set sorted in descending cardinality order of the corresponding demand-points sets $S_l, S_m, \ldots, S_u$, forming the set $R = \left\{ S_l^{(1)}, S_m^{(2)}, \ldots, S_u^{(r)} \right\}$, with $S_l^{(1)} \ge S_m^{(2)} \ge \ldots \ge S_u^{(r)}$ and $r = \left|R\right|$.

$flag = \text{TRUE}$, $j = 1$

while $\left(j \le r\right)$

{ while $\left(\left|S_q^{(j)}\right| > M\right)$ AND $\left(flag = \text{TRUE}\right)$

{ $\forall v_g \in S_q^{(j)}$:

$X^{(j)} = \{ x_{v_{i,q}^g} = \min\{ \{ d_{g,i} - d_{g,q} \}, \quad i \in p' - \{q\} \quad \forall g = 1,2,\ldots \left|S_q^{(j)}\right| \} \}$

If $\left|X^{(j)}\right| == 0$ then $flag = \text{FALSE}$

else

{ sort $X^{(j)}$ in ascending order

while $\left(\left|X^{(j)}\right| > 0\right)$ AND $\left(\left|S_q^{(j)}\right| > M\right)$

{ if $\exists x_{v_{c,q}^g} \in X^{(j)}$ such that $\left(\left|S_c^{(t)}\right| < M\right)$ then

$\{ S_q^{(j)} = S_q^{(j)} - v_g,\ S_c^{(t)} = S_c^{(t)} \cup v_g,\ X^{(j)} = X^{(j)} - x_{v_{c,q}^g} \}$

else $X^{(j)} = X^{(j)} - x_{v_{c,q}^g}$

}

If $\left(X^{(j)} = \varnothing\right)$ AND $\left(\left|S_q^{(j)}\right| > M\right)$ then $flag = \text{FALSE}$

}

}

if $flag = \text{FALSE}$ then END

else $j = j + 1$

}

► *Export:*

$\forall v_q \in p'$ it stands that $\left(\left|S_q\right| \le M\right)$: END

4. Numerical Example

The network consists of $N = 40$ vertices (prospective points) in total, numbered from 1 to 40, including both demand and candidate service-points of the logistics line. Vertex 1 is the start point (the depot) and vertex 40 is the endpoint. Data is shown in Table 1 [1].

As mentioned earlier, candidate service-points, i.e., $Q = \{1, 4, 6, 13, 14, 21, 27, 29, 34, 36, 40\}$, are also demand-points, thus if some of these eleven points are excluded from the final service-points solution, they should be definitely integrated in any of the available clusters, always according to some constraints being posed. In a nutshell, if they are not self-covered, by this we mean service-points that cover their demand on their own, they should then be hetero-covered. Besides, there is always a possibility for a candidate service-point to cover none of the demand-points (such as point 1), due to the violation of the constraints posed so far. We choose $T = 45$ because it makes evident the potential of the algorithm.

Table 1 Data Sets

S'_4	7	5	6	12	2	3	14	11	8									
d	14	17	19	27	29	32	32	35	45									
S'_{13}	12	7	14	5	8	16	18	22	15	11	6	3	17	19	10	9	23	
d	2	16	17	20	20	22	27	28	28	29	29	30	32	33	34	44	44	
S'_{21}	20	17	18	19	24	8	16	22	23									
d	4	20	21	26	26	28	30	35	38									
S'_{29}	32	34	27	28	33	30	31	26	25	35								
d	8	18	22	29	30	35	35	43	43	44								
S'_{36}	37	38																
d	23	45																
S'_{40}	39	38	35															
d	26	31	45															

♦ *Fisrt Part of the Algorithm*

Due to (1) and (2) $p = \{1,4,13,21,29,36,40\}$, having the shortest distance, i.e., $D = 404$, between the seven service-points. Table 2 contains the corresponding sets of service-points. The distance needed to be covered from the one to the other point (demand or service either) is less or equal to 45.

Table 2 Points' clustering under the T constraint $(T = 45)$

Service-points	Number of demand-points	Demand-points S_q
1	0	-
4	4	7, 5, 2, 6
13	10	12, 15, 10, 8, 3, 22, 11, 16, 14, 9

21	6	20, 23, 24, 18, 17, 19
29	10	32, 33, 35, 31, 25, 30, 28, 27, 26, 34
36	1	37
40	2	39, 38

Fig.1 shows the clusters that were shaped after applying equations (1) and (2). Each of these clusters has its own service-point, whilst the other ones are those we call demand-points. As far as anybody can observe on Fig.1, because of the fact that candidate service-points {34, 27, 6, 14} are finally excluded from service-points set, they are then considered to be only demand-points.

♦ *Second Part of the Algorithm*

By keeping the same service-point set ($T = 45$), we now apply the second constraint ($M = 8$) concerning the maximum number of demand-points belonging to a service-point set. The second constraint violation occurs on service-points 13 and 29, where $M = 10$. As a result, we should first calculate the distance between the demand-points of the current cluster with the service-points of sets having cardinalities less than M. The integration of the demand-point to the new cluster is going to be materialized according to the minimum increase in running distance.

Ten demand-points belong to service-point 13, which means that two of them must be removed. Among them, demand-point 3, will be moved first to service-point 4, because $x^{3}_{4,13} = d_{3,4} - d_{3,13} = 32 - 30 = 2$ is the first (minimum) element of $X^{(1)}$, then, under the same notion, $x^{11}_{4,13} = d_{11,4} - d_{11,13} = 35 - 29 = 6$, we move demand-point 11 from service-point 13 to 4. Constraint (3) is now satisfied concerning vertex 13.

The procedure is being forwarded to service-point 29, which also has ten demand-points. $x^{35}_{40,29} = d_{35,40} - d_{35,29} = 45 - 44 = 1$ is the first element of $X^{(2)}$, we also move vertex 35 to service-point 40. However, because this is the only acceptable movement, constraint (3) is not fully satisfied for node 29. According to the second part of the proposed algorithm the solution is not feasible nor optimal. The final solution is as follow on Table 3. Fig.2 shows the clusters that were shaped after applying (3).

Table 3 Points' clustering under T and M constraints $\left(T = 45,\ M = 8\right)$

Service-points	**Number of demand-points**	**Demand-points** S_q
1	0	-
4	6	7, 5, 2, 6, 3, 11
13	8	12, 15, 10, 8, 22, 16, 14, 9
21	6	20, 23, 24, 18, 17, 19
29	9	32, 33, 31, 25, 30, 28, 27, 26, 34
36	1	37
40	3	39, 38, 35

As shown in both solutions, the starting point α, i.e., point 1, is finally not included to the sets of the solution. This is already explained by the possibility of violating one or all of the constraints.

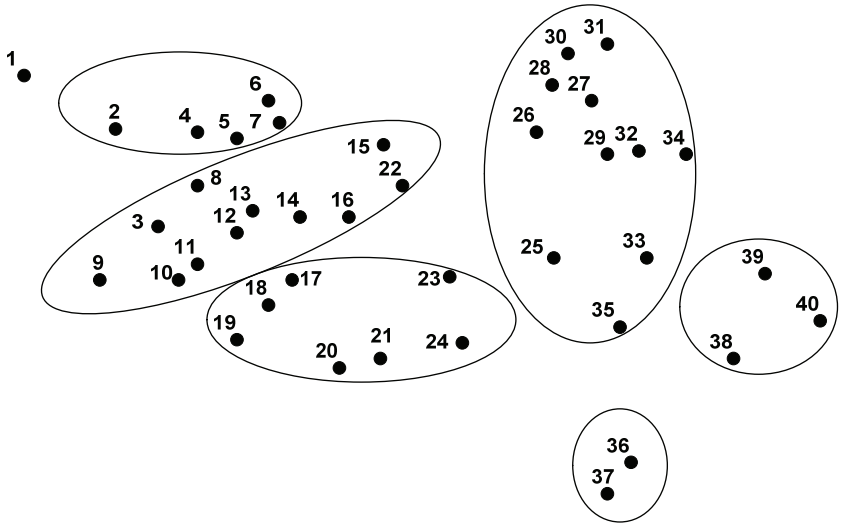


Figure 1. Clustering under T constraint

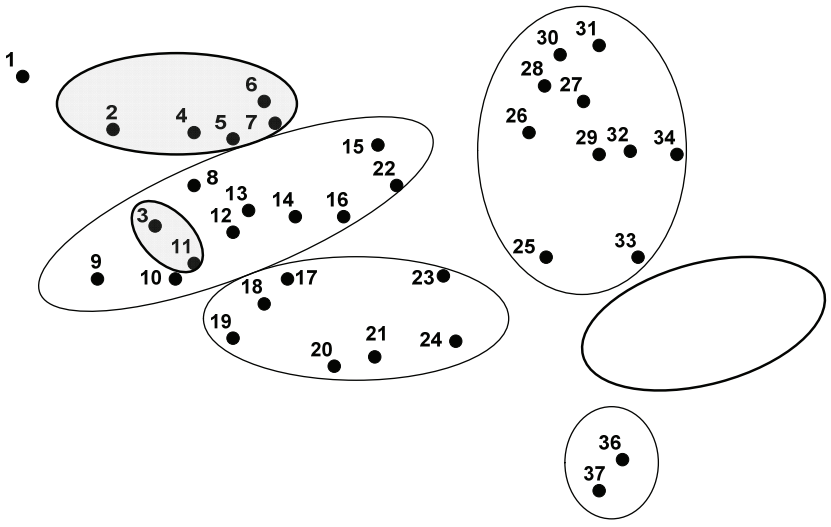


Figure 2. Clustering under T and M constraints, with 3, 11, 35 moved to other clusters

The algorithm is implemented by using Visual Basic environment v.6.0 in a typical Core II Personal Computer. The pre-processing phase assorts and organizes the data in an efficient way. The execution phase in both solutions is less than 2 seconds, by keeping the same number of points and using alternative data sets.

4. Conclusions

The heuristic algorithm presented here, can be effectively applied to several cases, using a considerable number of demand and service-points, suitable to real time logistic

environments. Obviously, whenever the value of T increases the shortest path covering set includes less service-points, while when T decreases the covering set includes more nodes, leading to a non-feasible solution below a limit value.

The second part of the algorithm is a greedy one and does not guarantee the balancing, if such exists. A more efficient methodology will take into account all the possible movements among all the demand-point subsets, by iteratively moving demand nodes to other subsets and by excluding the possibility never to return a node to its initial or already visited position.

Another possible and feasible constraint is capacity. In this paper, each service center is considered equal to the others, so there is always a possibility of an overload to happen at any service-point. This can be well managed by adding an additional constraint concerning the maximum capacity of each of the points. Capacities can also be considered at each demand-point.

We conclude that algorithmic approaches are of high interest in long-term regional development, in order to model real life demands, taking into account future needs related to special characteristics from various networks.

References

1 Kostopoulou S. Regional Development of Maritime Transport Network: An Application to Aegean Archipelagos, PhD Dissertation, Aristotle University of Thessaloniki, 1998.
2 Revelle C., Current J., Cohon J. The Application of Location Models to the Multi-objective Design of Transportation Networks. Regional Science Review 1984; 14: 1-23.
3 Mockova D., Methods for Solving Discrete Optimization Problems. Transactions on Transport Sciences 2012; 5: 71-82.
4 Daskin M. What you Should Know about Location Modelling. Naval Research Logistics (NRL)2008; 55: 283-294.
5 Mulligan G. Equality Measures and Facility Location. Papers in Regional Science: The Journal of the Regional Science Association 1991; 70: 345-365.
6 Hwang Heung-Suk. Design of Supply-chain Logistics System Considering Service Level. Computers & Industrial Engineering 2002; 4: 283-297.
7 Lan G., DePuy G., Whitehouse, G. An Effective and Simple Heuristic for the Set Covering Problem. European Journal of Operational Research 2007; 176: 1387-1403.

INNOVATION AND KNOWLEDGE ECONOMY IN TRANSITION COUNTRIES

Shenaj Hadzimustafa[1], Gadaf Rexhepi[2], Sadudin Ibraimi[3]

[1]*SEEU, Ilindenska nr, Tetovo, RMacedonia, s.daut@seeu.edu.mk*

[2] *SEEU, Ilindenska nr, Tetovo, RMacedonia, g.rexhepi@seeu.edu.mk*

[3] *SEEU, Ilindenska nr, Tetovo, RMacedonia, s.ibraimi@seeu.edu.mk*

Knowledge has become the major driving force of economic and social development all around the world. Innovations are one of the key elements in the terms of knowledge economy that convert the knowledge into economic and social benefits, usually found in the countries' innovation systems and the development of entrepreneurship. This paper assesses the role of innovation in knowledge economy, in the terms of achieving long-term economic growth. The analysis of panel data by using an array of indicators, each of which represents an aspect of the innovation, as independent variable in cross-section regressions 92 countries for the period 1960 to 2000, shows that innovation is a significant determinant of long-term economic growth. The Schumpeterian creative destruction, it is the innovations, expressed in different knowledge forms, are important factor helping the transition countries to leapfrog on the economic development path. The quantitative measurement of different variables of the innovation within the knowledge economy in the 22 transition countries that are being analyzed, give the picture of the innovation in the transition countries.

Keywords

Competitiveness, Economic growth, Entrepreneurship, Innovation, Knowledge economy

1. Introduction

Firms innovate to defend their existing competitive position as well as to seek new competitive advantages. A firm may take a reactive approach and innovate to avoid losing market share from the innovative competitors. Or it may take a proactive approach to gain a strategic market position relative to its competitors, for example by developing and then trying to enforce higher technical standards for the products it produces [1]. New things are always related with innovation.

Today's innovation in some way differ from innovation in past, where innovation were related with radical changes mostly related with new radical technology or new hardware, but today innovation are related with new software, program methods, techniques, approaches etc. In economics the change must increase value, which can be customer value, or producer value. The competition among enterprises in the last decade is taking more and more attention. This is as a result of more and more rigid competition that is taking place in economics of innovation. Organizations that do not innovate effectively may be destroyed by those that do.

Innovation can play an important role in economic and social development. For transition economies, innovation can also help to accelerate development towards a competitive market economy, and establish a competitive presence in international markets. Based on

the economic theory, the technical progress is a basis for economic growth, for which progress an effective innovation system has key role. An innovation system refers to the network of institutions, rules and procedures that influences the way by which a country acquires, creates, disseminates and uses knowledge. Institutions in the innovation system include universities, public and private research centres and policy think tanks. Nongovernmental organizations and the government are also part of the innovation system to the extent that they also produce new knowledge.

2. Role of intellectual capital in strategy

Many researchers have tried to understand why some enterprises are profitable. Porter (2004) considered that industry profitability arise from the interaction of five competitive forces that he proposes and that profitability of the industry depends on impact of these five forces. But why do companies within the same industry differ in the profit earned? This question influenced many researchers to try to answer this question.
When we are talking about intellectual capital primarily we think about its impact on formulating and improving of strategies. As a very important factor that affects intellectual capital is knowledge, i.e. knowledge based approach. Knowledge based approach conceptualize company as an independent regulatory system that optimize the interactions of individuals and groups in creating and implementing knowledge in formulating the strategies of the companies [2]. The importance of knowledge for enterprises was launched in early 1990 with the appearance of many studies that focused on the knowledge which contribute to the emergence of a new approach based on knowledge. This approach includes analysis of resources, capabilities of the company and organizational knowledge [3]. Authors David M. Brock and Eyal Yaniv [4], believed that knowledge is an important resource for the organization, but they also emphasized that enterprises know very little how this knowledge can be used by businesses in achieving competitive advantage, mainly for its movement through the organizational hierarchy. This knowledge can come from the experience and knowledge that their employees have (internally) or by consumers, competition, or literature (external). It happened with the company Sharp, when they used their knowledge for production of flat-display which allowed them to be leaders in market worth seven billion dollars. Most of the knowledge remains tactical which means it is harder for others to access or to imitate. Knowledge operates in a very mysterious way, for example knowledge used in Toyota when they produce cars refers to a very strong social and specialized organizational relationship that evolved through decades [5].

3. The role of innovation on economic growth

There have been a number of studies that show that innovation or the generation of technical knowledge has substantial positive effects on economic growth or productivity growth. The role of the innovation is witnessed and by a World Bank study done by Chen& Dahlman[6]. The study focuses on a cross-section regression that span 92 countries for the period 1960 to 2000, where different indicators from the knowledge economy have significant impact on the long-term economic growth. Different variables that present innovation that is key part of the knowledge economy have different impact. It is the number of patents, utility patents, published scientific and technical journal articles, and the amount royalty payments and receipts that provide empirical evidence for the domestic innovation and technological adaptation role on achieving a sustainable growth.
The first innovation variable that is being considered is the logarithm of the annual number of patents granted by the USPTO to a resident of a specific country. The estimated coefficient

of the patents variable is positive and highly statistically significant. The results indicate that a one percent increase in the number of USPTO patents tends to increase average annual economic growth by 0.19 percentage point, and increase output per worker by 0.20 percentage points. Similar results are obtained by using the logarithm of the annual number of *utility* patents granted by the USPTO to a resident of a specific country to represent domestic innovation. The statistically significant positive coefficient of 0.18 indicates that a one percent increase in the number of utility patents is associated with a 0.18 percentage point increase in annual growth of real GDP.
The logarithm of the annual number of published scientific and technical journal articles shows positive and statistically significant coefficients where the value of 0.22 indicates to be associated with a 0.22 percentage point increase in annual economic growth.
Royalty payments and receipts, combined as measures of technological adaptation and domestic innovation, produce coefficients that are positive and statistically significant. A one percent increase in royalty payments or receipts tends to lead to an increase in economic growth of 0.03 percentage point.

4. Innovation in the transition countries

For transition economies, the knowledge spillover theory of entrepreneurship suggests an alternative development path, with development being led by innovative start-up firms rather than innovation in incumbent companies. On the other side where institutional development is being strongly supported by international capital and knowledge transfers it may enable transition economies to develop more rapidly. The potential for open innovation will be greatest where firms are operating in knowledge rich environments. This, in turn, will depend on public and private knowledge investments through R&D or other aspects of knowledge creation or diffusion such as training, purchases of licenses or new software. In-house R&D, for example, is likely to have a direct role on knowledge creation and innovation, and firm's absorption capacity. Information technology, the technology transfer from FDI and public support can play an important part in facilitating network development and innovation [7].

4.1. KAM 2012 Innovation pillar in the transition countries

In 1999, the Knowledge for Development Program of the World Bank Institute developed the Knowledge Assessment Methodology (KAM) with the objective of helping country clients make the transition to the knowledge economy[8]. The KAM helps to identify problems and opportunities that a country may face, and where it may need to focus policy attention or future investments, with respect to making the transition to the knowledge economy. The KAM Knowledge Economy Index (KEI) is an aggregate index that represents the overall level of development of a country or region in the Knowledge Economy. It summarizes performance over the four KE pillars (Education, Innovation, ICT and Economic and Institutional regime). The innovation pillar for 21 transition countries is shown in Figure1, which a result varies from 0-10 (weakest-strongest innovation pillar). The top 5 transition countries with the highest results in the innovation pillar are Slovenia, Estonia, Croatia, Bulgaria and the Russian Federation. The red bars show the transition countries that are EU member states, the yellow ones EU Acceding countries, green bars present the EU candidate countries, purple bars, the EU potential candidates. The white bars are the rest of the transition countries form the Eastern Europe.

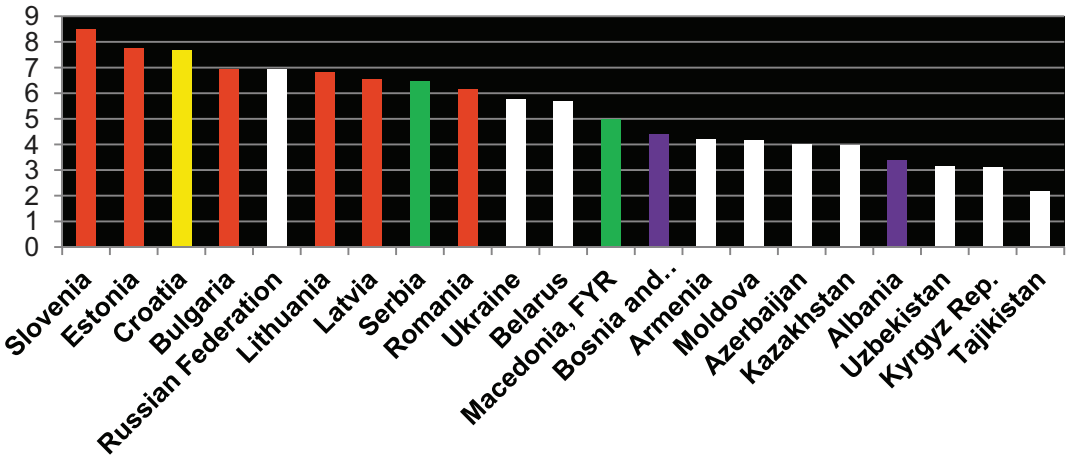


Figure 1 Innovation pillar (KAM 2012)

The over-time comparison of the analyzed transition countries concerning the innovation pillar, where a comparison on the achievements in 1995 and 2012 is being shown, gives good information on the path that the transition countries are being passing (Figure 2 and Figure 3. The countries that appear in the KEI (innovation) scatter plot can be loosely grouped into three broad categories in terms of their development towards the knowledge economy. The ones that are above the 45 degrees plot line have achieved improvement; the ones below have regression concerning the innovation achievements.

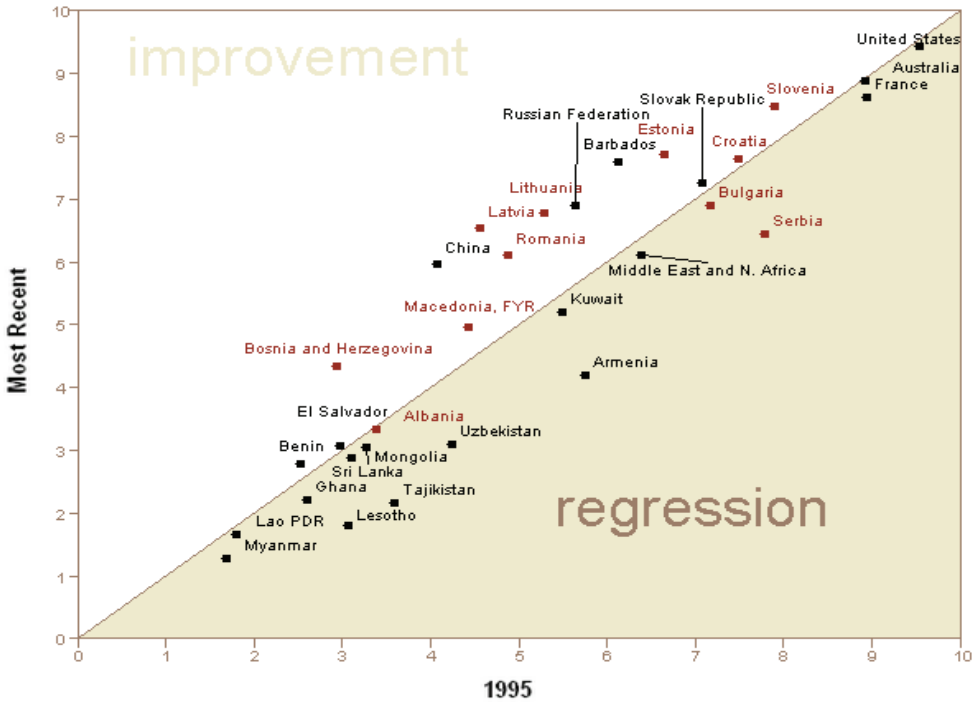


Figure 2 Over-time comparison of the Innovation pillar in the Eastern Europe transition countries member states of EU and on the road to EU membership

Figure 2 focuses on the transition countries that have passed or are still on the road to the EU membership. Firstly, located near the top-right corner of the scatter plot, are a group of countries that are in the advance stages of development in terms of the innovation (within the knowledge economy). These are mostly the economies of Slovenia, Estonia, and Croatia. Next, around the center of the scatter plot are a group of countries that are midway through the transition to the knowledge economy, Lithuania, Latvia, Romania and Macedonia. Lower results have Bosnia and Herzegovina and Albania. The countries that have just embarked on the path to becoming a knowledge economy appear around the bottom-left portion of the scatter plot.

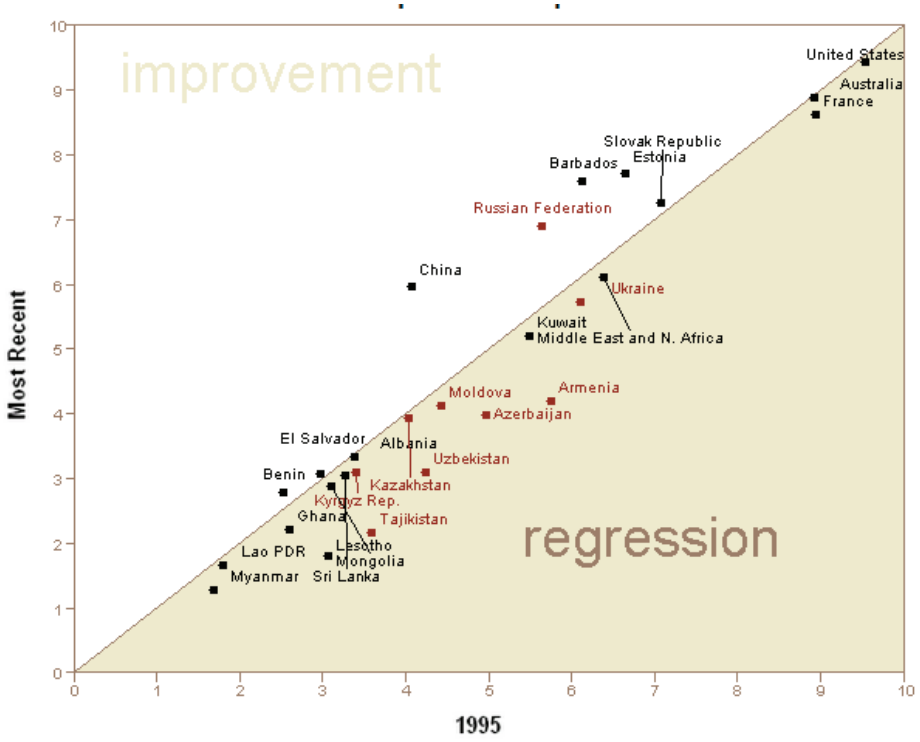


Figure 3 Over-time comparison of the Innovation pillar in the rest Eastern Europe transition countries

The results from Figure 3 show that only the Russian Federation has achieved improvement in the innovation pillar. The other transition countries that are from Eastern Europe and are not part of the EU accession process have regression in the innovation results in 2012 compared to 1995.

4.2 Innovation pillar variables

The amount of *royalty and license fees* an economy receives from the rest of the world can be used as a measure of domestic innovation. In fact, apart from being indicative of the amount of innovative activity taking place within the economy, royalty receipts also show the value of the innovation that is exported or sold abroad. On the other hand, royalty and license fee payments measure the amount innovation or technology that an economy imports from aboard. Indeed, royalty and license fee payments are our only measure that focuses exclusively on technological adoption from abroad. Figure 4 gives the results on the royalty and license fees realized in 2011. The Russian Federation has enormous royalty and license

fee payments, followed by Ukraine, Romania, Slovenia and Croatia. The receipts are highest in Russian Federation and Romania, followed by Slovenia and Ukraine.

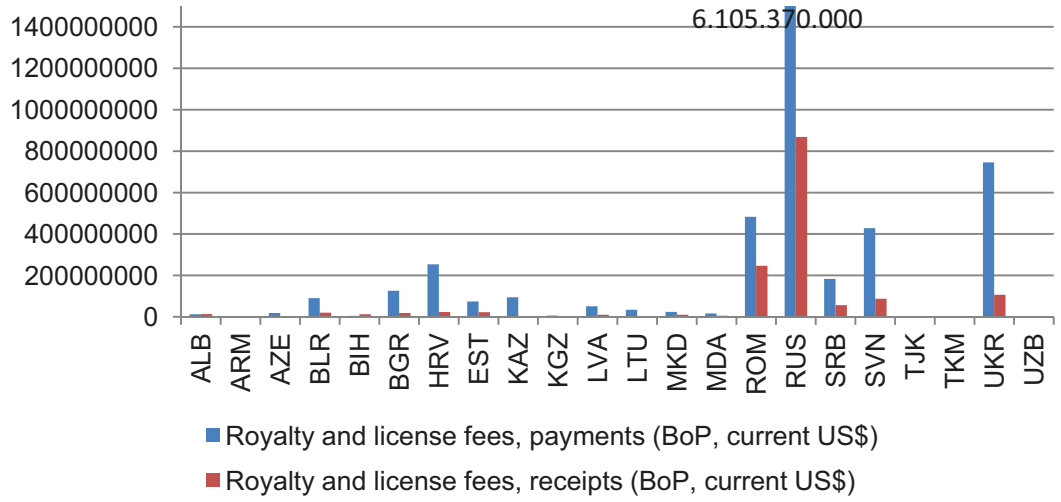


Figure 4 Royalty and license fees, 2011

Another measure of domestic innovation is the annual number of *scientific and technical journal articles* published by the residents of a specific country. The scientific and technical fields include the following: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences. While this indicator does measure domestic innovative activity, its does not focus only those innovations that have commercial value and thus economic production. Data on scientific and technical journal articles were obtained from the World Bank World Development Indicators are shown in Figure 5. In 2009 the Russian Federation has 14.016 scientific and technical journal articles. The results of Ukraine, Slovenia, Serbia and Croatia follow.

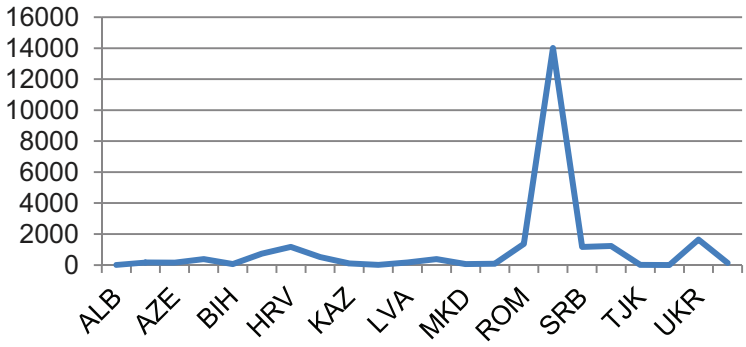


Figure 5 Scientific and technical journal articles, 2009

The number of *researchers in R&D (per million people)* in 2009 in Slovenia is 3.679, which is the highest in the analyzed group of countries. Estonia and Russian Federation follow with 3.210 and 3.091, respectively. Lithuania has also high results with 2.541 researchers in R&D (per million people). The lowest results are shown in Moldavia and Romania (Figure 6).

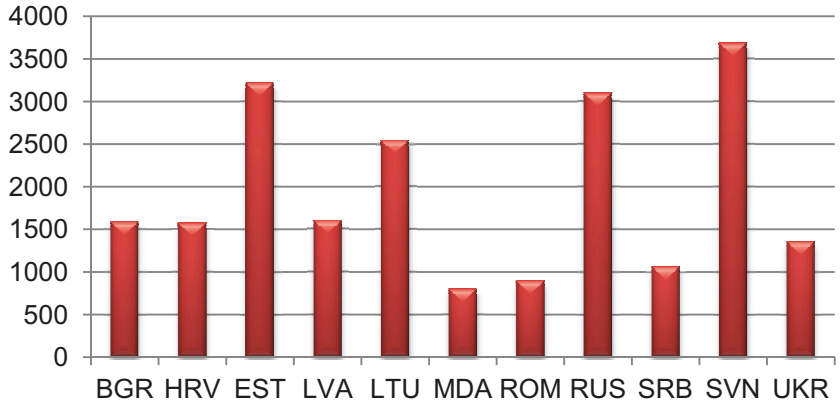


Figure 6 Researchers in R&D (per million people), 2009

Utility patents are patents that are granted to persons who invent or discover any new and useful process, machine, article of manufacture, or compositions of matters, or any new useful improvement thereof. Hence, utility patents constitute more than 90 percent of all patents. As with the total patent count, the annual number of utility patents granted by the USPTO for a country does a measure of the level of domestic innovation activity exist within that country. The total of utility grants approved by USPTO in the period from 1998-2011, prevail in the Russian Federation, with 2.809 grants being approved. Besides Slovenia and Ukraine, Bulgaria and Croatia show good results.

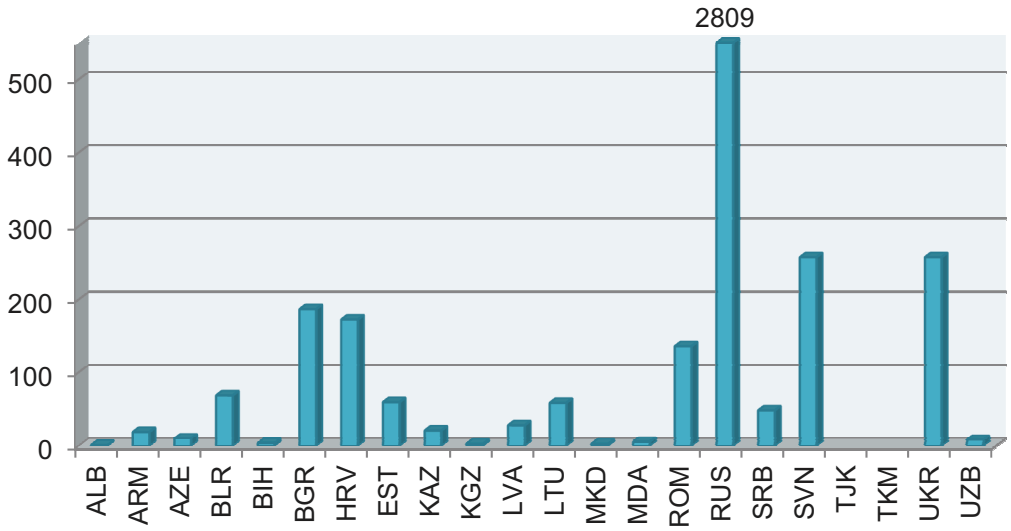


Figure 7 Utility patent grants (1998-2011)

The above mentioned variables are being used in calculating the innovation pillar within the knowledge economy index. The transition countries should foster their ambition towards promotion and achievement of high innovation activities within the companies, which should result in new innovative forms such as organizational innovation, operational innovation, supply-side innovation, core-competence innovation, sell – side innovation, product and service innovation, innovation of innovation, that will increase the competitive advantages of the companies, and the economy as a whole. The final result will be a long term economic growth of the countries.

3. Conclusions

Dramatic moments in the history of industrial change have always been characterised by the successful exploitation of new ideas and the achievements of innovators. The generation, exploitation and diffusion of knowledge are fundamental to economic growth, development and well being of nations. Josef Schumpeter many decades ago has stressed the role of the innovation and entrepreneurship as a hinge that opens the door to economic growth. In that direction not only technological knowledge, but also other forms of knowledge that are used to develop product, process, marketing and organizational innovations are important.
More analysts describe today's global economy as one in transition to a "knowledge economy" or "information society". The success of developed countries and their desire to achieve further sustainable economic development lies precisely in the meaning that they give to the knowledge and their focus on support and development of all elements of the knowledge economy: permanent education, innovation, information and communication technology and economic and institutional environment. According to Sir John Rose, Rolls Royce CEO, the world will talk less about "developed countries, developing and underdeveloped countries," and much more about "smart, smarter and the smartest countries" [9]. In such a environment the role of the innovation and the knowledge economy in the transition countries is substantial for generating sustainable long term economic growth. The improvement of the variables that create the innovation pillar will ensure a good basis for generating positive economic results, and move the countries up and left on the over-time KEI scatter plot.

References

1 OECD. Oslo Manual: Guidelines for Collecting and Interpreting Innovation data. European Commission. 2005.
2 Dobson P, Starkey K, Richards J. Strategic Management Issues and Cases, Second edition. Blackwell Publishing LTD. Oxford UK. 2004
3 Choo C H, Bontis N. The Strategic Management of Intellectual Capital and Organizational Knowledge. New York: Oxford University Press. 2002
4 Brock D M, Yaniv E. Knowledge is not Enough: Organisational Attention and Replication Strategies. Service Industries Journal vol.27 issue 7-8. 2007 October
5 Dobson P, Starkey K, Richards J. Strategic Management Issues and Cases, Second edition. Blackwell Publishing LTD. Oxford, UK. 2004
6 Chen D, Dahlman C. Knowldge and development: A cross section approach. Washington D.C.: World Bank. 2004
7 Roper S. Innovation in transition: A comparison of the innovation potential of incumbent firms and innovative start-ups in the Western Balkans. CSME WP 106. 2009 August
8 Chen D, Dahlman C. The knowledge economy, the KAM methodology and World Bank operations. Washington D.C.: The World Bank. 2005
9 Friedman T. The world is flat. 2nd □□. New York: Picador/Farrar, Straus and Giroux. 2007

REFLECTIONS ON A STUDY VISIT TO SILICON VALLEY: WHAT LESSONS CAN A SOUTH EAST EUROPEAN REGION LEARN FROM THE SAN FRANCISCO BAY AREA INNOVATION SYSTEM?

Nikos Zaharis[1]

[1]*South East European Research Centre (SEERC), 24 Pr. Koromila str, Thessaloniki, Greece, nzaharis@seerc.org*

Based on a study tour to San Francisco organized by the INNOPOLIS, INTERREG IVC project, an attempt is made to identify the main elements of the Bay Area's innovation system and draw up lessons for regions in the EU and especially the South-Eastern part of the EU. The paper examines the role of the higher education system, the role of culture and the role of the public sector in relation to creation and promotion of innovative entrepreneurship in the area and proceeds to compare them to the region of Central Macedonia in Greece. An attempt is also made to define the main characteristics that make the "Silicon Valley ecosystem" unique and provide useful insights for stakeholders and policy makers in regions with less well developed innovation ecosystems. The question whether the Silicon Valley ecosystem can be duplicated is answered in a negative way, but it is argued that nevertheless valuable conclusions and recommendations valid to any innovation ecosystem may be drawn.

Keywords
Innovation ecosystems, Innovation policy, Higher education, Smart specialization strategy.

1. Introduction: the SF Bay area and the Thessaloniki Metropolitan area.

The purpose of this paper is to analyze the SF Bay Area and Silicon Valley and arrive to some conclusions that could be of value to a completely different innovation eco-system, that of the Region of Central Macedonia and its capital Thessaloniki. Although the two areas are not comparable by any measure (economic, scientific, level of development etc), it is still useful to consider what are the basic elements that make one of them an "exemplary" case of an innovation enhancing environment and what can the other learn in order to stir its own environment towards more innovative friendly directions. We hope to be able to adapt these lessons to the particular local environment in our region and try to define our own recipe for success. The two areas are briefly presented in the following paragraphs.

1.1. San Francisco, the Bay Area and Silicon Valley

The San Francisco metropolitan area has a population of 4,300,000 people while the Bay Area population is 7,150,000 people (Figure 1). The regional GDP: $487 billion, $68,100 per capita (2009; if the Bay Area was a country it would be the 22nd richest country). The area includes Silicon Valley and poses a unique combination of high tech companies, world leading universities, high-risk financiers, an entrepreneurial spirit and a multi-cultural environment. Silicon Valley exemplifies the Venture Capital culture that accelerates

innovation. According to Steve Blank [1] VC finance proliferates from the existence of enabling infrastructure (i.e. the existence of Research Universities, a predicable economic system, a stable legal system and the availability of utilities 24/7) and it is based on a culture that consists of Risk taking; Entrepreneurial spirit; Outward-Facing Tech Universities and Free flow of People and Information.

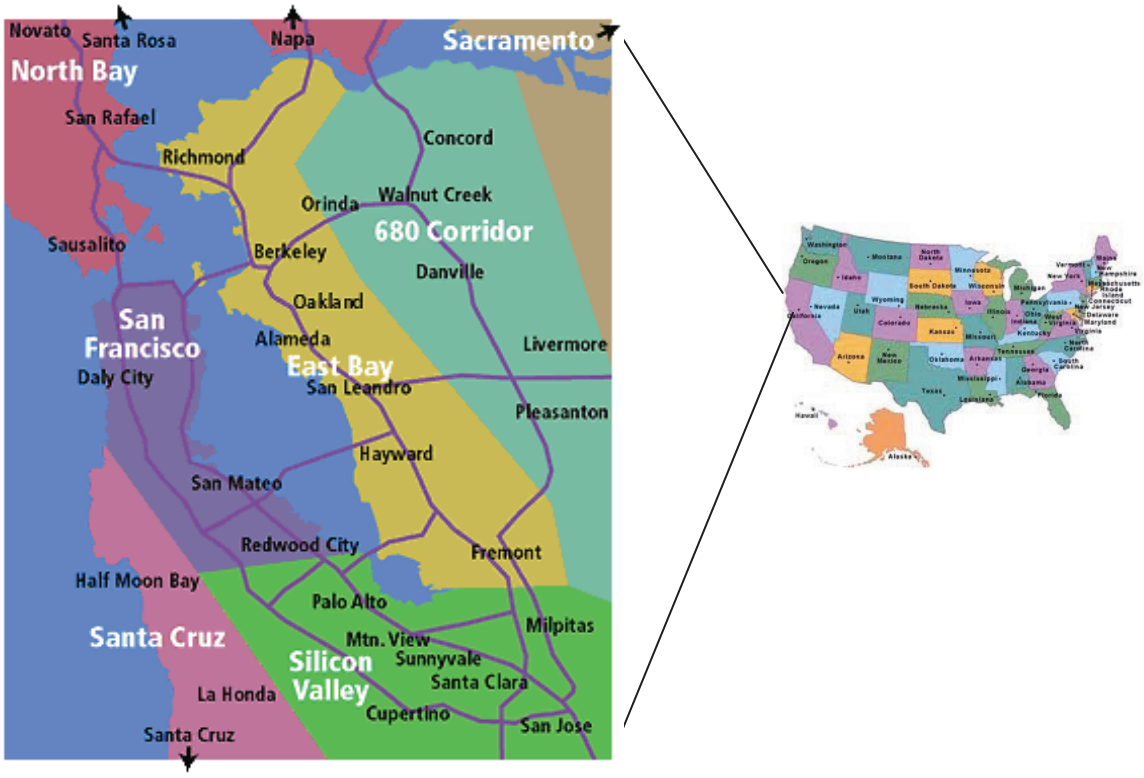


Figure 1 The SF Bay area.

1.2. Thessaloniki metropolitan area and the Region of Central Macedonia

The Thessaloniki Metropolitan area (Figure 2) is the main population, economic and cultural centre of the Region of Central Macedonia. The Thessaloniki metropolitan area population is 1,500,000 people of the 1,900,000 inhabitants of the Region of Central Macedonia. The regional GDP is $39.4 billion (2004), an average $21,038 per capita. It is a typical Southern European region where risk, failure and entrepreneurship are not highly rated in the value system. Its higher education system is rigid and not particularly friendly to entrepreneurship. There is virtually no risk capital available and there are only a limited number of start-ups. The region is suffering from de-industrialization for the last 2 decades. On the other hand the region exhibits a high concentration of higher education and research centers including "islands of excellence"; a long tradition of trade and industry; a unique location (the port, the Balkan hinterland) and a unique combination of history (including multi-cultural heritage), natural environment and mild weather. Thessaloniki and the region of Central Macedonia demonstrates the weaknesses and asymmetries of the Greek innovation system in terms of knowledge creation, diffusion and commercialization as well as the weak links between the elements of its triple – helix (industry, knowledge creating institutions, policy makers). An analytical treatment of the asymmetries in the Greek innovation system is given in [2]. See also the relevant INNO-Policy Trend Chart report [3]. An attempt to define the elements of a innovation strategy for the Thessaloniki metropolitan region is given in [4].

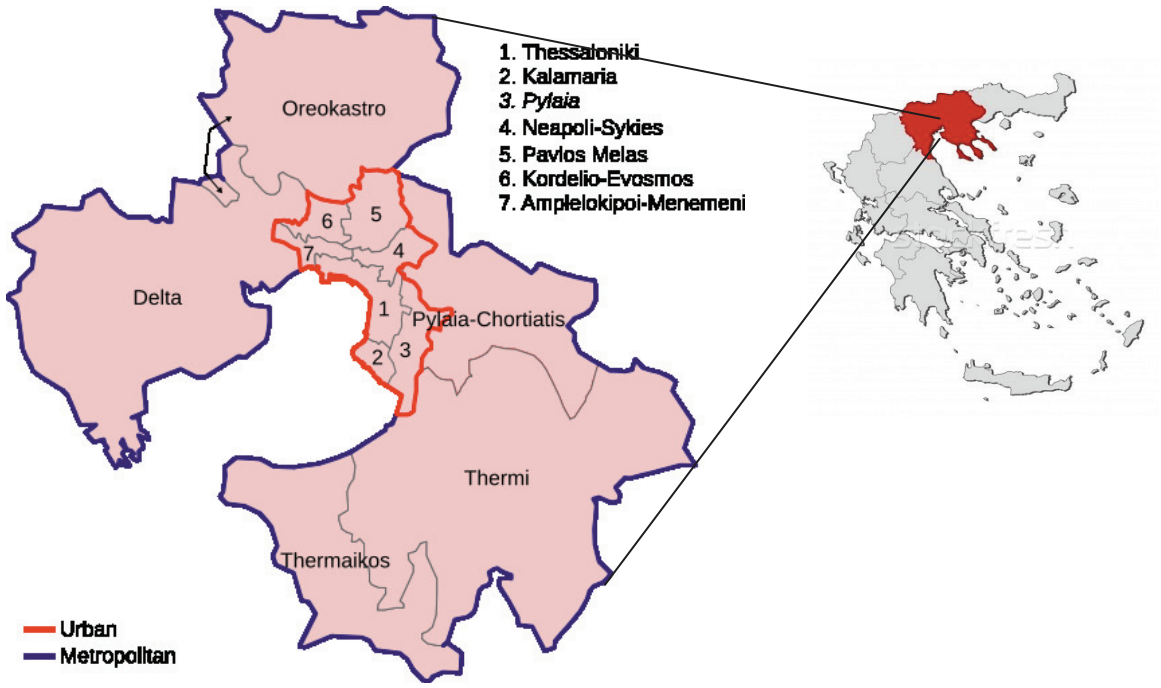


Figure 2 The Thessaloniki Metropolitan area.

2. The SF Bay area study tour

As part of a mission to learn from the experiences of Silicon Valley and the Bay Area on promoting innovation and apply these experiences to their own regions, four teams of policy makers and researchers from Manchester UK, Lodz Poland, Helsinki Finland and Thessaloniki Greece visited the Bay Area on July 2013. The study tour was part of the INNOPOLIS project, a project funded under the INTERREG IVC Program of the European Commision. The INNOPOLIS partners had the chance to visit a variety of institutions and discuss knowledge exchange, technology transfer, the role of the Universities and Research centers as well as the role of the policy makers on supporting new entrepreneurship and innovation. The full list of the organizations visited is given in table 1.

As can be seen by table 1, the study visit included a variety of organizations from every aspect of the triple helix (industry – academia – policy making), public and private including as diverse organizations as the NASA research center (one of the first public investments in the area of the Silicon Valley) and the 6th Str. Revitalization program (a public –private urban development partnership).

Table 1 Organizations visited during the study tour.

Number	Organization	Function
1	**AT&T Labs**	Private research center
2	**University of Stanford**	University
3	**Singularity University**	University
4	**University of California, Berkley**	University
5	**NASA Research Park**	Public research center and co-location area
6	**San Jose State University**	University

Number	Organization	Function
7	**US Market Access Centre**	Incubator/ service provider
8	**San Francisco City**	Local Authority
9	**Network for Teaching Entrepreneurship (NFTE) Bay Area**	NGO
10	**Urban solutions: 6th Str. Revitalization program**	NGO
11	**The Hub, Bay Area**	Incubator/ collaboration space
12	**Renaissance Business Center**	Incubator

The next chapter presents as short summary of the profile and the main elements of discussion per organization visited. The two final chapters discuss the lessons learned and overall conclusions of the study tour.

2. Summary of the meetings held during the study tour

2.1 Universities

2.1.1. University of Stanford: EPICENTER

The Mission of the EPICENTER is *"…to unleash the entrepreneurial potential of undergraduate engineering students across the United States to create bold innovators with the knowledge, skills and attitudes to contribute to economic and societal prosperity...".* Their work focuses on Undergraduate Engineering Education with an aim to promote "Entrepreneurship & Innovation" as a core part of Engineering Education. This work is supported by an NSF 5-years grant that responds to the National Priority to change the way engineers are trained nation-wide. It provides incentives & rewards for staff in order to include Entrepreneurship & Innovation in their teaching. EPICENTER works in cooperation with Accreditation Bodies towards policy change in education. A related goal is to reverse the trend of over-specialization in technical disciplines by bringing in humanities into the curriculums. Other incentives of EPICENTER include:

- i-corps program: teaching a class specifically to researchers. Main focus is to teach how to determine the commercial value of NSF funded research.
- Stanford Entrepreneurship Network: 30 entrepreneurship groups within the University. Completely de-centralized. Every week an invited entrepreneur gives a seminar to students and staff.
- Mayfield Fellows Program. A reverse pitching scheme where companies pitch to the best students for internships.

2.1.2. UC Berkley: Center for Information Technology Research in the Interest of Society - CITRIS

UC Berkley is part of the University of California state University system. It has about 280,000 students and an annual budget of $10billion. CITRIS operates as an umbrella organization providing seed capital for faculty to do research projects. It resembles a small (internal) NSF grant. It has 300 affiliated faculty members and it is involved only in projects that faculty can not do on their own or within their own networks. CITRIS focuses on research in the interest of Society: IT for energy; IT for infrastructure; IT for health care. The core of CITRIS research is focusing on Sensors (i.e. Sensors that are energy efficient by Nanotechnology; Sensors on mobile phones for traffic management; Pollution Sensors;

sensors for Earthquake monitoring). UC Berkley adopts a different approach than Stanford with regard to entrepreneurship. It focuses on basic research that will, in the long run, create value for the society. For example they estimate that Berkley-originated research created 1/3 of all Biotechnology jobs in the Bay Area and 1/5 of them in the US. Mix of cultures within the University is an important factor for excellence. They try to provide more cost effective education by adopting forms of on-line education and by focusing not only on training students but re-training them after they leave.

2.1.3. Singularity University

Singularity University was founded in 2008 by Drs. Ray Kurzweil and Peter Diamantis with a mission to "…assemble, educate and inspire a new generation of leaders who strive to understand and facilitate the development of exponentially advancing technologies to address humanity's grand challenges…". It is located within the NASA Research Park and benefits greatly from the proximity of other NASA Research Park companies as well as other Paolo Alto based companies. The University is focusing on sectors that present an "Exponential growth pattern". The University offers only post graduate education, i.e.

- A 10 week graduate program with a curriculum that is being reviewed every 6 months and include a mix of Technology Tracks (i.e. Artificial Intelligence & Robotics; Nanotechnology; Networks & Computing Systems; Biotechnology & Bioinformatics; Medicine & Neuroscience), Application Tracks (i.e. Energy & Environmental Systems; Space & Physical Sciences) and Resource/Management Tracks (i.e. Futures Studies & Forecasting; Policy, Law & Ethics; Finance & Entrepreneurship; Design)
- A 7 days executive program. The program concentrates on six exponential growing technologies: Artificial Intelligence & Robotics; Nanotechnology; Biotechnology & Bioinformatics; Medicine & Neuroscience; Networks & Computing Systems; Energy & Environmental Systems.

2.1.4. San Jose State University

San Jose State University is part of California "middle tier" State University system. California State University System has 3 tiers:

- *Upper tier:* Leading Research Universities: the UC system i.e. UCLA, UC Berkley, UC Davies etc
- *Middle tier:* Cal State Universities: i.e. San Jose State University, San Francisco State University. About 25 of them. A total of 420.000 students. SJSU about 20.000 students.
- *Lower tier:* Community Colleges: 2 years of studies. Possibility to transfer to the State Universities after completion of study. Another 500.000 students

SJSU is more a teaching oriented rather than a research-led university. It provides the bulk of the workforce in the Silicon Valley (maybe not the CEOs and the VPs but all the middle management). It is a Community University that works closely with the city, i.e. students work on community projects; library can be used by the city citizens. They emphasise the role of their Alumni by: An on line community of alumni; crowd sourcing for getting funds for start-ups; offering internships; sponsored activities; class visits and guest lecturing.

2.2 Research centers

2.2.1. AT&T Labs

For the last 20 years AT&T Labs is focusing on applied research for the last 20 years while relying on Universities to do the fundamental research and on the Government to fund it. They collaborate mostly with research intense Universities. Their approach is to initiate non-

biased research by giving the Universities a problem to solve but no bias on the methodology. Their approach to IP is very flexible. Usually IP is jointly owned with Universities. They collaborate better with Stanford that has an almost frictionless model of cooperation and actively encourages working with industry, than with UC Berkley which they view as less open to entrepreneurship. In Stafford University they cooperate with the Office of Technology Licensing. A recent AT&T initiative that promotes innovative small firm creation is the establishment of a series of AT&T Foundries which provide a collaborative environment for start ups. AT&T provides space, resources and access to networks. Up till now AT&T has invested a total 80m $ in 3 foundries that have been established in co-operation with technology partners: in Paolo Alto with Erickson, in Dallas with Alcatel and in Tel Aviv with Amdocs.

2.2.2 .NASA Research Park

The Research Park was built on 1939. NASA has invested a total of $18b. They believe and claim that they "kick-started" the Silicon Valley. It operates as a Technology Accelerator. The companies that are established within the Research Park have commercial leases and receive no subsidy or equity form NASA; neither does NASA endorse companies/producers. The value of locating within the Research Park is the opportunity to network and benefit from co-location with other companies and research labs. Currently the park hosts 90 companies on site, from Google to start-ups (including Universities), in diverse sectors such as Biotechnology; Information Technologies; Nanotechnologies.

2.3. Incubators/ accelerators

2.3.1. US MAC (US Market Access Centre)

US Mac is an incubator/ accelerator for foreign companies that want to be established in Silicon Valley. It was founded by San Jose State University on 1995 and operates as a non-for-profit company. It has helped over 900 companies over17 years. Currently 40 companies are hosted in 3 floors in San Jose plus 110 companies in San Francisco. Average stay: 24-30 months. When companies have raised their first investment money they leave the incubator/accelerator. Over 90 volunteers dedicate a minimum of 2 hours per month to support the companies. US Mac is currently preparing to starting a VC fund. They have raised 35m$ with an ultimate goal of 300m$

2.3.2. The HUB, Bay Area

The HUB is a co-working space in downtown San Francisco. It is a part of a global network of 35 locations. The SF one is number 28. They currently have 1300 members and 8 staff members. They support social entrepreneurs, i.e. for profit business that address a social need.

2.3.3. Renaissance Business Center

Renaissance Business Center is a 27 years old NGO. Original funding came from Federal funds, Banks and Corporations. They support under-resourced population towards business creation. Usually they focus on very small businesses (1-5 employees). Most business come to Renaissance when they are at the 3-6 months stage of their operations. Applicants are admitted based on their business plan. Their services include:

- Monthly one-one consultation on marketing, finance etc
- Open books- mutual confidentiality agreement

- Within the 1st year companies usually come up into problems and the incubator tries to help them overcome the "bumps"
- Flexibility: increase/decrease of office space when needed
- The center does not take equity at the businesses

They operate 4 sites in Bay area, in disadvantaged communities in SF, East Palo Alto, and north of Golden Bay Bridge with a total staff of 21 Full Time 3 Part Time. Currently they are hosting about 40 businesses in downtown SF.

2.4. Public Authorities and NGOs

2.4.1. San Francisco City: Mayor's Office of Civic Innovation

The Mayor's Office of Civic Innovation functions as a start up within government. They focus on 3 initiatives:

- *StartupSF* i.e. One-stop shop that helps companies cut through red tape; Portal SF; Tax incentives to start-ups that move to Market str. In downtown SF;
- *EngageSF* i.e Open government, open data from all public organizations so that businesses can develop applications based on the data; Hackathons (i.e. hacker marathons) organized by the City; On-line collaboration platform that lowers the barriers of entry to working with government;
- *SmartSF* i.e. Car2go: car sharing scheme; Living innovation zones: A mechanism that will allow business to demonstrate their products, services and applications using the city as a living lab; Support of Sustainable Social Enterprises.

2.4.2. Network for Teaching Entrepreneurship (NFTE) Bay Area

NFTE is an international NGO that focuses on teaching entrepreneurial skills to kids. It is helping about 50.000 kids 11-18 years old world - wide. They cooperate with the University of San Francisco (USF) which commits that MBA and graduate students work with kids from NEFTE as mentors and coaches. Also USF provides space for NEFTE 1000 kids per year in the Bay Area. Modules of teaching run for 1 semester up to 1 year with a 2 weeks introduction.

2.4.3. Urban solutions: 6th Str. Revitalization program

Urban Solutions is an NGO dedicated in revitalization of urban areas in economic decline. They invested $1.4m public money and leveraged $3.5m private investment in the area of SF 6th street, one of the poorest and deprived areas of the city. Their services include: Sustainability consulting to small businesses; Renovation investment; Small loans to businesses; Help in negotiating leases; organization of Art walks in the City.

3. Key lessons and conclusions

During the study tour a number of key themes were repeatedly discussed and re-surfaced in the meetings that the INNOPOLIS team had with the organizations that were hosting us. We discuss these key themes below; so that we will be able to draw some key lessons that will help us answer three important questions:

- Can the Silicon Valley be replicated?
- What can a South East European Region like Central Macedonia learn from the Silicon Valley?

- How we can use these lessons to define an innovation strategy for our region?

3.1. What makes Silicon Valley unique; what defines the "Silicon Valley spirit"?

The unique combination of high tech companies, world leading universities, high-risk financiers and an entrepreneurial spirit has elevated Silicon Valley to the status of the proffered destination for students, entrepreneurs and financiers from all over the US and all over the world. The most important elements of the Silicon Valley ecosystem are:

- A culture that welcomes failure: "If you are afraid to fail, you will not try". This in turn encourages experimentation; try, fail and retry.
- A unique educational system that caters for the needs of an ever developing dynamic entrepreneurial community.
- A culture of sharing, giving to the community and engaging that has allowed concepts like social entrepreneurship, voluntary mentorship, crowd-sourcing, crowd-funding and co-location to flourish
- A pioneer spirit combined with a liberal one (the former having its roots to the 1849 gold rush, the later having its roots in the freedom-loving and experimental '60s).
- An inter-disciplinary approach that breaks the barriers between scientific areas and encourages new innovative experimentation

3.2. What is the role of the education system and more specifically of the Universities in the Silicon Valley?

The importance of education and the Universities was repeatedly highlighted. In particular Stanford University is considered by many to be a "catalyst" for Silicon Valley and an institution where businesses and Venture Capitals are looking at closely in order to find their next "big business opportunity" However it is important to note that, in the Bay Area, there is a variety of approaches and ideas on the role of the education and more specifically of the higher education. We believe that this variety is an important ingredient of success:

- There is a variety of approaches on the role of Universities in bringing technological development to the market and society: UC Berkley and Stanford University exemplify two major different approaches. For UC Berkley it is important to focus on basic research, on putting the effort to open new frontiers and educate people and this will "flow back" to society. Stanford on the other hand strongly encourages staff and students to focus on applied research and to bring this research to the society through start-ups and IP exploitation of their own. It is important to note that the two approaches are complementary. It can be safely concluded that while Silicon Valley can not exist without Stanford, it would not be what it is now without UC Berkley either.
- Equally important is the "3 tier" construction of the California public University system. The system is constructed in a way that recognizes the fact that the needs of the society and the market are multi-tier. Businesses do not need only CEOs and VPs (that can come out of institutions like UC Berkeley and Stanford). They also need well educated middle-level management (like those that come out of State Universities like San Jose State University) and well educated and trained technicians and operators (educated in the 2-years public Colleges). The level of commitment and pride that the team experienced while talking to the SJSU staff ("…we educate all the Silicon Valley's middle management…") is nothing but remarkable.
- A third aspect worth mentioning is the considerable effort put by the Universities, we have visited, to exploit alternative ways of providing education that caters to special

needs, being it continuous education (UC Berkely, SJSU) on-line education (Stanford, UC Berkley), the development of post-graduate courses focusing on the development of exponentially advancing technologies (Singularity University) or the focus on re-designing and revitalizing engineering education (Stanford). Equally important is the ever-growing trend to offer free on-line material and courses as exemplified by the recent fast development of Mass Open On-line Courses (MOOCs like coursera, udacity and edX).

- The role of "T-shaped education" (2 years more general education plus 2 years specialized education) was exemplified by all the higher level educational institutions that we visited. It is deemed to provide the opportunity to the students to broaden their views and understanding of society before being more focused to their expertise. And this in turn helps inter-disciplinary approaches.
- Finally it is worth mentioning the attention that all four Universities give to the engagement with the community and the importance of bringing in professionals and entrepreneurs in the classroom, so that they can provide first hand real-life experience to the students, thus eliminating the "academia– society" chasm.

3. 3. What (if any) is the role of the public sector in the Silicon Valley?

Although there is an almost universal agreement that the public sector should better not get involved or risk inhibiting innovation and entrepreneurship, there is still enough evidence to support an active public sector involvement that recognizes the role that it can play in supporting:

- Basic research (i.e. the University of California system as exemplified by UC Berkeley)
- A well functioning education system (i.e. the "3 tiers" of the California State Higher Education System)
- Cutting red tape for new enterprise creation and development (i.e. the role of the Mayor's Office of Civic Innovation)
- Offering access to public data in view of creating new innovative services and businesses (i.e. again the SF Mayor's Office of Civic Innovation).

It should be also noted that one of the first big investments in the area (the NASA Research Center) was done by public money. The decisive role of public (and especially military) investment in creating the Silicon Valley is examined in detailed by Steve Blank [1] and emphasized by many scholars of innovation history (see i.e. Henry Chesbrough's analysis of the role that the Office of Scientific Research and Development (OSRD) and Vannevar Bush's "Science, The Endless Frontier" 1945 report played in creating the US and Silicon Valley innovation culture [5]).

3.4 Can the Silicon Valley be replicated?

A lot of efforts to replicate Silicon Valley have failed not only in Europe, but also within the US. The main conclusion of this study tour is that the uniqueness of Silicon Valley and the SF Bay Area lies not on the abundant offer of VC money; nor on the existence of two of the best Universities of the world; nor on the nice climate and location. It is not money, education and climate that mostly define SF Bay Area. It is the culture: the acceptance of failure; the positive attitude; the importance of sharing and openness; the co-existence of different cultures; the role of the community and the desire to give back to the community; the glorification of the pioneer/ entrepreneur; the continuous quest to open new frontiers. This is why Silicon Valley can not be re-created by bringing together a few very good Universities

and offering risk capital to businesses and start-ups. The culture needs to be nourished and this takes time and effort directed at the core values of the society.

3.5. What can Thessaloniki and the Region of Central Macedonia learn?

Building an entrepreneurial and innovation-prone culture should be the main focus of the Central Macedonia region. The main lesson is that implementing changes that affect profoundly the core values of the society is not something that can be done overnight and does not happen with subsidising the high-tech activities of a few firms or by encouraging research and innovation in a few local "centres of excellence". We need to think about how to cultivate a culture that embraces innovation and direct our efforts to the core values of the society. The main elements of such a strategy would be:

- Identifying and building upon the positive elements of the local culture, like the trade and industrial tradition, the willingness of the people to learn and invest in education and the natural advantages of the region.
- Using the concept of Smart Specialization ([6], [7]) to identify and support local strengths and capabilities and streamline public and private investment towards them.
- Promoting entrepreneurial spirit to young generations, by addressing the high school students and providing them with alternative career paths.
- Reforming and invest on education. Redefine the role of higher education so that it serves the purpose of supporting and boosting the local economy. In the California system there is a clear and valuable role for each tier of higher education (upper tier: research driven; middle tier: educating and preparing the middle level management of the Silicon Valley; lower level: provide a basic level of higher education to a large number of people). Additionally the two main research-led institutions have a clear and quite different vision for their role towards research and innovation. These two different visions are complementary and both play a significant role in the local innovation eco-system. We need to re-think Higher Education, continuous education and post-high school education, in order to define clear scope for each one that will serve specific needs and target-groups of the economy and the society. Mobility, competition, excellence, openness and continuous appraisal of the mission and achievements are necessary elements of such a reform.
- Redefine the role of public sector so that it serves entrepreneurship and innovation. Elements of this new role include: Encouragement of Public-Private Partnerships; opening up of public data so that new innovative applications can stem up; encourage entrepreneurship and severely cut red-tape; every public investment in the local innovation system should respect the following principles: accountability, sustainability of results, pursuing of excellence and always assess the impact of each investment, regulation and initiative.

References

1 Blank S. Hidden in Plain Sight: The Secret History of Silicon Valley http://bit.ly/SecretStoriesSteve
2 Komninos N, Tsamis A. The system of innovation in Greece: structural asymmetries and policy failure. Int. J. Innovation Regional Development, Vol. 1, No. 1, 2008 1
3 INNO-Policy TrendChart – Innovation Policy Progress Report, Greece. 2009
4 Georgiou C, Komninos N, Sefertzi E, Styliaras K, Zaharis N. Development of an Innovation Strategy for the Thessaloniki Metropolitan region. Proceedings of International Conference for Entrepreneurship, Innovation and Regional Development ICEIRD 2012, Sofia

5 Henry Chesbrough Open Innovation: The New Imperative for Creating and Profiting from Technology, Harvard Business School Press, 2005
6 Foray D. Smart specialisation: from academic idea to political instrument, the surprising destiny of a concept and the difficulties involved in its implementation. European Integration process in the new regional and global settings, Warsaw, October 19th and 20th, 2011
7 Foray D, Goddard J, Beldarrain X. G, Landabaso M., McCann P, Morgan K, Nauwelaers C, Ortega-Argilés R. Guide to Research and Innovation Strategies for Smart Specialisation (RIS 3) March 2012.

ARE GOVERNMENT SUPPORTS EFFECTIVE IN FUELING INNOVATIVENESS OF SMES IN EMERGING COUNTRIES? EVIDENCE FROM TURKISH CASE

Gökçen Arkalı Olcay[1], Melih Bulu[2]

gokcenarkali@sehir.edu.tr, melihbulu@sehir.edu.tr

[1]School of Management and Administrative Sciences, İstanbul Şehir University, gokcenarkali@sehir.edu.tr

Small and medium-sized enterprises play a key role in today's global economy in terms of their large share of the total workforce and the total number of firms. Although small firms have potential for innovation and can bring new ideas into the market, there exist many barriers for them to innovation and growth. This study concerns with the relationship between innovation policies that are initiated by Turkish Government to promote innovation among SMEs and the performance of these small and medium-sized organizations at firm level. Although small firms have low survival rates compared to large firms, SMEs comprise a very high percentage of the economy in almost all countries. Their contribution to the overall economy is significant as they often take the lead to turn ideas into new products, processes, and business methods. We investigate the effects of support funds for R&D, innovation and development of technology that are given by the public agency of Small and Medium Enterprises Development Organization on net sales for a sample of 844 SMEs across different industries. Our results reveal that support funds positively contribute to the net sales with higher contributions in large manufacturing firms that are located in technology development centers and industrial zones.

Keywords
Firm performance, innovation, R&D, SMEs, support funds

1. Introduction

Many scholars in the field of management have been involved in the debate on the outcomes of innovation outlasting during the last few decades. Innovation has been considered as the out way from economic downturns in the times of crisis and has been the power engine for development of firms, countries, and regions. Firms and countries invest in innovation to increase the productivity and the profitability of their organizations and the welfare of their nations.

Innovation matters to all as it affects the wellbeing of a firm. Yet, most firms cannot compete with others who invest in and manage innovation well. Therefore, it is crucial to understand how to create conditions to make innovation happen which in turn allows organizations build innovative capabilities. While large firms have structured processes for organizing and

managing innovation, small firms that are young usually do not have the resources or formal strategies for innovation [1]. Many new small firms enter the market with new ideas for developing new processes and products; however, they do not last for long exiting the markets in a few years ([2], [3]). Thus, survival of such firms in the long run has been a challenge especially for small firms as they are most exposed to the risk of exit. On the other hand, small firms are the ones that most benefit from innovation to survive in the market as time lengthens [4].

Small firms survive in the market to the extent that they engage in innovation. However, small firms face many challenges as compared to large firms. They have difficulty in accessing new technologies that they require to innovate, obtaining finance, and they are lack of know how, skills and capital investment for performing innovation activities (OECD, 2004). In this context, national innovation polices play a critical role in engaging and supporting small businesses. Many governments across the globe today establish frameworks, create funds, and revise their taxation and educational policies to stimulate innovation activities. Generating innovation possibilities through creating funds and suitable environments for innovation is important but it is not sufficient. It is equally crucial to bring out the benefits of innovative capabilities of firms in the forms of enhanced productivity or profitability for the sake of the overall economy. To serve to this purpose, many scholars try to establish the link between innovation and productivity while finding themselves in the middle of a debate on the impact of innovation. Innovation is clearly a significant ingredient in productivity (and profitability) but it is important to understand the environment and conditions, which stimulates the effectiveness of these highly expensive investments.

This study examines the relationship between support funds for innovation that are offered to Turkish small and medium-sized enterprises (SMEs) and their performance metrics. SMEs with their small scales can quickly adapt to economic changes especially in the times of crises and they play a critical role in the development and growth of resilient economies all over the world. In Turkish economy, SMEs comprise a large share of the total employment with 99.9% of the total number of enterprises and 81.3% of the total employment according to 2006 statistics given by OECD. Although SMEs comprise a large share of the overall employment and businesses in Turkish economy, their performances are low in terms of the shares in total exports (9%) and value-added (27.3%) as compared to their peers elsewhere in the world [5]. Low scores of Turkish SMEs in innovation made the Turkish Government to re-evaluate and develop new strategies for harnessing innovation and entrepreneurship among all businesses. Turkey is now at a milestone where the Turkish economy can take a step further towards achieving the goal of Turkey 2023 vision by investing in R&D and innovation policies especially in small businesses that are viewed as the engine of the economy. To boost the exports and decrease the account deficit, Turkish Government recently initiated various policies and support programs that will help to increase the competitiveness of Turkish companies and differentiate them in terms of new products and services.

Support program for R&D, Innovation and Industrial Applications and support program for Development of Technology and Innovation are the two major programs that have been designed and implemented by the Small and Medium Enterprises Development Organization (KOSGEB) in Turkey. While initiating such support programs is crucial for the sake of the small businesses, there is a need to understand the role of these funds on initiating and accelerating the innovativeness of SMEs particularly in the early stages of their life cycle. As SMEs grow and increase their business performance in time, they can choose to invest more

in R&D and innovate but innovation would be more challenging initially. New and young firms can be very creative as evidence from Patent Co-operation Treaty (PCT) suggests that a significant amount of patent applications come from new firms with about 14% in the United States, 16% in Denmark, and 22% in Norway ([6]). This study tries to measure and understand the role of national innovation policies on the growth performance of SMEs. While innovation can be linked to business performance of SMEs based on the previous empirical studies of firms across different countries, it is not clear how the support funds initiate and foster the innovativeness of SMEs. The funds that are allocated for the purpose of increasing the innovation activities of SMEs need to be evaluated on an empirical basis to better understand their tangible effects on firm performance measures and their overall effects on the Turkish economy.

2. Data and Methodology

2.1 Data and Descriptive Statistics

We propose an empirical approach to determine the effects of the support funds on firm innovation output and firm financial performance. We obtained firm-level support funds data including firm-level financial data from KOSGEB. Support funds data were collected from 844 SMEs that are concentrated in industrial sectors such as manufacturing, construction, wholesale, information & communication technologies, professional, scientific and technological activities. There are only a few firms in some of the industrial sectors that span our firm level dataset; therefore, we classify firms into three main industries by collecting relatively small number of firms in other industries: manufacturing, information and communication, and other.

The main independent variables of this study are the two types of support funds for innovation: support program for R&D, Innovation and Industrial Applications (RDInnovInd) and support program for Development of Technology and Innovation (DevTechInnov). While 581 firms have been granted by the support fund for R&D, Innovation, and Industrial Applications between years 2010 and 2012, 328 firms are supported through the program Development of Technology and Innovation over years 2009 to 2012. However, not all firms have been granted by both funds during the three years from 2009 to 2011.

Table 1a. Characteristics of the sample granted by the *R&D, Innovation, and Industrial Applications* support program

		Number of Firms with respect to Location			
Industry	*Number*	*KOSGEB Centers*	*Industrial Zones*	*Tech. Dev. Zones & Techno parks*	*Other*
Manufacturing	361	57	136	45	123
ICT	136	46	1	41	48
Sci. and Tech. Activities	58	23	3	20	12
Other	26	4	6	2	14

Table 1b. Characteristics of the sample granted by the *Development of Technology and Innovation* support program

		Number of Firms with respect to Location			
Industry	*Number*	*KOSGEB Centers*	*Industrial Zones*	*Tech. Dev. Zones & Techno parks*	*Other*
Manufacturing	221	45	62	24	90
ICT	85	38	-	25	22
Sci. and Tech. Activities	18	9	2	5	2
Other	4	-	1	-	3

Table 1 gives the characteristics of the sample, which provides a distribution of the firms with respect to location and industrial sector for the two types of funds, separately. Location is specified by means of four different levels that are KOSGEB technology development centers (TEKMER), industrial zones, technology development zones and techno parks, and other locations. KOSGEB established technology centers that are referred to as TEKMER by collaborating prestigious universities in major cities. Industrial zones comprise organized industrial zones and small industry zones. Identifying location is important here as there are many firms in this data set that are located in technology development centers and techno parks that are established by the Ministry of Science, Industry and Technology to promote the innovativeness of SMEs. Various grants and soft loans, tax reliefs, exemptions, and other tax-based supports are provided to the tenants of these centers to boost their innovation activities.

Tables 1a and 1b reveal that 22.38 % of all firms that are supported through funds for R&D, Innovation, and Industrial Applications are located in KOSGEB technology development centers whereas 18.59 % are located in technology development zones. Corresponding percentages are 28.05 and 16.46 % for firms that are supported through funds for Development of Technology and Innovation.

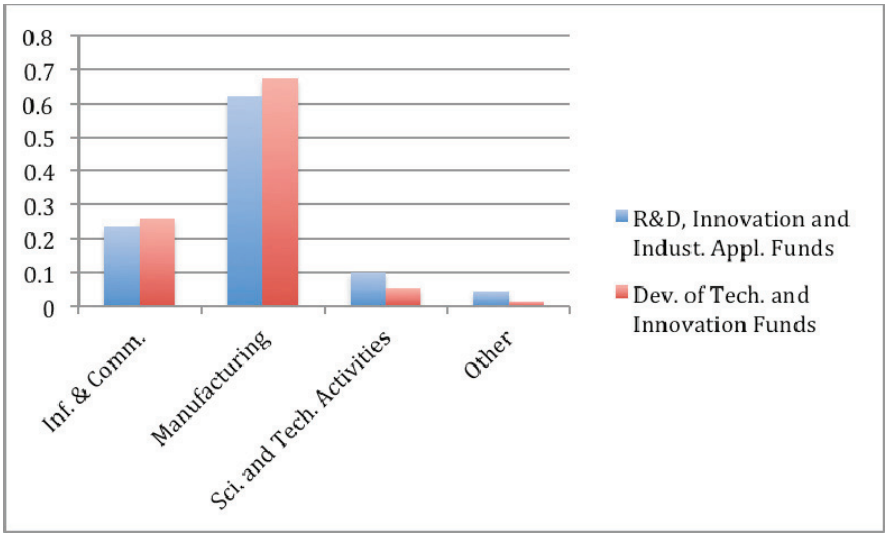


Figure 1. Partition of funds for R&D, Innovation, and Industrial Applications and Development of Technology and Innovation with respect to industry sectors

Figure 1 presents the partition of the funds across different industrial sectors. As the figure reveals, a high percentage of firms that have been supported through both support funds lie within the manufacturing sector with 62% and 67% for funds RDInnovInd and DevTechInnov, respectively. Firms that are classified in information and communication technologies follow the manufacturing sector with a share of 23% and 26% for RDInnovInd and DevTechInnov, respectively.

A firm's innovative activities tend to stimulate net sales. Different measures of firm performance are utilized in the prior literature as they are briefly summarized in Artz et al. (2010). Focusing on the net sales aspect of firm performance, we consider net sales as the dependent variable in this study. Because firm size contributes to the variation in firm performance (Kotabe et al., 2002), we control for firm size measuring the size as the logarithmic function of the total assets. To control for industry effects, we define a dummy variable for each industry. Three binary dummy variables are defined to indicate the industrial sector of the firm: DManufacturing, DInfandComm, and DOther. Similarly, a dummy is associated with the location of each firm. DSecKOSGEB, DSecIndustZones, DSecTechno, and DSecOther represent the regions of the firms in our data set.

2.2 Regression Analysis

We investigate the effects of the support funds (funds for R&D, Innovation and Industrial Applications and funds for Development of Technology and Innovation) on firms' net sales. We test the effect of two funds separately which we refer to as model 1 and model 2. While firms in our data set has been granted by two different types of support funds by KOSGEB, we have only three years of data for each type of the support funds. 581 firms received RDInnovInd funds between years 2010 and 2012 while 328 firms received DevTechInnov funds between 2009 and 2011. Thus, we investigate the effect of the sum of two funds on firm net sales to increase the time span of the data. The regression equation takes the following form where InnovFunds reflects the RDInnovInd, DevTechInnov, or TotalFunds.

Table 2. Pooled regression analysis of the support funds

	Model 1	Model 2	Model 3
RDInnovInd	0.06113		
DevTechInnov		0.00443	
TotalFunds			0.0410**
Size	0.56604***	0.50283***	0.49486***
DSecKOSGEB	0.11146**	0.15**	0.08873***
DSecIndustZones	0.11910**	0.18553***	0.10765***
DSecOther	0.09487*	0.24744***	0.12658***
DManufacturing	0.02981	0.10073	0.08540***
DInfandComm	0.02072	0.05115	0.01503
Adj. R^2	0.3690	0.3290	0.2964

Notes: Dependent variable= Net Sales. Regression coefficients are standardized. *** (**,*) indicate 1%, (5%, 10%) level of significance.

The indices i and t represent the firm and the year, respectively. ϵ_(i,t) is the error term. Technology development zones and technoparks are chosen as base dummy for region whereas firms that are classified in industrial sectors referred to as other includes industrial sectors such as wholesale, construction, electricity is chosen and chosen as base dummy for industrial sector.

Table 2 provides the parameter estimates of the regression models that are considered in this study. The positive and significant impact of TotalFunds on net sales indicates that support funds for national innovation policies result in an increase in net sales of the small firms that are supported through these funds. Size is also positively related to net sales of SMEs. According to Model 3, while firms in manufacturing industry has a significant and positive impact on net sales as compared to firms that are classified in other industrial sectors, we do not observe this significant and positive impact for firms in information and communication industry. With respect to location, firms that are located within the KOSGEB technology development centers, industrial zones, an in other location significantly increase the net sales. Firms that are located in technology development centers and technoparks do not positively contribute to net sales. About 60% of all firms in our data set is classified in manufacturing sector. This can be partially explained by the fact that a significant portion of firms in our data set are classified in manufacturing sector and most of these firms are located in industrial zones.

3. Conclusions

Despite the increased policies and support funds for nurturing innovation activities of small firms all around the world, quantifying the effects of these polices on firm productivity or performance has long been neglected. While developing policies and supporting SMEs is crucial for the survival of small firms, systematic statistical measurement of SME policies is needed to improve the effectiveness of these policies. We measure the effectiveness of support funds provided by one of the largest public agency in this field in Turkey, the Small and Medium Enterprises Development Organization (KOSGEB). Yet, comparative studies among different sources of this kind of support within Turkey as well as cross-country comparative studies must be done to analyze the impacts in the long run.

This research contributes to the literature by examining the effects of support funds on firm net sales. 844 SMEs that receive financial support from KOSGEB are tracked during the years 2009 and 2012. Most of the SMEs receiving these funding are active in manufacturing and information and communications sectors. According to the regression results, support funds significantly increase the firms' net sales. Besides, firm size positively contributes to net sales. Our results also reveal that manufacturing firms have higher net sales as compared to other firms. Moreover, firms that are located within KOSGEB centers, industrial zones, and other regions have higher net sales than firms located in technoparks and technology development centers. This can partially be explained by the fact that most of the SMEs supported by KOSGEB are manufacturing firms that are located in industrial zones and KOSGEB centers. A significant portion of the firms that are active in information and communication technologies, although small in count, are located in technoparks and technology development centers. While these knowledge-intensive small firms have more potential in nurturing innovativeness of the economy by developing value added products and services, most of them are so small that cannot compete with their larger counterparts.

Innovation requires high R&D investments that are typically risky and outcomes are uncertain in the short-run. Small firms often lack the resources to invest in R&D and innovate. Nevertheless, our analyses indicate that supports for innovation pay off in terms of higher net sales for manufacturing SMEs. This does not necessarily suggest that innovation results in lower or non-significant benefits in financial measures for firms that are specialized in information and communication technologies. Since the data span of this study was limited to a few years (i.e., from 2009 to 2012), the non-significant effect of other industrial sectors other than manufacturing could only be inferred rather than be generalized. Future research should collect longitudinal data on a larger number of firms that is more balanced with respect to different industrial sectors.

This study has key implications for government agencies, practitioners and researchers. The findings of this study shed light on the essential role of innovation policies and supports on fostering the innovation activities of Turkish SMEs. From Turkish Government's perspective, support funds for innovation results in higher financial performance for those SMEs that benefit from these funds. The solid empirical evidence can further accelerate future support programs within KOSGEB and other private and public sector agencies. KOSGEB and similar agencies can improve the effectiveness of the support programs in the long-term and establish new funds and support programs to further foster the innovation. The findings can also be used to compare similar effects in different countries at least from a researcher's point of view.

The sample for this study was drawn from KOSGEB, which was limited to a few years that are from 2009 to 2012. Given the small range of time in our sample, we investigate the contribution of support funds in current net sales. A larger range of time would allow us to investigate the effect of support funds for innovation on the differences in financial firm performance before and after funding which opens a new avenue for future research. The research model should be tested further using samples from other supporting agencies and countries. In this study, the firm performance is measured using net sales in considering that investments in innovation will be reflected in financial firm performance. However, there are other important measures of innovation outputs such as patent count and number of new products and services that would be used to test the contribution of support funds in innovation on these measures of innovation outputs. Moreover, there exist other factors such as firm's age, firm's technology and R&D investments, and entrepreneurship capital, which can also affect (marginal and joint effects) the firm's innovation performance. Since it is not easy to quantify factors such as entrepreneurship capital, further data need to be collected through surveys and interviews.

References

1 Bessant, J.R., Tidd, J. Innovation and Entrepreneurship. West Sussex, England: Wiley 2007.
2 de Jong, J.J.J., Marsili, O. The fruit flies of innovation: A taxonomy of innovative small firms. Research Policy 2006; 35: 213-229.
3 Audretsch, D.B. Innovation, growth, and survival. International Journal of Industrial Organization 1995; 13(4): 441-557.
4 Cefis, E., Marsili, O. Survivor: The Role of Innovation in Firm's Survival. Utrecht School of Economics Tjalling C. Koopmans Research Institute Discussion Paper Series 03-18 2003.
5 Bascavusoglu-Moreau, E. Entrepreneurship and the National System of Innovation. What is Missing in Turkey? UNI-MERIT working paper series #2010-030 2010.
6 OECD Innovation Strategy, http://www.oecd.org/dataoecd/51/28/45326349.pdf, 2011.

USING PUBLICLY AVAILABLE INTERNET TOOLS TO TEACH PATENT RESEARCH AND DEVELOPMENT

Søren Jensen and Stoyan Tanev

Institute of Technology and Innovation, Faculty of Engineering, University of Southern Denmark
soj@iti.sdu.dk and tan@iti.sdu.dk

Abstract

The management of Intellectual property rights is becoming increasingly important in the 21st century knowledge society. Patents are especially important for engineering design and R&D teams. However, there is a lack of educational resources in this area. There is an increasing need to enhance the university curriculum with appropriately designed courses focusing on patent development strategies. There is therefore a need for the development of such academic courses by using publicly available resources and by focusing on cost efficiency. The focus on the balance between cost and educational efficiency is especially important within the context of the economic challenges which are drastically limiting the financial resources of all universities.

In a previous contribution presented at the ICEIRD 2012 conference we have discussed our finding that technology entrepreneurs in general are interested in more education on the patent system [1]. In this paper we will examine the current literature addressing the subject of teaching patent development to engineering students and entrepreneurs. The review will primarily focus on literature that supports the teaching of patents to engineering students. With the advancement of the internet a number of patent offices are offering online tools that can be utilized in the teaching of the patent system, we will provide a review and analysis of these tools resulting in a suggestion for a patent course syllabus corresponding to an average student workload of 5 ECTS.

Keywords

Course syllabus, education, engineer, online tools, patent

1. Introduction

The management of Intellectual property rights is becoming increasingly important in the 21st century knowledge society. There are multiple reasons for such growing importance. One of them is the increasing openness, interdependency and accelerated internationalization of technology-driven firms within the context of ongoing globalization processes. Patents are especially important for engineering design and R&D teams as they contain the description of emerging technologies developed in cooperation with both internal and external partners. These trends are in the process of affecting the content of academic engineering programs worldwide which now emphasize the need for the acquiring of both engineering and management skills. In this sense there is an increasing need to enhance the university curriculum with appropriately designed courses focusing on patent development strategies. It is true that there are many examples of courses focusing on the professional development of patent experts. However, there are very few examples of such courses within the context of master engineering programs. The development of such courses by focusing on the expertise of patent firms could be very expensive and may not be economically justified. There is therefore a need for the development of such academic courses by using publicly available resources and by focusing on cost efficiency. The focus on cost efficiency is especially important within the context of the economic crisis which is drastically limiting the financial resources of universities.

In our contribution to the ICEIRD 2012 we have found that technology entrepreneurs in general ask for more education on the patent system [1]. In this paper we will examine the current literature addressing the subject of teaching patent development to engineering students and entrepreneurs. The review will primarily focus on literature that supports the teaching of patents to engineering students. With the advancement of the internet a number of patent offices are offering online tools that can be utilized in the teaching of the patent system to engineering students and entrepreneurs, we will provide a review of these tools. In the conclusions a suggestion for a patent course syllabus corresponding to an average student workload of 5 ECTS is described, including a summary of the relevant literature and suggesting a list of online tools that could be used for a cost efficient course development.

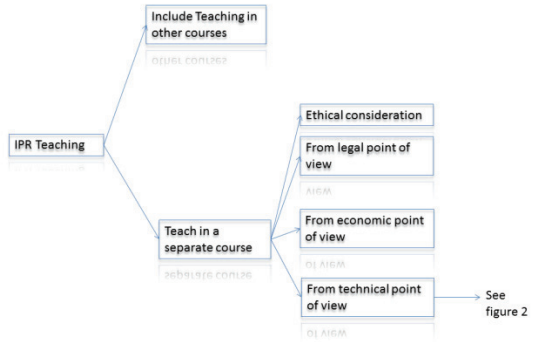
Patents are often associated with a tedious process from conceiving an invention to the granting of a patent. Most scientists and engineers see the demand for patent filing before publication as prohibitive to their research career. But fully understanding the patent system allows them to both patent and publish their research results without significant delay. Moreover a – often overlooked – feature of the patent system is that most technical developments are (also and often only) published as patents and thus patents contain a wealth of technology information. Patents are a valuable source for technology information and they are freely available for scientists and engineers having the skills to search patent documents. Moreover understanding and being able to benefit from the patent system is part of the “Engineering Library Literacy”[2] .

2. Methodology

Our search for materials related to the subject were performed in the period between May and November 2012 on the internet and in databases such as Compendex and Web of Science, using

relevant keywords to cover the area of "Teaching patents to entrepreneurial engineering students". The search revealed a number of approaches to teaching patents to engineers and – as seen in figures 1 and 2 some limitations in the results were necessary. The searches dealing with "teaching patents to engineers in a separate course from a technological point of view" resulted in a number of web pages and less than 20 scientific articles or conference papers covering the area. This material is dealt with in the analysis below. In figures 1 and 2 below we have depicted the selection process we undertook in the literature review phase. The cutoffs are either dealt with other places or not relevant to our subject. The two subjects "Teaching to understand the patent system" and "Using patents in Entrepreneurship teaching" are discussed in this article.

Figur 1 Overview of subject matter included in the review



3 Results

3.1 Understanding the patent system

The first question that was raised was whether the patent teaching should be a course for itself or it should be introduced through the incorporation in other courses. This dilemma is discussed by Roach et al [3], Soetendorp et al [4] and others. They argue that due to a generally crowded syllabus the right way to introduce patent teaching in engineering programmes is to include the subject in another, relevant course. Kaplan and Kaplan [5] argue that IP teaching in general should be included in other engineering courses, even on the freshman level.

Starkey et al [6] investigated the general knowledge on Intellectual Properties (IP) amongst students and teachers in New Zealand secondary schools. In general less that 50 % were able to give correct definitions to subjects such as: patent, copyright, registered design or trademark. For patents less than 25 % of the teachers were able to give a correct definition to the subject "patent". We have chosen to work on patent teaching in a separate course, supported by Soetendorp [7] who states that a large number of professors are reluctant to include IPR teaching in their classes as they don't feel confident teaching an area unfamiliar to them.

3.2 Various teaching methods

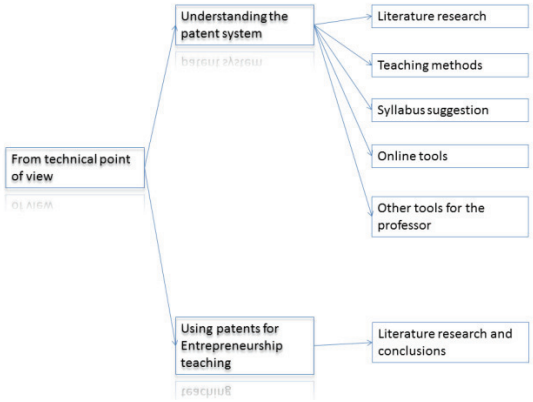
Soetendorp [4] mentions 5 ways to teach patent understanding:

- The case method
- The problem solving method
- The simulation model
- The clinical method
- The doctrinal method.

The first four are characterised by student activating learning. A course with activated students produces the highest learning. This is amongst others achieved by Henry and Richey [8] who describe a course where law students and engineering students act as professionals that must work together in joint projects. The law students must advice the engineers on the IPR situation and the engineers must work on formulating the technologies to make them understandable to the law students.

Schox and Chesney [9] suggested and used cases to introduce students to the differences and relationships between “Patentability” and “Infringement”. Four cases are assigned by the students to a 2 x 2 matrix covering the four combinations of infringement/non infringement and patentable/non patentable.

Figur 2 Continued from Figure 1: The subjects investigated in this article.



3.3 Suggestion of a general syllabus with an active learning strategy

Based on our literature review and our own experience in teaching IPR and patent understanding to engineering students, we have suggest the outline given below for a course teaching intellectual properties to engineering students at university level. We have focused on describing a course where the engineering students learn to appreciate the patent system as a tool for technology information by class room teaching in combination with freely avaliable online tools. The aim with the described course syllabus is to introduce the students to a general understanding of the patent system and to give them an opportunity to explore the patent system as a tool for technology information. As argued above an active learning approach is the most fruitful when teaching engineering students patent understanding, therefore a lot of practical exercises where each student, or small groups, work on the exercises on an individual basis. The course is intended to cover the workload of 5 ECTS for an average student (approximately 130 to 150 working hours for the average student). The course is constructed in such a way that first part of the course is a

general introduction to the IPR system (corresponding to 2 ECTS workload conducted during a one week intensive course). This part is conducted as class room instruction with on-class exercises. This first part of the course is a blend of professor lecturing and student group work. Minor exercises on using the public available patent databases for patent searching is included to familiarize the students with that resource for further in depth work during the exercises in second part of the course.

The second part of the course is a number of exercises that the individual student has to work with. This part is suitable for distance instruction. The student builds a portfolio of exercises in this second part and approval of the portfolio is required to pass the course. Thus the course is structured in such a way that an external professor could be engaged for the one week intensive basic instruction and the remaining course could be conducted as distance learning. The portfolio can be used for assessing the student but assessment can also be an oral exam based on the students learning from the portfolio assignments.

Students preparation before showing up on class, read the book "Intellectual Property Management: A guide for scientists, Engineers, Financiers and Managers." [10]

In our literature review we have only investigated patent teaching as it is most relevant to engineering students but in the suggested syllabus below an introduction to other types of IPR are included. It is our experience that students often confuse the various types of IPR and their use. Therefore we find that a short introduction to the most frequently used IPR (Copyright, Trademark and design protection) is most relevant.

Tabel 1: Overview of 5 ECTS Patent course syllabus

	Content	Exercises	Online ressources to be utilised
2 ECTS (one week course)			
Introductory readings	Junghans *et al*		
Day1	General intro to IPR, legal aspects, invention disclosures and other types of IPR than patent	Work on Trademarks and Design protection	www.ohim.eu, http://wipo.int/academy/en/courses/rp_catalog/index.jsp "Primer on IP"
Day2	General introduction	Exercise on writing an	http://www.wipo.int/about-ip/en/iprm/ chapter 2 on patents

	to Patents, the history behind the system, organisations in the patent system, general aspects on patentability and searching patent databases.	invention disclosure based on an invention given by the teacher	
Day3	Introduction to the anatomy of a patent document, databases, deeper into novelty, inventive step, about claims, IPC, file inspection	Introduction to exercise aiming at training of searching, reading and evaluating enforceability of patents	"How to get a European patent": https://e-courses.epo.org/course/view.php?id=50 "Theory of Inventive step and the problem/solution approach": https://e-courses.epo.org/course/view.php?id=65" "About the international Patent Classification system": http://www.wipo.int/classifications/ipc/en/ "Searching for patents with Espacenet": https://e-courses.epo.org/course/view.php?id=41 "European Patent register assistant": https://e-courses.epo.org/course/view.php?id=157
Day4	Wrap up on exercise, repetition of subjects as chosen by students in relation to	Continued work on day 3 exercise	

	the exercise		
Day5	Student presentation of their exercises – as poster presentations. Introduction to the commercial aspects of the patent system	Licensing Game End of course	"Intellectual Property in Business": https://e-courses.epo.org/
3 ECTS (a number of assignments during a 3 month period)	The portfolio exercises are supposed to challenge the students on the edge of their learning from the one week intensive course. They should be carried out by students on an individual basis, supervised by the professor.		
Exercise 1	Review on status of The European Unitary Patent		
Exercise 2	Literature review on Patent Mapping and an exercise in patent mapping in relation to a local company.		
Exercise 3	A patent search exercise		
Exercise 4	Infringement exercise		

Alternative exercises for the student work portfolio could be a): Writing a patent application on a fictious invention provided by the professor, or b) Advising a company on which IPR protections to undertake based on a given business plan.

The business aspect of the patent system is only briefly touched upon in the suggested course. The subject of IP strategy and its relation to a company's technology management requires some further discussion.

3.4 Available online or web accessible materials:

EPO e-learning: The European Patent Office has developed an extensive e-learning site (www.epo.org/e-learning) providing materials from general introduction to patentability and searching to more advanced subjects. From this material it is possible to provide the students with online learning resources as a supplement to the class room teaching. The only drawback of these resources is that the EPO regularly reshuffles the website, thus the links to specific e-learning sequences are lost. The World Intellectual Property Organisation (WIPO) also provides an extensive e-learning program, found on the WIPOs web- page together with other learning offers to students: http://www.wipo.int/portal/en/resources_students.html.

A large number of patent office's provides the opportunity to search patents online including the WIPOs Patentscope where all PCT applications can be searched in full text and there is an immediate access to the corresponding file inspection, USPTO provides a database supporting searches for US patent applications from 1790 to today – searching in full text from 1971 and distinguishing between patent applications (which not necessarily reflects the actual prohibition right granted) and granted patents within the US jurisdiction. The SIPO (Chinese patent organization) provides a database covering Chinese patents and also provides – in cooperation with the EPO – a Google based translation of the Chinese patents to English. Here it should be mentioned that the WIPO Patentscope provides the opportunity to look up Chinese phrases and perform a full text search in Chinese patents from the found Chinese phrases. Finally the EPO Espacenet database should be mentioned as an easy to use search facility covering the patent documents from more than 90 countries, with an extensive help function. Similar to the WIPO the Espacenet provides link to the corresponding file inspection (via INPADOC or the European Patent Register (for EP applications)). It is recommended that the students are introduced to more than one of the mentioned databases as searching only one database might give a too narrow list of relevant documents even though the same keywords are used in the databases.

In a joint project the European Commission and The European Patent Office has developed the "Ip4Inno materials" www.ip4inno.eu where online lectures on Intellectual Property in relation to business can be found.

3.5 Other tools for the teacher

The IPR inexperienced professor might look for inspiration when preparing the lectures in "Teaching of Intellectual Property" [11] written by a series of professionals and edited by Yo Takagi, presently Assistant Director General, Global Infrastructure at WIPO. The book covers inspiration to IPR teaching to both law and non-law students within the majority of IPR issues. Inspiration might also be found in the ip4inno teaching kit issued by the European Patent Organisation and the European Union. The kit is originally developed for business consultants, but covers a broad range of IPR issues also relevant to the engineering student. It is issued in a number of languages as it is an "open license" kit where you are invited to upload a new language version of the material. Finally The European Patent Office has developed a "Patent Teaching Kit"

and an “IP Course Design Manual” directed towards university professors. The kits are available free of charge from the EPO.

4 . Using patents as a foundation for entrepreneurship teaching.

A number of references are suggesting or have actually been using patents as starting point in entrepreneurship and/or innovation education of engineers. Douglas Arion et al [12] describe the “InovaED” at Cathage College. Here the local technology transfer office provides a number of University or company patents that are still maintained, but are off-strategy to the assignee company. The patents are used in courses where ideation, creativity and business development are taught. An alternative approach is to let the students invent their own technologies and products and ask them to investigate the patentability of their inventions through searching the online patent databases. This approach is described in various forms by Cook et al [13], Swamidass et al [14] and Ruiz [15].

5. Conclusion

In this paper we provided a literature review focusing on existing approaches to teaching patent development to engineering students and entrepreneurs. The analysis of some of the existing approaches in combination with our own educational experience resulted in a suggestion for a patent course syllabus corresponding to an average student workload of 5 ECTS. We believe that the suggested syllabus could be additionally developed or refined by others in their attempt to adapt it to their own educational context. Furthermore a course on intellectual property strategy for entrepreneur and startups could be relevant. In our literature survey we also identified a number of interesting references which combine patents with entrepreneurial and creativity teaching.

References

[1] Christian Carstensen, S. Jensen & S. Tanev: Intellectual property practices of new technology companies, Proceedings of the 5th International Conference for Entrepreneurship, Innovation and Regional Development, June 1-2, 2012, Sofia, Bulgaria.

[2] Ronald J. Rodriques: Industry expectations of the new Engineer, Science& Technology Libraries 2001 vol 19 issue 3-4, p 179-188

[3] Jim Roach, R. Soetendorp: Intellectual property in the engineering syllabus – a model for integrating key but not core concepts across the disciplines, report published by The Higher Education Academy February 2008 ISBN 9781904804680

[4] Ruth Soetendorp: Food for Engineers - intellectual property education for innovators, Industry and Higher Education, p 363 – 375, December 2004

[5] Kathleen M. Kaplan, Lt Col John J. Kaplan (2005). Using Intellectual Property to Enhance Engineering Education. In: “Proceedings of the 2005 American Society for Engineering Education Annual Conference & Exposition Copyright 2005, American Society for Engineering Education”

[6] Louise Starkey, S. Corbett, A. Bondy, S. Davidson: Intellectual property: What do teachers and students know ? International Journal of Technology & Design Education 2010, Vol. 20 Issue 3, p333-344

[7] Ruth Soetendorp, R. Mclaughlan, J.R.B. Childs: Engineering enterprise through Intellectual Property education – pedagogic approaches http://eprints.bournemouth.ac.uk/3299/ accessed January 16th 2013

[8] Robert M. Henry, S. M. Richey (2010): Interdisciplinary Experiential Education of Intellectual Property Concepts in an Engineering Context, published in Transforming Engineering Education: Creating Interdisciplinary Skills for Complex Global Environments, 2010 IEEE 6-9 April

[9] Jeffery Schox, D. Chesney (2013): How to Teach Patent Law to Engineers http://ipmall.info/hosted_resources/Teaching_IP/Jeffrey_Schox_2007.pdf accessed January 16th 2013.

[10] Claas Junghans, Adam Levy (2006). "Intellectual property Management" Wiley-VCH

[11] Yo Takagi et al., Eds. (2006)"Teaching of Intellectual property" Wiley-VCH

[12] Douglas Arion, Matt Wagner and Clifton Kussmaul (2009) Inovaed: A model and resource to help students leverage late stage intellectual property. ASEE annual conference and expositions proceesings.

[13] Kenneth Cook, Donald Riemer, Sabah Abro (2010) Entrepreneurial experiences and intellectual property: A student perspective. ASEE annual conference and expositions proceesings.

[14] Paul Swamidass and A.J. Gokcek (2009) Empowering young inventors: An experimental course on IP and patent application drafting in Auburn University. Journal of Technology Transfer 35, p424-431

[15] Fransisco Ruiz (2004) Learning engineering as an art: An invention Center. International Journal of Engineering Education vol. 20 p 809-819

THE IMPACT OF INFORMATION COMMUNICATION TECHNOLOGIES AND INNOVATION ACTIVITIES ON ENTREPRENEURIAL BUSINESSES
Empirical Evidence in Transition Economies

Shqipe Gerguri-Rashiti[1], Hyrije Abazi-Alili[2], Veland Ramadani[3]

[1]*South East European University, Ilindenska b.b., Tetovo, 1200 Macedonia,*
s.gerguri@seeu.edu.mk

[2]*South East European University, Ilindenska b.b., Tetovo, 1200 Macedonia,*
h.abazi@seeu.edu.mk

[3]*South East European University, Ilindenska b.b., Tetovo, 1200 Macedonia,*
v.ramadani@seeu.edu.mk

The aim of this paper is to investigate the impact of Information Communication Technologies (ICT) and innovation activities on entrepreneurial businesses using the Business Environment Enterprise Performance Survey (BEEPS) firm-level data in the three rounds: 2002, 2005 and 2008. The novelty of this research is based on the idea of studying the usage of ICT and innovation activities on performance of entrepreneurial businesses by using dynamic approach so that we can estimate the adjustments that arise from the impact of ICT and innovation activities. The rapid technological development and the growing use of information technology (IT) in business organizations have become the centre of attention in past few years. A bulk of literature has been published on the use of IT in different industries, different types of business organizations and in different areas of business management. On the other hand, the probability of entrepreneurial businesses to undertake innovation activities has shown to enhance firm performance. This study implements various estimations on BEEPS observations to test whether the change in the usage of ICT and other innovation determinants have increase the probability of firms to undertake innovation activities.

Keywords
Entrepreneurial Businesses, ICT, Innovation Activities, IV technique

1. Introduction

The impact of innovation activities on economic growth has been studied extensively for developed market economies. There is ample evidence in the literature that US experiences higher labour productivity growth than the EU and that the increase is attributable to greater development of innovation activities [1-2]. In order to increase the innovation activities undertaken by firms in the EU the Lisbon Strategy set a goal for Europe to become “the world’s most competitive and dynamic knowledge-based economy in the world, capable of sustaining growth with more and better jobs and greater social cohesion” by 2010. Although the EU failed to achieve this goal, the aspiration to achieve this status became the first priority area of the ‘Europe 2020’ Strategy, which is ‘smart growth’ through the development of knowledge, innovation, and education [3]. Accordingly, the EU has set itself an ambitious

target - the Barcelona objective - of increasing R&D expenditures to 3 per cent of GDP in particular by improving the conditions for R&D investment by the private sector, and developing a new indicator to track innovation [3]. In order to accomplish these goals the OECD has prepared an 'innovation strategy', containing the following major themes: i) the "openness" of innovation; ii) the central role of entrepreneurship; iii) creating and applying knowledge; iv) applying innovation to address global and social challenges; and v) improving the governance of policies for innovation.

The literature on innovation activities varies in many ways, particularly in ways of defining innovation and its measurement and the identification of variables which influence the level of innovation activities. Furthermore, the literature has also struggled to identify the characteristics of entrepreneurship. In this respect, there is one view which considers entrepreneurship and innovation as virtually synonymous. According to Shane and Venkataraman [4], the field of entrepreneurship is defined by the investigation on the way how, by whom and with what are discovered, evaluated and exploited the consequences to produce future goods and services. Based on the reflection of Gartner and Carter [5], the entrepreneurial behaviour involves the activities of individuals who are associated with creating new organizations rather than the activities of individuals who are involved with maintaining or changing the operations of on-going established organizations. According to Acs and Audretsch [6], what distinguishes entrepreneurship from innovation is the organizational context.

This study is interested in identifying the variables which influence the level of innovation activities and their impact on the performance of entrepreneurial. The rapid technological development and the growing use of information communication technology (ICT) in business organizations have become the centre of attention in past few years. A bulk of literature has been published on the need of renewing and adjusting the information technology function in business organisations [7], the application of ICT in different industries [8-9], different types of business organizations [10]; Heintze and Bretschneider [11] and in different areas of business management [9,12]. The belief that technology is a source of competitive advantage is so widely accepted in the management and economics literature that it has become axiomatic. Morone [13] considered technological innovation as the main force behind industrial development and productivity growth. For Porter [14], it is a "source of change" in market and can be one of the factors behind the demise of dominant firms that were causing lack of competition in the industry. However, it is critically important to have a clear definition of technology before understanding the relationship between organizations and technology [15]. A famous definition of technology was given by Galbraith [16] who defined technology as "the systematic application of scientific or other organized knowledge to practical tasks" [16, p23]. The use of technology in the business organization and market has been increased a lot since the last decade. Now, the creation and successful commercialization of technology, is among a company's most potentially viable strategies [17]. Nevertheless, it can succeed with the synergy of skilled management that (re)defines the company's goals and competencies and through a good strategic planning process [18]. Utilization of information technology for gaining strategic advantage over competitors should be the focus of business entrepreneurial activities to survive in the rapidly evolving world of e-business [17].

The following section discusses the theoretical background and empirical evidence on innovation and ICT and the model of the knowledge production function. Specifically, issues arising when trying to measure innovative activity and firm performance are further discussed. Section three provides the methodology and the estimated regressions. Finally, in section four findings and conclusions are presented.

2. Theoretical Background and Empirical Evidence on Innovation and ICT

There have been considerable debates about the impact of new ICTs on economic performance and competitiveness in general, and on productivity, efficiency, and innovation in particular. Over a relatively short time span, ICT has become an intrinsic part of everyday life to the extent that, like electricity, modern society could not function in its absence. Recently it is being discussed that ICT impact not only has been transforming economic processes into generating a sustained increase in economic growth through processes of technological development and innovation, however, the expectations at firm level are of greater efficiency, lower costs, and access to larger and new markets. Many research studies have tried to assess the economic impact of ICT on firms and countries. According to Jorgenson [19] emphasis in these studies has been on the impact of ICT in OECD countries, in particular the United States. The main findings of these studies suggest that ICT has contributed greatly to productivity growth and competitiveness in the OECD countries in the last decade. Furthermore the forthcoming studies were mainly focused in greater detail on the processes of application and use of ICT within firms.

In transition economies the ICT dynamics are at a stage when one can apply lessons learned from countries such as the United States and old European Union (EU) member states both at corporate and government levels. On the other hand considering the characteristics of the transition economies of Central and Eastern Europe they might require tailoring of the lessons learned from Western Europe and the United States, and even create new approaches to policies for ICT adoption and utilization. In a recent study conducted in transition countries such as Estonia, Latvia, Lithuania, Poland, from companies surveyed it was found that companies use ICT to serve customers and markets. A considerable number of the companies in the survey place a high priority on two interrelated business areas: purchasing & procurement and marketing & sales. Firms actively use computer networks for these activities and almost all of them are using the Internet to buy and sell goods and services. From the same study ICT incorporation has already had an impact on economic performance among firms in transition countries. Table 1 presents the findings on the impact of ICT on economic performance where it is evident that ICT is a substantial contributor to productivity, profitability, and growth. What is more important around 30% of the firms have stated that ICT usage itself generates increases in ICT investment which indicates that engagement in ICT usage is to a certain extent a self-sustaining process that requires cumulative investment.

Table 1 ICT and economic performance of firms.

Performance Indicators	Percent of firms with reported increase	ICT contribution (percent)	ICT in combination with other factors (percent)
Labour productivity	50.4	13.1	47.0
Operational costs	41.1	5.1	28.1
Revenue from sales	55.2	7.0	43.4
Profitability	44.0	10.5	48.2
Capital investment in innovation	51.5	16.1	57.5
ICT investment	45.4	30.2	46.0
Competition in price	57.1	5.3	29.1
Competition in quality	63.8	10.0	39.5
Percent of firms with reported decrease			
Operational costs	18.6	15.7	51.7

Source: The International Bank for Reconstruction and Development / The World Bank [20]

2.1 Innovation and Entrepreneurial Business Performance

The importance of the SME as a sector is getting vital factor for economic growth. As such it has gained a high importance in the research field. There is a vast literature investigating the determinants of entrepreneurial performance such as size of firm, innovation activities, ownership, technological change, and others. The European Commission [3] puts forward the definition of small and medium-sized enterprises (SMEs): (i) a small business defined as employing between 10 and 49 people and (ii) medium-sized enterprise defined as employing between 50 and 250 people.

Innovation, as mentioned, is regarded as a significant factor in determining a firm's success [21]. The empirical literature on investigating innovation behaviour and its effect on firm performance face the methodological challenge of how to measure innovation or technological change. This challenge is accompanied by the difficulty of getting appropriate data which correspond to the definition of innovation. Consequently the empirical studies have mainly adjusted their analysis of innovation depending on the measures of innovation available to them, using proxies which reflect only some aspects of the innovation process.

In defining innovation activities undertaken by companies most of the empirical evidence follows Joseph Schumpeter, who defined innovation in a broad sense, as: "*carrying out of new combinations" that include "the introduction of new goods …, new methods of production …, the opening of new markets …, the conquest of new sources of supply … and the carrying out of a new organization of any industry*" [22, p66].

Following Schumpeter's definition of innovation activities, most of the empirical literature defines innovation as the development of new products and/or new processes introduced to the market. The OECD (2005) Oslo manual guiding the collection of data on innovation reflects this perspective by defining innovation as: "... the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations [23, p.46]. An alternative definition of innovation adopted more recently by

policymakers in the UK and also applied in the literature [24] regards innovation as the 'successful exploitation of new ideas'. If this is scrutinised further, this definition combines (i) new ideas – involve new product/process or service, (ii) exploitation – presents the applicability of the idea, and (iii) successful – implies that the innovation is adapted by the market (from firm's viewpoint the target is increased profitability).

Based on these definitions, the most common measures used in the literature analysing the innovation process are as follows: i) a measure of the inputs into the innovation process, such as R&D expenditure or the number of scientists and engineers, ii) a measure of output, such as the number of inventions which have been patented and iii) a direct measure of innovation output, such as new product or new process. These proxy measures for the innovation process have their limitations. Not all R&D expenditures result in innovation output since this measure reflects only the resources committed to producing innovation output, but not the innovation process. The number of patents does not indicate whether this output has a positive economic value or whether it has successfully been introduced in the market. Whereas the new product and/or process is acknowledged as a proxy that directly quantifies the effect of innovation and its success in the market.

2.2 ICT and Entrepreneurial Business Performance

The other challenge faced by studies investigating innovation activities are the determinants of innovation. For SMEs to be innovative a particular role is played by ICT. Technology, in business environments, is often seen as a vital necessity these days [25]. The debate has gone further on discussing the impact of size on ICT investments, arguing that small businesses have less money and therefore less to invest in ICT [26-27]. Hadjimanolis [28] examined innovativeness from the perspective of resources suggesting that small firms lack resources and bargaining power which hinders their ability to be innovative. He established that the size of the firm did impact on the availability of resources, resources including ICT, expenditure on training, and research and development.

The above mentioned relationship is a relatively new area of research, which has even less research focused on small businesses and IT [29]. Any business which defies technological advancements and innovation seems to be awkward, not only to its clients but also to business partners and dealers associated with it. However, in today's running environment, technology has impacted and integrated with almost all the small and large organisations and industries, to some extent [8-9, 24]. Apart from them, businesses which intend to solely rely over technological innovations and advancements seek easiest possible ways to achieve their goals. This can be specifically explained in a manner that, with surrounding environment transforming gradually, they face some basic hurdles in their way of integrating technology as an umbilical organ of their process and functions. The integration of business, with technology is mostly done with an intention to reduce operational costs, increase efficiency of results, increase effective communication development, effective promotion, and progression towards development. In this process of integration, different organisations and businesses face various difficulties and hurdles, which are to be eliminated or ruled out with the help of effective planning and processes re-engineering [30].

Nowadays we have an increasing trend of moving away from the traditional approach of managing companies and concentrating more on IT which is becoming an essential part for the future of the companies. Previous studies reported the significant importance of timely access to reliable information for increasing entrepreneurial productivity and highlighted the role played by information technology in this regard. The literature also pointed out the need to look at the usability of IT application by the decision makers to understand the actual use of information technology in improving performance.

3. Methods of investigation and Empirical Results

For the empirical analysis of this paer we use firm-level data from the World Bank/EBRD's Business Environment Enterprise Performance Surveys (BEEPS) [31] conducted in 2002, 2005 and 2009. The BEEPS questionnaire consists of questions which allow us to specify the variables which are used in the theoretical framework followed here. The pooled data for 2002, 2005 and 2009 is used in order to utilise the advantage of a larger number of observations, with the final sample consisting of 9,354 firms. Table 2 provides the description of the variables employed in the model and their expected signs.

Table 2 Description of the variables and expected signs

Dependant variable	Description of the variables
Labour productivity	Labour Productivity = Sales / number of employees (log)
Innovation Activities	Dummy for innovative firms (new product and/or process)

Independent variables	Description of the variables	Expected signs
Size	Number of employees	- / +
R&D intensity	Amount spent on R&D / Sales	+
dInvestR&D	Invested in R&D (dummy variable = 1 if the firm has invested in R&D)	+
dInternetCONN	dummy = 1 if the firm have a high-speed, broadband Internet connection on its premises	+
de_mailCOM	dummy = 1 if the firms currently communicate with clients and suppliers by e-mail?	
Direct_exports	% of establishment sales as direct exports	+
dFRGNinv	Foreign Ownership– (=1 if the % share of foreign capital in the company> 10%)	-/+
dDOMprivate	Domestic Ownership– (=1 if the % share of domestic capital in the company>10%)	-/+
dSTATE	State Ownership	-
FRGNcomppress	Pressure from foreign competitors - Effect on decisions to develop new products	- / +
Skilled_workers	Share of employees with university degree	+
Age	Firm's experience–year since establishment	+
Agesq	Firm's experience–year since establishment squared	+
EU_members	dummy = 1 if EU member country	+
Sector	The industry in which the firm operates	

According to the statistics for the pooled data, the average labour productivity has increased by 25 percent from 2002 to 2005, and doubled from 2005 to 2009. The size of the companies in the sample is varying on average from 90 to 140 employees. On average the firms' R&D investments are approximately 4% (R&D expenditure to sales ratio). The average exporting experience of firms that have exported directly is 10 years (12 percent of firms). Firms are established mainly 16 to 20 years ago (in the 1980s and 1990s). For companies surveyed in 2002, on average 33 percent of the employees have university degree, and this percentage

drops to 14 percent in 2009. Considering innovation activities, 62 percent of the companies have indicated that they have introduced new products and/or processes in 2002, the number increases to 79% by 2009.

In order to explore the nature of the innovation process in transition countries, we develop a model to empirically investigate the relationship between firm's innovation activities, ownership structure and productivity. The econometric technique applied in this investigation is probit model on innovation activities [32]. The model presents the probability of the firms to innovate (probit model) which reveals the importance of a group of firm specific factors on firms' innovation activity. The general model we will refer to can be written as follows:

$$Innov\_activity_{it} = \phi_0 + \phi_1 Size_{it} + \phi_2 R\&D\_intensity_{it} + \phi_3 Direct\_export_{it} + \phi_4 dFRGN\_inv_{it} + \phi_5 dDOM\_private_{it} + \phi_6 FRGN\_comppress_{it} + \phi_7 Skilled\_workers_{it} + \phi_8 T1 + \phi_9 T2 + \varepsilon_{it} \quad (1)$$

The regression coefficients and corresponding p-values of two specifications of the probit model (for the probability to innovate) are presented in Table 3 (see Appendix I for STATA output).

Table 3 The determinants of the probability to innovate

Independent Variables	DEPENDANT VARIABLE: Innovation Activities (=1 if new product and /or new process introduced)			
	Coefficients	□-values	Coeff.	□-values
Size	0.23***	(0.000)	0.13***	(0.000)
RnD2Sales	**2.54*** **	**(0.004)**		
dInv_RnD			**0.67*** **	**(0.000)**
dInternetCONN	0.02	(0.007)	0.03	(0.612)
Direct_export	0.002**	(0.049)	0.00	(0.298)
dFRGNinv	0.21**	(0.050)	0.22***	(0.002)
dDOMprivate	0.23***	(0.002)	0.17**	(0.012)
FRGNcomppress	0.09***	(0.000)	0.07***	(0.000)
Skilled_workers	0.01***	(0.001)	0.01***	(0.000)
Age	0.01	(0.004)	0.00	(0.612)
Agesq	-0.00	(0.449)	-0.00	(0.267)
EU_members	-0.33***	(0.000)	-0.25**	(0.046)
Sector	-0.01***	(0.002)	-0.01***	(0.001)
D1: 1- if year =2002	-0.72	(0.181)	-0.52**	(0.078)
D2: 1-if year=2005	-1.12	(0.172)	-0.49**	(0.043)
Constant	1.42***	(0.000)	0.65	(0.113)
Observations	**3,004**		**5,281**	
LR chi2	438.2		654.2	
Pseudo R2	0.1138		0.1028	

In the first specification we employ R&D intensity as an indicator of innovation activity. Since there is a large number of missing data for the R&D investment variable 73%, 40% and 92%

for 2002, 2005 and 2009 respectively), We replace this variable with a dummy variable of whether the firms have invested in R&D or not (the second specification reported in table 3) which is based on larger number of observations.

4. Conclusions

The probit model results show significant effect of some of the innovation activities determinants, which are in accordance with the theoretical literature. The consideration of size as a determinant explaining innovation goes back to Schumpeter [33] who stated that large firms in concentrated markets are more advantageous in innovation. The positive and significant sign of the firm size supports this hypothesis indicating that larger firms in transition economies tend to undertake more innovation activities than smaller ones.
According to new growth theory, R&D activities are expected to lead to product and process innovation. Becheikh et al. [34] on a review of empirical studies published between 1993 and 2003 bring together a set of variables related to the innovation process, and find that R&D expenditure do not necessarily lead to new product and/or process. For the TEs, we mentioned in the previous section that not all firms that undertake innovation activities have indicated to invest in R&D. However, both specifications of the R&D variables in the regression, the R&D intensity and dummy invested in R&D, appear to have positive and significant relationship with innovation activities. Because of the insignificant coefficient of the ICT implementation on firms we cannot interpret the coefficient.
Ownership structure is shown to influence productivity both directly and indirectly, through innovation activities [35]. Carlin et al. [36] find significant effect of privatisation on new product restructuring. Moreover new product directly increases sales and productivity growth, implying an indirect effect of ownership on enterprise growth. We employ variables of private foreign and domestic owned firms (state companies as base category) in innovation and productivity models. We expect that foreign ownership plays an important role in explaining innovation, considering it as external source of information for innovation. In accordance to this, the results show that foreign owned firms with more than 10% of ownership are significantly positively related to firms' innovation activities, indicating that they are more innovative than state owned firms. The same applies for the domestic owned firms.
The literature on innovation suggests that a moderate degree of competition is better than either monopoly or intense competition. The data provides a qualitative perception variable of foreign competition pressure on decision to develop new product. We employ this variable for having the impact of competition, and the results show positive significant coefficient of the variable. The firms' innovation activities are higher if the firm has competitive pressure from foreign firms. The role of human capital on the decision of the firms to innovate has gained importance in the most recent literature. We employ the level of education of the employees as the share of employees with university degree. The coefficient of this variable is significant and positively related to the decision to innovate. The firm's export activity may have effect on the innovation behaviour of the firm. We suppose that firms learn from trade in terms of innovation (learning-by-exporting hypothesis)and thus exporting firms will improve their innovation activities to remain competitive in international markets. The variable included in the modelis the percentage of direct exports to sales to indicate the effect on innovation activities. The regression results show positive significant impact of export intensity on innovation activities when using R&D intensity as independent variable. However the results show insignificant coefficient when applying the other alternative variable of R&D, the dummy invested in R&D. The Age of the firm together with age squared appears to be insignificant in both probit model specifications. We control for time and sector in the model. The interpreted coefficients are statistically significant at 1% level of significance, offering evidence that the Ho hypothesis, ($\square_{it}$ =*0*) can be rejected for these cases. On the other hand

age and age squared are statistically insignificant at 1%, 5% and 10% level of significance. Therefore their calculated *p values* lie in the region of acceptance, so we fail to reject the Ho hypothesis. According to chi^2 statistics the explanatory variables are jointly significant (since Prob>chi^2 = 0.000) at 1% level of significance, therefore the null hypothesis that all regressors are jointly insignificant may be rejected.

References

1 Ark B V, O'Mahony M and Timmer M P. The Productivity Gap between Europe and the United States: Trends and Causes. Journal of Economic Perspectives, Volume 22, Number 1 Winter 2008. Pages 25–44
2 O'Mahony M, Rincón-Aznar A and Robinson C. Productivity Growth in Europe and the US: a Sectoral Study. Review of Economics and Institutions, Vol. 1 – No. 1, Spring 2010 – Article 5.
3 European Comission Progress Report. http://www.europeanforum.net/news/1007/european_commission_progress_reports_2010, 2003.
4 Shane S, and Venkataraman S. The Promise of Entrepreneurship as a Field of Research Academy of Management Review. 25:217-226, 2000.
5 Gartner W B and Carter N. Entrepreneurial behavior and firm organizing processes. In A. Z.J. and Audretsch D. B. (Eds.), Handbook of entrepreneurship research, Dordrecht, NL: Kluwer. 2003.
6 Acs Z J and Audretsch D B. Entrepreneurship, Innovation and Technological Change. Foundations and Trends in Entrepreneurship Vol. 1, No. 4 June, 23 2010
7 Guillemette M G and Pare G. Toward a New Theory of the Contribution of the IT Function in Organizations, MIS Quarterly, (36: 2) pp.529-551 2012.
8 Francalanci C and Galal H. Information Technology and Worker Compensation: Determinants of Productivity in the Life Insurance Industry, MIS Quarterly, (22: 2), 1998.
9 Devaraj S and Kohli R. Information Technology Payoff in the Healthcare Industry: A Longitudinal Study, Journal of Management Information Systems, Vol. 16(4), 2000.
10 Blili S and Raymond L. Information Technology: threats and opportunities for small and medium-sized enterprises. International Journal of Information Management, 13, 439-448. 1993.
11 Heintze T and Stuart B. Information Technology and Restructuring in Public Organizations: Does Adoption of Information Technology Affect Organizational Structures, Communications, and Decision-Making. Journal of Public Administration Theory and Research 10:801–830. 2000.
12 Ellram L and Zsidisin G. Factors That Drive Purchasing and Supply Management's Use of Information Technology. IEEE Transactions on Engineering Management. 49(3), 269-281. 2002.
13 Morone J. Strategic Use of Technology, California Management Review, Vol. 3, No 31, p. 91-110, 1989.
14 Porter M E. Cases in Competitive Strategy. Trade Cloth, 1983.
15 Hassan H, From Demographic Transition to Fertility Boom and Bust: Iran in the 1980s and 1990s. Development and Change, 37 (3). 2006
16 Galbraith J K. The New Industrial State, Boston: Houghton Mifflin. 1967
17 Shim J K and Siegel J G. Budgeting Basics & Beyond 2nd Edition 2005.
18 Fletcher P, Services for the next generation: Planning for the future, Housing, Care and Support. Vol. 2 Iss: 1 pp. 12 – 16.1999.
19 Jorgenson D W, 'Information Technology and the US Economy, The American Economic Review, Vol. 91, No. 1. 2001
20 The International Bank for Reconstruction and Development / The World Bank (2007)
21 Pratali P, Strategic management of technological innovations in the small to medium enterprise, European Journal of Innovation Management, Vol. 6 Iss: 1, pp.18 – 31. 2003.

22 Schumpeter J A. Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process. New York Toronto London: McGraw-Hill Book Company. 1934
23 OECD, Annual Report, OECD publishing, Washington, 2005. http://www.oecd.org/newsroom/34711139.pdf
24 Stoneman P. Soft Innovation: Economics, Product Aesthetics, and the Creative Industries. 2010
25 Rivard H. A Survey on the Impact of Information Technology on the Canadian Architecture,
26 Engineering and Construction Industry,Electronic Journal of Information Technology in Construction,Vol. 5. 2000.
27 Aragón-Sánchez A and Sánchez-Marín G. Strategic Orientation, Management, Characteristics and Performance: A Study of Spanish SMEs.Journal of Small Business Management 43(3): 287-308. 2005.
28 Hadjimanolis A. A Resource-based View of Innovativeness in Small Firms.Technology Analysis and Strategic Management 12(2): 263-281. 2000.
29 Burke K. The impact of firm size on Internet use in small businesses. Journal of Electronic Markets 15(2): 79-93. 2005.
30 Ashrafi R, Baghdadi Y: E-business: issues, challenges and architecture. IJBIS 3(4): 391-409 2008.
31 Business Environment and Enterprise Performance Survey (BEEPS) II-IV
32 Green W H. Econometric Analysis. 7ed. New Jersey: Prentice-Hall. 2012.
33 Schumpeter J A. Capitalism, Socialism and Democracy. New York: Harper. 1942.
34 Becheikh N, Landry R and Amara N. Lessons from Innovation Empirical Studies in the Manufacturing Sector: A Systematic review of the Literature from 1993 - 2003. Technovation (26), 644-664. 2006.
35 Hill C W and Snell S A. Effects of Ownership Strucuture and Control on Corporate Productivity. Academy of Managment Journal, 32 (1), 25-46. 1989.
36 Carlin W, Fries S, Schaffer M and Seabright P. Competition and Enterprise Performance in Transition Economies: Evidence from a Cross-country Survey. EBRD Working Paper No 376. 2001.

Appendix I - Results of the probit specification for pooled data

a) STATA output of the probit model – Firms' probability to innovate with R&D intensity as independent variable

```
. probit  Innov_act size   EurRnD2Sales Direct_export   dFRGNinv  dDOMprivate  FRGNcom
>ppress Skilled_workers  Age Agesq  EU_members Sector D1 D2, nolog

Probit regression                                 Number of obs   =       3004
                                                  LR chi2(13)     =     438.20
                                                  Prob > chi2     =     0.0000
Log likelihood = -1705.6666                       Pseudo R2       =     0.1138

------------------------------------------------------------------------------
Innov_act |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
size |   .2291372   .0396482     5.78   0.000     .1514281    .3068462
EurRnD2Sales |    2.53855   .8757818     2.90   0.004     .8220493    4.255051
Direct_exp~t |   .0023316   .0011834     1.97   0.049     .0000121    .0046511
dFRGNinv |   .2058499   .0886857     2.32   0.020     .0320292    .3796707
dDOMprivate |   .2364842   .0760382     3.11   0.002      .087452    .3855163
FRGNcomppr~s |   .0868125   .0221833     3.91   0.000     .0433341    .1302909
Skilled_wo~s |   .0059363   .0010169     5.84   0.000     .0039431    .0079295
         Age |   .0005086   .0038176     0.13   0.894    -.0069738    .0079909
       Agesq |  -.0000249   .0000329    -0.76   0.449    -.0000894    .0000395
  EU_members |   -.333449   .0636684    -5.24   0.000    -.4582368   -.2086613
      Sector |  -.0111425   .0015434    -7.22   0.000    -.0141675   -.0081175
          D1 |  -.6838717   .1821038    -3.76   0.000    -1.040789   -.3269547
          D2 |  -1.032526   .1728589    -5.97   0.000    -1.371323   -.6937286
       _cons |     1.0348   .2202403     4.70   0.000     .6031375    1.466464
------------------------------------------------------------------------------
```

b) STATA output of the probit model – Firms' probability to innovate with dummy if invested in R&D as independent variable

```
. probit  Innov_act size  Inv_RnD Direct_export   dFRGNinv  dDOMprivate  FRGNcomppress
>  Skilled_workers  Age Agesq  EU_members Sector D1 D2, nolog

Probit regression                                 Number of obs   =       5233
                                                  LR chi2(13)     =     668.71
                                                  Prob > chi2     =     0.0000
Log likelihood = -2820.6608                       Pseudo R2       =     0.1060

------------------------------------------------------------------------------
Innov_act |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
size |   .1326729   .0295819     4.48   0.000     .0746935    .1906524
     Inv_RnD |   .6715035   .0565392    11.88   0.000     .5606887    .7823184
Direct_exp~t |   .0009143   .0008779     1.04   0.298    -.0008065     .002635
dFRGNinv |    .220539   .0727133     3.03   0.002     .0780236    .3630544
dDOMprivate |    .169713   .0673637     2.52   0.012     .0376826    .3017435
FRGNcomppr~s |   .0664403    .017349     3.83   0.000     .0324368    .1004438
Skilled_wo~s |   .0052736   .0008599     6.13   0.000     .0035883     .006959
         Age |   .0015686   .0030955     0.51   0.612    -.0044985    .0076357
       Agesq |  -.0000311    .000028    -1.11   0.267    -.0000859    .0000238
  EU_members |  -.2464555   .0460318    -5.35   0.000    -.3366761   -.1562349
      Sector |  -.0073029   .0011594    -6.30   0.000    -.0095752   -.0050306
          D1 |  -.5221755   .0792792    -6.59   0.000      -.67756   -.3667911
          D2 |  -.4977121   .0443338   -11.23   0.000    -.5846047   -.4108195
       _cons |   .4586173   .1213538     3.78   0.000     .2207683    .6964663
------------------------------------------------------------------------------
```

PATENTS-POSSIBLE ADVANTAGE TO INCREASE THE PERFORMANCE OF SMEs

Sorin Mircea Axinte[1], *Gabriela Ivanus*[2]

[1] *Scince and Technology Park for Micro and Nanotechnology, Bucharest Romania. Romanian Association for Technology Transfer*

[2] *National Institute for R&D in Microtechnologies IMT Bucharest, PhD Student "Politechnica" University of Bucharest, Romania*

With no information about price or market price asked for comparable intangible assets, mainly due privacy the terms of trade, we can't conclude that the methods used in evaluating patents are correct. The results of overall evaluation by known methods, may vary within a range of 3 ÷ 4%. Although an unconventional method Patent-Value-Predictor used by American evaluators may be an option for the European area.
Since most intangible assets (patents, trademarks, design, etc.) are traded on an inactive market, with a unique character and the nature of intellectual property, there can be no comparison.
In the case study there is a review of known methods and error display.
Patent evaluation must be made in the context of the overall effect of its application to the national economy.
Patent portfolio of Innovative SMEs (NTBF's) may be a chance for them to develop on the market and show their dedication.

Keywords

intangible assets, patent, valuation

1. Introduction

Contemporary economic operates with theoretical used concepts of intellectual capital, intellectual property, industrial property and intangible assets. Contemporary economic theory commonly used concepts of intellectual capital, intellectual property, industrial property and intangible assets
Since 1990, the impetuous development of the knowledge economy in modern management introduced the concept of intellectual capital.
There was a need for intellectual capital management of the company, seen both as a source of revenue and also as a means of increasing competitive advantage. As a result, the enterprise management theory appeared in the latest economic discipline and direction practice – company management's intellectual capital.
If managers of companies with commercial success would be questioned about the amount, structure, management, effects, etc.., and the intellectual capital (IC) of the company, perhaps most responses would be limited to assessments on patents, trademarks and

software products owned. Also, intuitively, the answers would refer to training, training forms, talent and experience of employees.
Key issues, which arise in connection with the intellectual capital of an undertaking cover more concrete issues such as:

- The definition and purpose of intellectual capital
- Quantifying intellectual capital
- Management of intellectual capital

The mere enunciation of the three aspects, in a theoretical – methodological manner, with important practical effects for managers of any business, introduces several new areas of economics, related to modern business management, and accounts for intangible assets and property. Last but not least, it also sets its place in the modern economic theory of the information society. Due to the multitude of economics knowledge, quantifying intellectual capital at the enterprise level is a challenge for scientists and managers involved in the direction or side issues. Intensification of current debates, in a more detailed understanding of the place, the importance and contribution of intellectual capital in increasing the value of the enterprise to which it belongs, was the direct and stringent critical change occurred in the last society and business world of the last two decades.
For any new problem of great complexity, there are differences in approach and there is a visible trend of various points of view, thus creating a paradigm of intellectual capital of the company. That can also identify with another notion, namely intangible assets, including intellectual property firm.
The two formulations of "intellectual capital" and "intangible assets, including intellectual property" are currently used in management, especially in the doctrine of evaluation. Peter Drucker, in his famous book "*Post Capitalist Society*" proves that, in every new economy, a new knowledge resource, in addition to the other three traditional factors of production (labor, land and capital) is "today's only essential resource."
Intellectual capital has various definitions. The most synthetic one belongs to the ICM Group LLC, namely: "*Intellectual capital is the kind of knowledge that can be turned into profit*."
There are other views on intellectual capital component. OECD defines intellectual capital as the economic value of two categories of intangible assets of an enterprise, namely structural capital (organizational) and human capital. It is provided that the scope of human capital includes human resources, as well as business relations with customers and suppliers and structural capital includes computer systems, distribution and supply channels.
A research to evaluate intellectual capital of companies has resulted by the emergence of a large number of methods and procedures proposed in the last few years. Today, there are 25 methods of evaluating intellectual capital of companies.

2. Valuation of Intangible Assets

Intangible assets are a challenge to current economic thinking and the intangible heritage assessment is a prerequisite for establishing a breach in the traditional ways of analyzing the enterprise.
Undoubtedly the success of today's businesses is bound by an invisible power, which is the intangible capital. With the support of classical production factors and change-oriented management, intangible assets have become a significant economic architecture in recent decades. Intellectual capital is now a new language of economic thinking!
Evaluation of intellectual capital is necessary and beneficial to society especially in position to claim compensation following an injury to an intellectual property right, or in a situation calling for injury assessment.
Intangible assets are always attached to all human activities (political, social, economic), but they have also penetrated the sphere of economic research, at present only in the micro level research. A pressure factor, especially for the accounting, tax and assessment, is the

development of economic realities, which led to finding solutions for registration, taxation and estimating of long-term assets of tangible form.
For a trading company or trading of intellectual property rights or licensing, their intake evaluator determines the exact value of these intangible assets.
These values can be used to increase the share capital of the company for which the company can more easily get a bank loan.
Today, mortgage companies can give away their brands. Evaluating intangible assets to meet the benefits created, comes after signing a joint venture agreement.
Today companies buy and sell intangible assets, participate in the formation of joint ventures with these assets, while banks accept them as collateral for loans.
The key to assessing intangible property in general and intellectual property, such as trademarks or patents, is to determine the economic benefits of ownership of such property.
The patent is an act of ownership which gives the patent owner the exclusive right to his invention for 20 years. The patent is registered in company assets among intangibles assets and can be traded, sold or transmitted by license.
Valuation of intangible assets requires understanding particular aspects of assessment, determined primarily by the particular characteristics that have them. The assessment of methods includes:

- A method of profit advantage;
- Profit contribution variance method;
- Economic method of payment;
- One way cost savings;
- Creating cost method;
- Purchase cost method;
- Assimilation method.

Intangible asset valuation methods are therefore based on the same three approaches:

- A method included in cost based approach;
- A method recorded in the income-based approach; there are methods that analyze the advantage of holding these assets in terms of a positive effect for the company (profit);
- A method listed in market comparison approach, namely on past transactions concluded and similar assets.

Choice of method for a particular case and in a particular situation always depends on circumstances.
The methods recommended in the literature sequencing are based on the relevance of non-specific values for the results, as shown:

Table 1 - Relevance in intangible asset valuation methods

No.	**Relevance method / intangible assets**	***Good***	***Satisfactory***	***Poor***
1.	Technological properties, patents	Profit	Market	Cost
2.	Brand names, product	Profit	Market	Cost
3.	Copyright	Profit	Market	Cost
4.	The labor force	Cost	Profit	Market
5.	Management information system	Cost	Market	Profit
6.	Software	Profit	Market	Cost
7.	Distribution	Cost	Profit	Market
8.	Franchising rights	Profit	Market	Cost
9.	Business practices and procedures	Cost	Profit	Market

The main intangible asset valuation methods are summarized in Table 2 where a case study on the evaluation of intangible assets is presented separately.

Table 2 - Main evaluation methods of intangible assets

Method	Explanation
Profit based methods	
1. Royalty savings method	It is a method particularly applicable for evaluating patents and licenses. Intellectual property rightful owner may transfer the right to the use of third parties for a certain fee, which most often is a percentage of the sales volume generated by the use of intellectual property. Such rights typically fall between 2 - 8% of sales, the most common being the 5% level of sales.
2. Cost savings method	We may encounter cases where intangible assets are due to measurable cost savings. By creating this asset, intangible elements contribute directly to achieving additional income. This cost advantage can be created by: a contract that brings advantages to buying raw materials (ex: contracts for the supply of oil) a process or method that saves labor and reduces material costs.
3. Profit advantage method	This method applies where there is possible to estimate with reasonable accuracy the advantage of possession and use of intangible assets (higher unit selling prices, higher sales volumes and so on), plus eventually expressed synthetically by net profit.
Cost-based methods	
4. Creating cost method	Usually, the cost of creating an intangible asset rarely approaches its value. There are situations where cost method can be applied to create a valuation technique based on the cost of creating a similar intangible asset (patent, secret process and so on). Applicability of the method is limited by the lack of information required to estimate the effects of ownership and use of such assets. The method is particularly useful as a means of verifying and testing the conclusions resulting from the application of other methods. Clearly, if the effect of intangible elements in business flows (in profit for example) are less than the cost of creating, this does not mean an advantage and therefore do not trigger a positive value.
5. Purchase cost method	Occasionally, an intangible asset can be bought on the market at a price considered equivalent to its value. Experts recommended test methods: cost savings, creation cost, profit advantage. In turn purchase cost may be useful as a test for licenses and franchise value.
Comparison based methods	
6. Comparation method	Is applicable for those intangible properties that are commonly traded in the market. It can refer to computer licenses, copyrights etc. Based on information on transactions with similar properties, the assessor is an indication of the value of the intangible asset.

In accordance with international standards IVSC-GN 4, intangible assets can be grouped into: rights, relationships, differentiated intangible assets - also called goodwill or goodwill - and intellectual property.
Main approaches used to evaluate patents are:

a) market comparison approach to patents;
b) income capitalization approach patents;
c) cost based approach.

3. Case Study

The invention relates to technology and equipment to produce continuous flow of organic substrate culture inoculated with mycelium, mushroom culture. Achieving a technological line seeded substrate for mushroom production is based on patent application no. A2007-00797/16.08.2011.
Technology according to the invention comprises three plants. The organic substrate culture moves in a continuous and undergoes processes of disinfection / sterilization, cooling and seeding with mycelium, the final product being introduced into culture perforated bags are transported in rooms culture of the fungus.
The three process units that organic substrate moves continuously being subjected to various operations such as disinfection / sterilization, cooling and seeding with mycelium. These are cylindrical, with some structural differences, having an inner cylinder rotating helical shaft that ensures continuous movement of the substrate.
Disinfection / sterilization of organic substrate is performed using microwave energy at a frequency of 2450 MHz microwave energy supplied by sources mounted over the plant for disinfection / sterilization positions to ensure the temperature of disinfection / sterilization uniformly throughout the mass in vegetable substrate technological conditions, which affect the environment.

Table No. 3 - Effects on the national economy

Effects	Observations
1. Increasing competitiveness of industry and national economy. Export growth	Applying new technology significantly reduces energy consumption and technological losses, implicitly lowering production costs. This will ensure competitive products with much better price quality ratio.
2. Significant savings for heating and electricity	One of the characteristics of Romanian agriculture in general is the energy consumption per unit of useful effect much higher than the one of developed countries.
3. Savings from raw materials	Strong patent application reduces the size of the technological losses compost processing.
4. Reducing imports	The generalization of new technologies relieves the external balance of payments with the amounts of imported seeded compost and mushrooms.
5. reducing pollution	Is done properly with lower energy consumption (pollution caused by the composting process by thermal processes).
6. Development upstream industry	Business growth in the production of equipment increases the number of employees in this area etc
7. Increasing resources available to the state budget	Increases profits from upstream and downstream businesses, increasing the number of employees and so on, will increase billable meal.

3.1. Patent evaluation

Evaluating a patent involves several steps which, moreover, will be included in the evaluation report. Detailed structure analysis, valuation of a patent or group of patents, involves the following steps:

a) legal analysis;
b) social analysis;
c) technical analysis;
d) assessment itself - the actual.

Proper assessment can be done in case of the following two classes of patents:
1. Active patents, used in production at the measurement date.
2. Inactive patents, not only applied in measurement data, but with real chances of application.
For a third class of patents - the inactive and not likely to be used by the owner, including the assignment / license, it is obvious that they will be valued at zero or even negative value, corresponding to annual protection fee paid by holder. In this category are included patents conditioned upon a certain large capital expenditure and that would generate a loss in any kind of application possible.
Applied patent firm must satisfy, cumulatively, these basic requirements:

- It must have an important contribution to generating economic benefits for the enterprise;
- This contribution can be isolated from the impact of other assets, tangible and intangible.

The value of a patent is determined by these facts:

- The patent contribution must generate economic benefit proportional to the size of the company or to payable royalties (when patents should, by definition, be acquired through a license agreement).
- The patent must be directly proportional to advance of its technical – technological trait, compared to competitors.
- The patent must be inversely proportional to its age.
- The patent must be directly proportional to the nature of the invention and patent claims force.
- -It must also be directly proportional to the scope of the patent (ex: in the industrial branch level).

Common assessment methods are:
i) the contribution to profit;
ii) exemption from royalty method (in more than one entry);
iii) cost savings methodl;
iv) the residual method

3.1.1. Contribution to profit method

Determination of the patent, this approach presupposes the existence and justification of assumptions necessary calculations, namely:

- Evolution of annual turnover of products manufactured using patent or proprietary technologies;
- Discount rate net profit

Calculations are based on the following data:

- The estimated economic life (useful) of the patent, applied under review and the company holds patent is 8 years;
- Annual turnover, based on the patent assessment that increases at a rate of 5% per year; - Share of gross profit, contribution made by the patent, the turnover is 8%;
- Gross profit tax rate is 16%;\
- Net profit discount rate is 20%.

Years	Turnover	Patent contribution in turnover 8%	Net profit	Discount factor k = 20%	Discounted net profit
1	3.000	240	149	0,833	124,12
2	3.150	252	156	0,684	107,01
3	3.308	265	164	0,579	95,11
4	3.473	278	172	0,482	83,14
5	3.647	292	181	0,402	72,81
6	3.829	306	190	0,335	63,71
7	4.020	322	200	0,279	55,71
8	4.221	338	210	0,233	48,85
TOTAL			**1.423**		**650**

It follows that patent value obtained by the method of updating its net profit attributable is the 650 000 units

3.1.2. Direct estimation of net profit

A simpler alternative method to profit contribution is based on a direct estimation of net profit cancel (PNA), obtainable from the patent application. The initial NAP can be attached assuming future annual growth at a constant growth rate, denoted by (g) and a prediction horizon limited to the remaining economic life of the patent. By establishing a discount rate based on the above assumptions, we can calculate the patent (Vb) as follows:

$$V_b = PN_a * m$$

where m = capitalization factor, calculated according to the formula:

$$m = \frac{1-(1-k)^{-n}}{c}$$

in which:

c = capitalization rate (c = k - g)
k = the discount rate
g = annual rate of growth in net profit hoped annually
n = number of years of remaining economic life of the patent

For n = 8 years, k = 20%, g = 5% and NAP = 149 000 units.
It follows that m = 4.487, and Vb = 149 x 4487 = *670,500 units*

It is noted that the result obtained by this simple approach is very similar to that obtained by the previous approach, because the assumptions used are identical. This simple approach is appropriate if a patent can be applied to a single user able to satisfy through products manufactured based on the patent, total product demand. If the calculation of annual net profit (of 149) is not taken into account for the application of patent costs, these costs should diminish Vb application resulting from the capitalization of net income.
This approach can be applied to include a patent holding company, if assessments are made in order to establish economic balance and the establishment of joint ventures.
The value of a patent, capable of generating a measurable annual net profit for a potential buyer is a function which depends on:
- The size of the annual net profit duck year and possibly its average annual growth (g);

- The capitalization rate based on two main factors: the risk free rate and subjective estimation of the potential buyer of the patent, the risk resulting from this acquisition, on the following issues:
  - whether the patent will withstand legal claimants.
  - whether to patent a product is more efficient than the patented process;
  - if new processes or technologies will transform the patent into a mere technical museum relic.

In other words, the higher achieving annual net profit will be more uncertain future, the discount rate / capitalization will be higher.

3.1.3. Exemption from royalty method (in more than one entry)

This method is usually applied in cases of patent holding companies. To assess by this method is the inclusion of patent value in the economic balance necessary for company acquisition by another larger company, a merger, the sale of the company as a whole or in stocks.
The conceptual basis of this method lies within the assumption that the economic benefit of a buyer is that the patent will exempt (avoidance, economy) him to pay a fee. In other words, the patent owner will make a "royalty savings" brevet. If paid to a third party patent holder (or mark) by calculating the present value of the stream of net royalty payments market, the owner is exempted of an intangible asset.
This situation uses the same data that were used in the previous method, namely:
- The estimated economic life (useful) remaining patent applied under review and the company holds the patent for 8 years;
- Annual turnover, based on the patent is 3,000 assessment year and the increase at a rate of 5% per year;
- Gross profit tax rate is 16%;
- Net profit discount rate is 20%;
- Industry average royalty is 5% of turnover.

Years	Turnover	% Of royalty	Discount factor k = 20%	Economy	
				gross	net present
1	3,000	5%	0.833	149	0,833 x 0,84 (150 - 0,125 V_b)
2	3,150	5%	0.684	149	0,684 x 0,84 (150 - 0,125 V_b)
3	3,308	5%	0.579	149	0,579 x 0,84 (150 - 0,125 V_b)
4	3,473	5%	0.482	149	0,482 x 0,84 (150 - 0,125 V_b)
5	3,647	5%	0.402	149	0,402 x 0,84 (150 - 0,125 V_b)
6	3,829	5%	0.335	149	0,335 x 0,84 (150 - 0,125 V_b)
7	4,020	5%	0.279	149	0,279 x 0,84 (150 - 0,125 V_b)
8	4,221	5%	0.233	149	0,233 x 0,84 (150 - 0,125 V_b)
TOTAL				1,192	523,2 - 0,4 V_b

The last column indicated the factor 0.84. This is the percentage of net royalties that the patent remains available to the user, less corporate tax rate of 16%.
The annual rate of depreciation of patent also has a remaining economic useful life of 8 years is 100/8 = 12.5% or 0.125. This value is subtracted from gross royalty to determine which net fee that would express only the net profit of the patent application.
So the present value of net royalty economy is: 523.2 to 0.4 Vb.

But the present value of annual depreciation for 8 years, to be added and a discount rate of 15% is:
Depreciation updated Vb = 0.125 x m, where m = 4.487, n = 8 years, k = 20%.
So amortization updated = 0.125 x 4.487 = 0.561 Vb
That patent value, calculated using net fee and depreciation over the useful economic life remaining is:

Vb = 523.2 to 0.4 Vb + Vb 0.561
Vb = 523.2 to 0.161 Vb
Vb = 523.2 / 0.839 = *622,600 units*

4. Conclusions

1. The patent value calculated by the three methods may vary depending on the method addressed in a range of +/- 3 ÷ 4%.
2. The result of the evaluation method to profit contribution is centered between the results obtained by other methods.
3. The Valuation methods are not sufficiently conclusive given that the assessment is taken into account only economic factors.
4. The assays that have been used have correction factors or mathematical algorithms that consider:

- Reducing energy consumption to achieve product / technology and the effect on medium and long term of this advantage in the context of energy prices continue to increase;
- productivity growth due to patent application;
- significantly reducing supply costs (direct and indirect) and their quantification;
- depreciation of expensed with the aid of patent acquisition, can be made on its life or a period as short;
- influencing markets for the product / technology on profits.

Clearly the market is what gives value to the patent.
Given the uniqueness of product / technology can't be applied in proprietary comparison method used to evaluate tangible assets.
Replacement cost method could be applied for development of technology, but not for products, given their unique nature.
Patent-Value-Predictor unconventional model used in the U.S.A could be a possible method for assessing European patents in the context of applying the EU GDP and its weighting in the performance component states.

References

1 Reilly R F ,Schweihs R P. Valuing Intangible Assets. Ed.Mc Grow-Hill, 1998.
2 Westland C. Valuting technology. Ed.John Wiley&Sons, 2002.
3 Haqnabusa M. Evolution of patent rights and determination of resonable for royalties.Commentary on New Industrial Property Low of Japan.Hanabusa Institute for the Protection of Industrial Property, Tokio, Japan, 2008.
4. Iclazan T. Stan D. Recovery patented invention. Ed.Politehnica, Timisoara, 2005.
5. Smith et al. Valuation of intellectual Property and Intangible Assets. Ed. John Wiley &Sons Inc., New York 1954, ISBN 0-471-30412-3.
6. Neifeld R. Company Perspectives, Procedures and Best Practices in View of the AIA, Presented by Rick Neifeld at IEEE-USA, Arlington, VA, October 19, 2012.
7. Neifeld R. A Macro-Economic Model Providing Patent Valuation and Patent Based. Company Financial Indicators. JPTOS No.83,p.211, april 2001

THE EFFECT OF VENTURE CAPITAL INVESTMENTS IN FINANCIAL PROBLEMS IN TURKEY

Dr. Ahu Coşkun Özer[1]

[1]*Marmara University, Vocational School Of Social Sciences, Turkey,*
ahu.coskun@marmara.edu.tr (The research was conducted by Ahu Coşkun Özer for Ph.D. Thesis in Istanbul University, Faculty of Economics)

***Abstract*- In the literature, there are some studies on the measurement of the effectiveness of venture capital investments in the world. However, it is relatively new concept in Turkey so researches conducted about venture capital investments are very limited. Therefore, in this study it is aimed to measure effectiveness of venture capital investments to financial problems of SME's in Turkey. Both the fact that an alternative investment tool and different method in solving the problem of financing for SMEs, venture capital investments are widely used all over the world. However, it is seen that venture capital investments on SME's are very low rate in Turkey. Venture capital investments in Turkey are mainly for large enterprises. One of the main reasons is the high risk of SME compared to large enterprises. In this research it is aimed to evaluate the effect of venture capital investments on financing problems of SME.**

Keywords: Financing problems, SME, Venture Capital Investments, Number of Employees, Business Turnover

1. Introduction

Venture capital is an alternative tool for companies financing. Venture capitalist aims to support entrepreneur and to profit from investment. There are studies that measure the effectiveness of venture capital investments in the world. However, it is began to spread new in Turkey so researches conducted about venture capital investments are limited therefore in this study aim to measure the effectiveness venture capital investments.

Firstly, theoretical framework is discussed. Definitions and determinations of venture capital are included. Secondly, after the functioning of the model discussed, a survey research was conducted. Results evaluated by statistical program. Effect of venture capital investments on solving financing problems of SME's was analyzed.

2. The Definition of Venture Capital

Venture capital has developed as an important intermediary in financial markets, providing capital to firms that might otherwise have difficulty attracting financing. These firms are typically small and young, plagued by high levels of uncertainty and large differences between what entrepreneurs and investors know. Moreover, these firms typically possess few tangible assets and operate in markets that change very rapidly. Venture capital

organizations finance these high-risk, potentially high reward projects, purchasing equity linked stakes while these firms are still privately held [1].

Venture capital is defined as meeting the companies seeking financing or entrepreneurs who have new ideas with financier or capitalist ready to risk. Venture capital investments are for the new projects dynamic and have the potential for rapid growth and high profitability.

The main purpose of venture capital is to make long term investment on businesses has the potential high growth and competitive advantage [2]. These investments are long term investments that can be liquidity after 5-10 years, from the date of initial. Venture capitalist do not want to be connected for years after invested the company, their main purpose is that after moving to a place to company by financing to sell their shares, to support other projects, in other words constantly enlarging his money by taking risks [3]. Venture capital investments are included in the financial investments because the primary goal is to achieve a return in depend on the company's growth and profit.

3. The Parts of Venture Capital

Sides of venture capital are roughly consisting from who demand funds, supply funds and intermediary in the supply of the funds. According to these parties, other parties also participate in the investment process. In general, parties is called by risk-capitalist parties (venture capitalist), entrepreneurial company (funded enterprise); investors (individual and or corporate). In fact, these parties have been included inventors [4]. Venture capitalist is defined as person who provides the necessary capital to entrepreneurs to implement their ideas and projects and share knowledge and experience with entrepreneurs. The entrepreneur or entrepreneurial company brings forth new products and projects with new ideas. If venture capital investment is made by the professional venture capital firms and then investors are able to provide financial support for the projects through professional venture capital companies. The inventors are those who produce thought (the invention) that enables the solution of a particular problem in the field of technology and want to realize this idea actually. Invention is the act of thinking of this phase and it translates it into innovation by applying a new mode of production and a new area. The inventor may be sometimes the same person with entrepreneur who launches this invention to the market.

4. The Stages of Venture Capital Financing

Venture capital investments are classified in stages in conjunction with the growth stages of companies. Venture capital investments are classified as seed capital stage, the initial capital financing stage, early stage and gate financing**,** bridge financing and stage of buying shares.

Seed capital stage is a stage of financing the entrepreneur whose product is currently in thought process stage. The stage of start-up capital, financing support is given the company which is usually during the establishment or a new established or operating in a short time, to produce and launch the product. At this stage, projects were prepared and market research had been completed. The process of production of the product would be started. That’s why; in the initial stage venture capital investment is done. In early stage and gate financing stage, the company's production of goods or services are available, but company in need of funding in order to get the superiority brand image of product in the market and increase market share. Bridge financing is transferred to the companies to go public in 6 months to 1

year. If the company is good for the supply of shares, the financing to be obtained until it supply shares to the public.

In the stage of buying shares and assets, venture capital firm support to entrepreneurs who want to buy companies to be sold for various reasons, but not enough financial resources and assets [5].

5. Risk Factor for Venture Capital

Investors in venture capital funds are typically very large institutions such as pension funds, financial firms, insurance companies and university endowments-all of which put a small percentage of their total funds into high risk investments. They expect a return between % 25 and %35 per year over the lifetime of the investment [6]. The biggest risk for the venture capital investment is to result in a loss. The newly established firms and new developed products have risk not to get a share in market so venture capital investments may result in a loss. The most of the risks in venture capital investments are in the stage of thought and start up because most uncertainties are in these stages.

According to the survey Ruhnka ve Young (1991), venture capitalist expect that the risk of loss associated with venture capital investments decreases steadily as a venture reaches higher stages of development. Their results indicate that the aggregate risk of loss is as high as 66 % for seed investments and round 20 % for bridge financing [7]. Ruhnka and Young also cite another source of risk in venture capital investing, exit or liquidity risk. They believe that this risk is responsible for the "so-called 'living dead' phenomenon" among portfolio firms. "This refers to investees that were once *expected* to equal or exceed portfolio target levels of return, but that stall out in their sales growth or profitability." This risk "may not reflect a fear of absolute loss of investment so much as the fear that a once-promising investee may fail to survive the rigors of competition in later stages of development and slip into 'living dead' status, dragging down portfolio returns and impairing the chances for a profitable exit "[8].

Table 1: Risk of Loss and Rate of Return for Venture Capital Investments

	Risk of Loss	Rate of Return
1. Seed	66.2%	73.0%
2. Startup	53.0%	54.8%
3. 3rd Stage	33.7%	42.2%
4. 4TH Stage	20.9%	35.0%
5. Exit Stage	20.9%	35.0%

6. Venture Capital Investments in Turkey

Venture capital investments in Turkey are examined as before 1999, in this term markets were dominated by uncertainties so investments was limited and the period between the year 1999-2000 in this period first major venture capital investments started in Turkey. The years of venture capital investments started to increase in the period between 2001 and 2005. After 2005, foreign venture capital investors started to invest the companies in Turkey.

Venture capital funds in Turkey are different form organizational structures. Off-shore of the foreign funds is active in Turkey, and the venture capital funds that are subject to certain conditions, the Capital Markets Board (CMB, SPK) legislation. The funds are subject to CMB have some responsibilities. These are:

- Corporate and income tax exemption
- The obligation to invest in local companies
- At least 50 % of total amount of funds required to be transfer to the venture companies

Five venture capital investments trusts, subject to CMB regulations and open to the public, are operating in Turkey. These are:

- İş Girişim Venture Capital Investment Trust Co., Ltd.
- Rhea Venture Capital Investment Trust Co., Ltd.
- KOBİ Girişim Venture Capital Investment Trust Co., Ltd.
- Gözde Girişim Venture Capital Investment
- Egeli & Co. Agricultural Venture Capital Investment

7. Venture Capital Investment Stages in Turkey

There is not official statistics showing the stages of venture capital investments in Turkey. However, examples of seed capital and early stage investments are Airties, Artesis, Vistek, Kodalfa technology companies, investments made by venture capitalist Ziya Boyacigiller. Seed and early-stage venture capital investments are accounted for the majority of total venture capital investments in Turkey.

The new projects are being developed for SME's public offerings in Turkey. Bridge financing is a type of the financing for the companies that will open to public at least in one year. Emerging Companies Market founded in Istanbul Stock Exchange is aimed to public offerings for SME's. In this context, KOSGEB, (Administration of Small and Medium Sized Industry Development and Support, Ministry of Science, Industry, Technology) provide bridge financing to SME's that will be offered to public. KOSGEB bridge financing applications takes the form as grants or loans. However, venture capital investments in bridge financing for SMEs not yet implemented in our country because SME's has not started to public offerings yet.

Acqusition and Mergering Venture Capital Investments in Turkey are increasing. Following the quiet period in 2009, M&A activity in 2010 has soared to reach the highest number of deals ever and the second highest deal value after the year 2005, in Turkish M&A history. Total M&A volume was around US$29 billion two times the deal value and number of last year, respectively [9].

8.Material And Methods

8.1. Purpose of The Study and Survey Research

Research project is aimed to determine the effect of the venture capital investments for SME's financial issues. The use of venture capital is compared with other financial resources to solve financial problems. A questionnaire consisting of 64 items, designed in accordance with this objective. This research conducted between November 2011 and January 2012, in İstanbul İkitelli Organized Industrial Zone.

8.2. Scope of the Study and the Sample

Simple random sampling method which gives each equal chance for being selected is used. Number of firms in İkitelli Organized Industrial Zone that make up the scope of the research is 23.165. Accordingly, a confidence interval of ± 5, with 95% probability of correctly convenient to analyze the sample size is calculated as 378. Within this research, 32 firm using venture capital totally 418 firm are interviewed. The solution of financial problems due to the use of the study venture capital firms is included in the research. The number of the firm that uses venture capital to solution of financial problems in Turkey is approximately 200. All these firms are contacted to survey but only 32 companies admit to be participated into the survey. Firms use and not use venture capital are compared.

8.3. Analysis and Hypothesis Testing

In the first stage, 11 companies using venture capital of total 60 companies are interviewed and data is evaluated. SPSS program is used to evaluate the data. The value of Cronbach's alpha of the questions about the basic hypotheses of the research is calculated as 0.905 at first stage.

9. Results

3.1. Hypothesis

Hypothesis 1

H0: Venture capital is not effective in solving financial problems of firms

H1: Venture capital is effective in solving financial problems of firms

To test the hypothesis that "the use of credit or venture capital is solution to financial problems" is dependent variable, "Using the venture capital" is accepted as independent samples and independent samples t-test is performed. Because the dependent variable covers firms using credit or venture capital, firms using credit or venture capital to solve financial problems, is included in the analysis. 32 firms using venture capital and 198 firms not using venture capital are analyzed. According to the t-test results (t=-5,5745, p=0,000<0,05), firms using venture capital have higher rate solution to the problem of financing than non-users.

Table 2: Dissolution Rates of Financial Problems by The Venture Capital User Group, T-Test Results

	Did you use venture capital finance to solve your financial problem?	N	Average	Standard Deviation	t	P
The use of venture capital or credit is effective to solution of financial problems for company.	Not used	198	3,44	1,248	-5,575	0,000
	Used	32	4,41	,837		

Hypothesis 2

H0: As a solution for financial problems of SME's venture capital investments have the same effect on company's turnover with bank credit.

H1: As a solution for financial problems of SME's venture capital investments have the more impact on company's turnover than bank credit.

To test the hypothesis, "our business turnover increased after the use of credit or venture capital" is accepted as dependent variable, "Firms state of the using venture capital or bank" is accepted as independent variable, and analysis of variable is performed at 0,05 significance level. Because the dependent variable covers the user of bank credit or venture capital, the firms using credit or venture capital is included in the analysis. 230 companies using bank credit or venture capital are classified as:

1-Only user of bank credits

2-A new variable is created as user both bank credit and venture capital

Each item of independent variables is considered as a group, in order to investigate whether the variances are homogeneous Test of Homogeneity of Variances is performed. Levene Statistic = 10.380, p = 0.000 is calculated. The level of significance as a result of the test, p = 0.003 <0.05, so the variances between the groups are not homogeneous and to investigate the differences Welch test should be used.

Table 3:Analysis of Variance Hypothesis 2

Welch Test				
Welch statistics		df1	Df2	P
29,343		2	22,000	,000
Multiple comparison test Games-Howell				
(I)	(J)	Difference averages (I-J)	Std. Hata	p
Only venture capital (vc) users	Only bank credit users	1,152*	,327	,011
	User both vc and credit	-,290	,361	,706
Only bank credits users	Only venture capital users	-1,152*	,327	,011
	User both vc and credit	-1,442*	,197	,000
User both vc and credit	Only venture capital users	,290	,361	,706
	Only bank credit users	1,442*	,197	,000
*Difference between averages at the level of 0.05 is significant.				

According to the results of analysis (Welch = 29,343, p = 0,000 < 0,05) turnover of the businesses using only venture capital have increased higher rate than business using only bank credit so H1 is accepted.

Hypothesis 3

H0: Venture capital investments to solving the financial problems of SMEs have the same effect to number of employees of the company with bank credit.

H1: Venture capital investments to solving the financial problems of SMEs have different effect to number of employees of the company from bank credit.

To test the hypothesis that "After the use of credit or venture capital number of personnel has increased in business" is accepted as dependent variable, "State of using venture capital or bank loans of firms" is accepted as independent variable. Analysis of variance at 0, 05 significance level is performed. Levene test is used to test for homogeneity of variance analyzes. The case of homogeneous groups, Tukey test is used to detect differences between the groups, homogeneity is not satisfied Games-Howell test is used. The dependent variable covers the firms using venture capital or firms using credit or firms using both venture capital and bank credit to solve financial problems are included in the analysis.

230 company using venture capital or bank credit was classified as:

1) only user of venture capital
2) only user of bank credit
3) using both, a new variable is created and included in the analyzes.

Each item of independent variables is considered as a group, in order to investigate whether the variances are homogeneous the Levene Test (Test of Homogeneity of Variances) is performed. Levene Statistic = 2,418, p = 0,000, is calculated. Because the level of significance as a result of the test, p = 0,091> 0, 05, the variances are homogeneous, and to investigate the differences between the groups ANOVA should be used.

Table 4: The Effect Of Venture Capital Investments to The Number of Employees

After using credit or venture capital, the number of the employees increased.					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	75,850	2	37,925	27,512	,000
Within Groups	312,915	227	1,378		
Total	388,765	229			
Multiple comparison test: Tukey HSD					
(I)	(J)	Differences between averages (I-J)	Std. Error	p	
Only venture capital (vc) users	Only bank credit users	1,404*	,364	,000	
	User both vc and credit	-,372	,437	,671	
Only bank credits users	Only venture capital users	-1,404*	,364	,000	
	User both vc and credit	-1,776*	,269	,000	
User both vc and credit	Only venture capital users	,372	,437	,671	
	Only bank credit users	1,776*	,269	,000	
*: Difference between averages at the level of 0, 05 is significant.					

According to the results of analysis of variance (F = 27,512, p = 0.000 <0.05) only using of venture capital, only using of bank credits or using both in their effect to the number of employee is different. The number of the employees of the companies using venture capital have increased higher rate than the companies using bank credit. ‘’H1: Venture capital investments to solving the financial problems of SMEs have different effect to number of employees of the company from bank credit’’ hypothesis is accepted.

Hypothesis 4

H0: Venture capital investments to solve the problems of financing for SMEs have no effect to investment idea in the future of company.

H1: Venture capital investments to solve the problems of finance for SMEs have an effect to investment idea in the future of company.

To test the hypothesis between "State of thinking to invest in the future" and "Status of using venture capital", chi-square analysis is performed at the 0.05 significance level. As a result of the chi-square analysis (chi-square statistic = 4,380), p = 0,036 <0.05 so "H1: solving the financial problems of SMEs to invest in venture capital investments have an effect on the idea of investing in the future of the company." hypothesis is accepted. As a result of the analyzed, 78.1% firms using venture capital consider to investing in 2012. %59, 3 firms not using venture capital consider to invest in 2012.

Table 5:Effect of Venture Capital Investments for Future Investments Decision

Pearson Chi-Square				
Chi-Square Statistics		Df	P	
4,380[a]		1	,036	
Do you think new investment in 2012?		Did you use venture capital to solve financing problem?		Total
		0 Not Used	1 Used	
Yes	Number	229	25	254
	%	59,3%	78,1%	60,8%
No	Number	157	7	164
	%	40,7%	21,9%	39,2%
Total	Number	386	32	418
	%	100,0%	100,0%	100,0%

10. Conclusions

Venture capital investments to SME's by in institutional venture capital trusts have very low rate in Turkey. Venture capital investments in Turkey are mainly for large enterprises. One of the main reasons is the high risk of SMEs compared to large enterprises

When the companies using venture capital compare with not using venture capital companies, it is seen that venture capital to be more effective in solving financial problems of companies. According to the analysis results, only user of venture capital and only user of bank credit manage financing problems at different rates. When the businesses using venture capital are compared with only user of bank credit, venture capital financing is more effective in solving the problems than bank credit.

The effect of venture capital in the company's turnover is evaluated. Venture capital investments have more effect on company's turnover than bank credit. Regarding the effect of venture capital for the number of employee, the number of the employees in firms using venture capital have increased higher rate than firms using only bank credit.

When the venture capital impact on companies investment idea of future is analyzed, 78.1% firms using venture capital consider to investing in 2012. %59, 3 firms not using venture capital consider to invest in 2012. In this respect, venture capital investments have a positive effect on future investments of companies.

References

1-Paul Gompers, Josh Lerner, 2001, Venture capital revolution, Jurnal of Economic Perspectives, Volume 15, Number 2, pp.145-168.
2-Tülay Zaimoğlu, 1995, Risk sermayesi ve Türkiye'de uygulama olanakları, SPK Publications, Ankara.
3-Nakilcioğlu, İ. H., 2001, "İnternet'te risk sermayesi kavramı," Afyon Kocatepe Üniversitesi, İ.İ.B.F. Dergisi, Cilt: II, Sayı: 2.
4-M. Altan Masun, 1995, ''Bir finansman yöntemi olarak risk sermayesi Türkiye uygulaması, sorunlar ve çözüm önerileri'', Marmara Üniversitesi, Institute of Social Sciences, Phd Thesis, İstanbul.
5-İlhan Uludağ, 1996, Gümrük birliği sürecinde KOBİ ve risk sermayesi şirketleri modeli, İstanbul Chamber of Commerce (İTO) Publications, No:4996-42, İstanbul.
6-Bod Zider, 1998, How venture capital works, Harvard Business Review, https://notes.utk.edu/units/biz/macc/MAccCal.nsf/0/36abe202e19e223e852571370060c1a7/$FILE/Venture_Capital_Overview.pdf,p.1
7-T,Seppa, Laamanen, Valuation of venture capital investments:Emprical evidence, http://www.realoptions.org/papers2000/LaamanenSeppa.pdf, p.1
8- Jhon Ruhnka ve Jhon E. Young, Some hypotheses about risk in venture capital investments , Vol.6, No.2 ,1991, s.126-127, 12.11.2010.
9-Başak Vardar, 2001, Annual Turkish M&A Review 2010, (Çevrimiçi), http://www.deloitte.com/assets/Dcom-Turkey/Local%20Assets/Documents/turkey-tr_kf_birlesmesatinalmaraporu_210111.pdf, p.5.

DEVELOPMENT AGENCIES AS ENABLERS OF REGIONAL INNOVATION: THE CASE OF TURKEY

Ayla Esen[1], Özen Aşık-Dizdar[2]

[1]Istanbul Kemerburgaz University, Mahmutbey Dilmenler Cad. No:26 Bağcılar, İstanbul, Turkey, ayla.esen@kemerburgaz.edu.tr

[2]Fairleigh Dickinson University-Vancouver, 842 Cambie Street, Vancouver, BC, V6B2P6, Canada, o_dizdar@fdu.edu

This paper focuses on the issue of regional innovativeness, and reflects upon the innovative capacity of regional plans developed by 26 Regional Development Agencies recently established in different regions of Turkey. The purpose of the paper is to determine the degree to which these plans can be effective in defining the future innovation agenda of the region in various dimensions (thus, facilitating technological innovation), and in finding solutions to societal needs (thus, facilitating social innovation). The method used in the study is qualitative research. Data is collected from regional plans of 26 regional development agencies in Turkey and analyzed through content analysis. Findings demonstrate that the concept of innovation is widely adopted in regional plans and activities that aim to enhance the innovative capability of regions, such as R&D support and technical education, appear frequently within strategies. Another important finding is that regional plans of the 26 development agencies consistently support the principles of sustainable development, ensuring a balance between economic development, social development and environmental sustainability.

Keywords
Regional development, regional development agencies, regional innovation, social innovation

1. Introduction

In a world that is still significantly affected by globalization, regions are increasingly recognized as important sources of competitive advantage, playing a crucial role in a country's economic development. Corporations, policy makers and the civil society are focusing more on the term "regional" or "glocal" instead of "global", illustrating the understanding that globalization and regionalization go hand in hand. Most sources highlight the fact that in order to compete in a global economy, localized learning processes and knowledge characterized by regional and local contexts are among critical success factors [1], [2].

The concepts of "innovative milieu" and "innovation system" have opened up a new agenda in research streams on innovativeness as well as regional development [3], [4], [5], [6]. Critical success factors and conditions for regions to be innovative have long been at the center of dicussions within the regional development and regional innovation research stream. There is widespread agreement on the positive relationship between knowledge,

technological innovation and competitiveness at the regional level [7]. Hence, success is sought in the interplay of these variables, built up through a region's true characteristics.

The emergence of regional development agencies throughout the world added more emphasis on the role of innovation in regional competitiveness. Today, regional development agencies work in collaboration with the regions' stakeholders to facilitate technological and social innovation within regional contexts.

Turkey has recently established 26 statistical regions at the NUTS-II (Nomenclature of Territorial Units for Statistics – Level II) level, and put Regional Development Agencies into operation for each statistical region since 2006. These development agencies "play a critical role in mobilizing support and funding for regional development projects" [8]. Development Agencies in Turkey are currently in the realization stage of their 2010-2013 plans. What are the main dimensions covered in the regional plans of 26 Regional Development Agencies in Turkey? Do these plans foster regional innovation? How are the sources of innovation capacity defined? This paper will address these questions through a content analysis of their regional plans.

2. Background

During the last decade, the term "innovation" has achieved a permanent place in the regional development agendas. Concepts such as innovation systems, innovation *milieu,* and innovation capacity are widely recognized by researchers and policy makers. Regional development agencies, as actors that bridge the gap between economic policy and other fields, play a key role in facilitating innovative activities within regions. This section will investigate the role of development agencies in fostering regional innovation.

2.1 Regional Innovation and Regional Development Agencies

Regions are important, and their critical role in sustainable economic and social growth is recognized more and more every day. Oughton et al. state that "growing international competition and integration strengthens the importance of the regional dimension because there is a well-defined set of external economies that are realized at that level" [7]. Recently, however, the focus of regional competitiveness research and policies has shifted on innovativeness of a region.

Innovation can be defined as a novel and improved process, product, administrative system, or program [9]. Innovation capacity or the capacity to innovate refers to the "capabilities of a system to convert knowledge into innovation that is able to drive long-term economic growth and value creation" [10]. From this point of view, regional innovation capacity can be described as the capabilities of a region to produce innovation to facilitate sustainable economic and social development.

Schiuma and Lerro identify four main knowledge assets categories building a knowledge-based capital that can foster regional innovation [10]:

- Human capital: the know-how characterizing the different actors within a region
- Relational capital: the group of knowledge resources linked to the relationships characterizing a regional system
- Structural capital: assets that are tangible in nature but play a fundamental role in the development, acquisition, management and diffusion of knowledge at regional level
- Social capital: the knowledge assets related to the soft infrastructure of a region (e.g. values, culture, routines, behavior).

The above four dimensions are widely utilized in regional development plans and policies, to formulate regional objectives and strategies.

Regional innovativeness is emphasized in policies as well. The European Sixth Framework Program supports projects to enhance research and innovation capacities throughout Europe under the "FP7 Capacities programme". One of the themes covered by the programme is "regions of knowledge". According to the programme "the 'Regions of knowledge' initiative aims to strengthen the research potential of European regions, in particular by encouraging and supporting the development, across Europe, of regional 'research-driven clusters', associating universities, research centres, enterprises and regional authorities" [11]. Networking and coalition building are defined as the key success factors for European framework programmes. The integration between governments, universities, and corporations is crucial for becoming a "knowledge society" [12]. One should add "civil society" into that group as well. These four main stakeholder groups are key actors in defining problems and finding solutions to these problems of the region, as well as act upon these solutions.

Today, involvement of stakeholders in societal decision processes and benefits of collaboration are widely recognized [13]. Stakeholder involvement in developing regional plans may produce multiple benefits. On the one hand, problems of the region can be better defined by different stakeholders groups. On the other hand, solutions offered by stakeholders would be much more easily internalized by the implementers.

Regional development agencies, by definition, integrate all these concepts together. Development agencies seek to improve innovation to facilitate the region's competitiveness. And they try to achieve that through facilitating coalitions, networks and collaborative projects between stakeholders of the region. They integrate stakeholder groups in developing the future strategic agenda of a region, and they provide financial and technical support to prioritized projects that are facilitated by networks of stakeholders groups.

2.2 Regional Development Agencies in Turkey

A regional development agency can be defined as "a regionally based, publicly financed institution outside the mainstream of central and local government administration designed to promote economic development" [14].

Hughes lists the following criteria for "model" regional development agencies [15]:

- The structure should be semi- or quasi-autonomous of government
- The objectives should be sufficiently broad:
    - Regional competitiveness
    - Regional growth
    - Indigenous/SME growth
    - Inward investment
- There should be multiple policy instruments:
    - Environmental improvement
    - Industrial infrastructure
    - Business advice
    - Venture capital

Turkey has recently established Regional Development Agencies in 26 NUTS-II regions. The objective underlying the foundation of development agencies is:

- to develop cooperation between the public sector, private sector and non-governmental organizations,

- to ensure proper and effective use of resources and mobilize local potential, thereby accelerate regional development in harmony with the principles and policies envisaged in the national development plan and programmes,
- to ensure its sustainability; and to reduce inter and intra-regional development disparities.

Each agency has an Executive Board, a General Secretariat, and a Development Council which acts as an advisory board. The Development Council is composed of a maximum of 100 members who represent universities, corporations, public authorities and civil society in the region. All 26 development agencies have developed regional plans for the 2010-2013 period through a participative process that included stakeholders of the region, and are currently providing financial support to the region's actors (e.g. universities, local authorities, corporations, non-governmental organizations) to realize the main strategic priorities defined in these plans. The regional plans are formed on the basis of competitiveness, sustainable development and participation principles.

3. Data Analysis and Findings

This section describes the research methodology, and presents the findings of the study. Adopting a qualitative methodology, content analysis was used to examine the regional plans, with the aim of generating a comprehensive understanding. Findings are presented and discussed on the basis of main conditions for sustainable regional development, as well as regional innovation.

3.1 Research Methodology

This study focuses on the content of the 26 regional plans to discover their potential to enable regional innovation. For this purpose, a qualitative research was conducted. First of all, the official web addresses of the 26 development agencies were examined, and the regional plans published on these web sites were downloaded. The first three levels of the regional plans, vision statements, development axes and main strategies (See Figure 1), were considered for the content analysis.

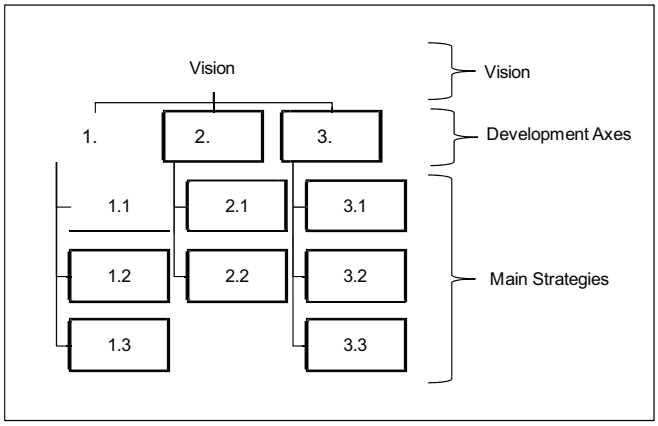


Figure 1 Regional Plan Template

Vision Statements: The two coders independently examined the vision statements to see whether the terms that are directly related to innovation, such as "innovation", "innovativeness", "novelty" literally existed within the statements. The vision statements that

included at least one of these terms were coded as 1, and others were coded as 0. There was 100% agreement between the coders.

Development Axes: The first coder examined the development axes presented in the 26 regional plans, and grouped them into 15 broad categories. Then, two coders independently coded the development axes into these 15 categories as 1-0. Evaluations of two coders were brought together and their level of agreement was assessed using Cohen's Kappa statistic [16]. Cohen's Kappa was calculated as 81%, which can be accepted as "good agreement" for content analysis. Joint evaluations were then re-assessed by another independent judge, who examined the development axes and made correctional comments.

Main Strategies: Main strategies were examined to answer the following two questions:

- Is innovation mentioned in a strategy statement? If so, how and under which development axis is it mentioned?
- What are the terms that are related to social issues/problems?

For terms regarding innovation, two independent coders examined the main strategies in regional plans and came up with a list of items, and their level of agreement was 100%. For terms related to social issues, the first coder examined the main strategies in 26 regional plans, and grouped the items related to social problems into 8 broad categories. Then, two coders independently coded the items related to social issues in strategy statements into these 8 categories as 1-0. Evaluations of two coders were brought together and their level of agreement (Cohen's Kappa) was 75%, which can be accepted as "good agreement". Joint evaluations were then re-assessed by another independent judge, who examined the strategies and made correctional comments.

3.2 Findings

Vision Statements

The first part of the content analysis focused on identifying whether vision statements of the 26 development agencies contained a term directly related to innovation. Vision statements are guiding principles in prioritizing decisions for organizations [17]. Vision is the first and the most important step in strategic planning studies. As for development agencies, a vision statement is a tool to guide and control for which projects to support in the sustainable development of the region. Therefore, it is important to go deeper into the visions of 26 agencies to understand whether the term "innovation" is placed within the statements. Words related to innovation (See Table 1) were observed in 9 out of 26 development agencies' vision statements.

Table 1 Innovation-related terms in vision statements.

Terms related to innovation	Frequency
Innovativeness	2
Innovative approach	2
Innovative and knowledge-based	1
Open to innovation	1
Leader in innovation	1
Innovative and competitive	1
Innovativeness capacity	1

The observed frequency (9 out of 26) shows that 35% of the vision statements refer to innovation. This reflects the future agenda of the region's stakeholders who took part in the planning process. Innovation is seen as one of the guiding principle for these regions' development and growth plans.

Development Axes

In the second part of the analysis, development axes (also referred to as thematic axes, development tracks etc.) were examined and grouped into categories.

Table 2 Categorization of development axes defined in regional plans

Categories	**Frequency**	**Percentage** *(N=26)*
Competitiveness	19	73%
Environmental sustainability	17	65%
Social capital/structure and human capital	15	58%
Infrastructure improvements	12	46%
Social development, integration and social inclusion	10	38%
Quality of life and place	10	38%
Rural development	10	38%
Improving tourism	7	27%
Improving employment	5	19%
Improving transportation, logistics and communication	5	19%
Improving industry and trade	5	19%
Improving the investment environment	4	15%
Knowledge-based learning economy	2	8%
Strengthening the institutional structure	2	8%
Branding and innovativeness	1	4%

It can be seen that more than half of the regional plans prioritize competitiveness, environmental sustainability and social/human capital in their plans. This trilogy is compatible with the three domains of sustainable development [18] as shown in Figure 2.

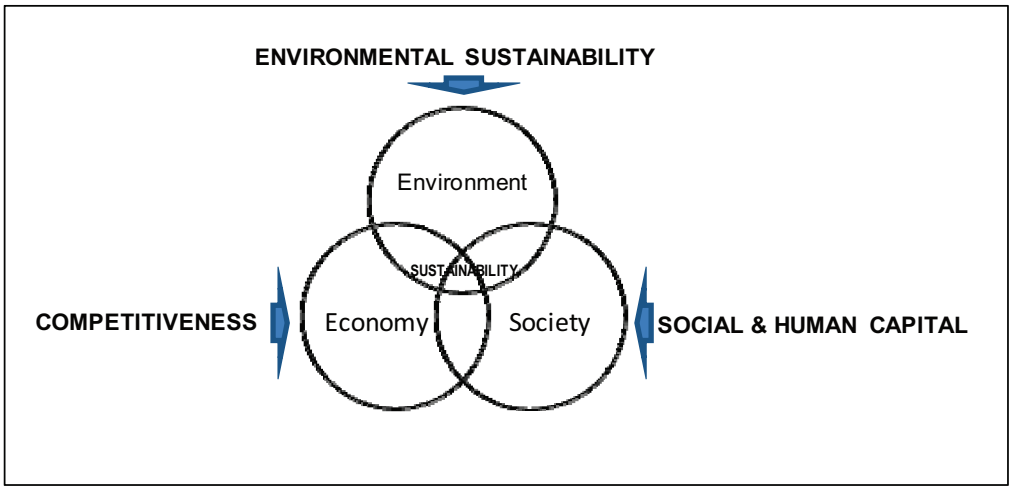


Figure 2 The three domains of sustainable development.

Innovation and Social Issues Covered within Main Strategies

The third stage of the analysis involved examination of the main strategies listed in regional plans. As part of the analysis, development axes (also referred to as thematic axes, development tracks etc.) were examined and grouped into categories. Strategy and actions to improve innovativeness appeared under the development axes "competitiveness", "knowledge-based learning economy" and "branding and innovativeness". All but seven development agencies have mentioned ways or tools to increase innovativeness within their strategies. A list of ways to improve innovative capacities of regions mentioned within the regional plans can be seen in Table 3.

Table 3 Actions to improve innovative capacities of region (as defined in regional plans).

Actions Proposed for Innovativeness
Increasing innovativeness in various industries (agriculture, tourism, trade, manufacturing)
Improving R&D capacity (Improving R&D culture, University-industry cooperation for R&D, Subsidizing R&D activities, Establishing R&D labs)
Supporting high-tech industries
Investing in human resources to improve their innovative capability (Technical training and education, Increasing creativity of human resources)
Becoming a knowledge society, creating an innovation culture

The last aim of the study was to find out whether the regional plans had a potential to support social innovation efforts in Turkey. Increasing awareness in social problems has been forcing governments, businesses, and civil society to take action on working together for social development. People, groups, and institutions form inter-organizational collaborative platforms for that purpose. The social value created by these platforms is defined as social innovation. By examining the social issues addressed in the strategies of development agencies, we aimed to see if there was any room for social innovation in these plans. Provided that these addressed social problems/issues are solved through innovative products, services, processes, or business models, development agencies may well be

enablers of social innovation in Turkey. Table 4 shows the main categories regarding social issues

Table 4 Categorization of social issues/problems addressed in regional plans

Categories	Frequency	Percentage *(N=26)*
Social inclusion	21	81%
Public education and employment	21	81%
Health services	15	58%
Environmental sustainability	13	50%
Social solidarity	9	35%
Reducing poverty	4	15%
Disaster management	1	4%

The list of social issues in Table 4 reflects the priorities of regional stakeholder groups. Projects that aim to solve these issues will most likely stem from these same stakeholders, therefore one should expect that these regional plans may facilitate the realization of social innovation efforts provided that development agencies provide technical, organizational and financial support to well-developed projects.

3. Conclusions

Our main question at the beginning of this study was: Are regional development agencies in Turkey enablers of regional innovation? Based on our findings, it is possible to argue that they definitely show the potential to become enablers, as reflected in their current regional plans.

This study has addressed the issue by a content analysis of regional plans. We have examined, in particular, the degree to which these regional plans adopt strategies to improve the innovative capabilities of regions, and to find innovative solutions to societal problems. The purpose of the study is to contribute to the research stream on regional innovation, as well as social innovation. Main conclusions of the study can be listed as follows:

1. Innovativeness is related to competitiveness.

Within the 26 regional plans, nearly all strategies regarding innovativeness or innovation are placed under the “competitiveness” development axis. This is compatible with extant research that relates innovativeness to competitiveness. Development agencies in Turkey seek to improve innovativeness to facilitate regions’ competitiveness.

2. Regional plans aim to increase innovative capacity.

Strategies such as improving R&D capacity, supporting high-tech industries, improving the innovative capacity of human resources through technical training and education, and creating an innovation culture appeared within regional plans. These actions are closely related to improving the innovative capacity of regions (provided that they are actually implemented within the region).

3. Regional plans ensure sustainable development.

The main development axes formulated within regional plans mostly involve themes related to economic, social and environmental sustainability. These are the three domains of

sustainable development (See Figure 2). The regional plans ensure compatibility between economic and social development and the environment.

4. Development agencies may become enablers of social innovation in the future.

Regional development based on the innovative capacity stemming from the region's own stakeholders may have tremendous social implications. The solutions offered by stakeholders would be much more suited to the region's requirements, much easier to implement, and keenly embraced by the implementers. The regional plans cover many social issues (e.g. social inclusion, education and health services, employment, reducing poverty); the solutions that address these issues may lead to social innovation, in case these solutions bring innovation in some sense.

5. Development agencies may be the solution to the regional innovation paradox.

The regional innovation paradox "refers to the apparent contradiction between the comparatively greater need to spend on innovation in lagging regions and their relatively lower capacity to absorb public funds earmarked for the promotion of innovation and to invest in innovation related activities compared to more advanced regions" [7]. "Innovation in agriculture" appears in regional plans of various development agencies; by supporting innovation in agriculture and rural development, development agencies may overcome the regional innovation paradox: the capacity of lagging regions to absorb public funds for innovation will increase.

6. Regional plans reflect the ideas and future agenda of the regions' stakeholders.

As the regional plans formulated by the 26 agencies reflect the collective output of a participative process, their contents offer great insight into the stakeholder point of view regarding development of a region.

Further research could be suggested in the following areas:

- How the regional development plans are put together: the process through which the plans are written down can reveal important insights into the time and effort put in by the contributors. It is possible to examine the contributions of each stakeholder, and learn more about their priorities, their concerns, and even the time span it takes to arrive at a plan mutually agreed upon.
- How each regional plan compares to another: the details of each regional development plan would inevitably vary, and different regions would have different requirements and priorities to put forward. It would be interesting to compare those priorities in order to develop a better understanding and provide a better allocation of resources to regions. Another interesting comparison would be to see the degree to which different regions attach importance to innovativeness, or the different tools and objectives they add into their strategies regarding innovativeness.
- How implementation works: The present study only focused on what's written in the plans, as the "ideal" state still underway to realization. It would be an interesting follow-up to take a deeper look at the implementation process, and whether the objectives are indeed realized, which would feed into an in-depth analysis and corrective action (if necessary) of the plans by each region's stakeholders.

The importance of "region" increases and regional development agencies will remain the key facilitators of regional competitiveness in the future. The ultimate aim should be to boost competitiveness through creation of an innovative environment, within the framework of sustainable development through economic, social and environmental development. Regional development agencies' plans reflect strong intentions to improve regional innovative capacity; bringing these plans into realization is the big challenge in the development agenda of Turkey.

References

1 Asheim, B. Interactive learning and localised knowledge in globalising learning economies. GeoJournal 1999; 49(4): 345-352.

2 Storper, M. The regional world: Territorial development in a global economy. New York, NY: Guilford Press 1997.

3 Mole, K., & Worrall, L. Innovation, business performance and regional competitiveness in the West Midlands: Evidence from the West Midlands business survey. European Business Review 2001; 13(6): 353-364.

4 Asheim, B., & Gertler, M. The geography of innovation: Regional innovation systems. In J. Fagerberg, D. Mowery, & R. Nelson (Eds.), The Oxford Handbook of Innovation (s. 291-317). Oxford: Oxford University Press, 2005.

5 Gustavsen, B. Innovation, participation and 'constructivist society'. In M. Ekman, B. Gustavsen, B. Asheim, & O. Palshaugen (Eds.), Learning regional innovation: Scandinavian models (s. 1-14). Hampshire: Palgrave Macmillan, 2011.

6 Dabson, B. Rural regional innovation: A response to metropolitan-framed place-based thinking in the United States. Australasian Journal of Regional Studies 2011; 17(1): 7-21.

7 Oughton, C., Landabaso, M., & Morgan, K. The regional innovation paradox: Innovation policy and industrial policy. Journal of Technology Transfer 2002; 27: 97-110.

8 Lagendijk, A., Kayasu, S., & Yasar, S. The role of regional development agencies in Turkey. European Urban and Regional Studies 2009; 16(4): 383-396.

9 Damanpour, F. Organizational innovation: A meta-analysis of effects of determinants and moderators. Academy of Management Journal 1991; 34(3): 555-590.

10 Schiuma, G., & Lerro, A. Knowledge-based capital in building regional innovation capacity. Journal of Knowledge Management 2008; 12(5): 121-136.

11 European Commission, E. European Commission CORDIS: FP7. 02 02, 2013 tarihinde Community Research and Development Information Service Web Site: http://cordis.europa.eu/fp7/capacities/regions-knowledge_en.html 19.07.2011.

12 Ennals, R. Europe as knowledge society: Integrating universities, corporations, and government. Systemic Practice and Action Research 2004; 17(3): 237-422.

13 Stauffacher, M., Flüeler, T., Krütli, P., & Scholz, R. W. Analytic and dynamic approach to collaboration: A transdisciplinary case study on sustainable landscape development in a Swiss prealpine region. Systemic Practice and Action Research 2008; 21: 409-422.

14 Halkier, H., & Danson, M. Regional development agencies in western Europe: A survey of key characteristics and trends. Aalborg: European Research Unit, 1996.

15 Hughes, J. T. The role of development agencies in regional policy: An academic and practitioner approach. Urban Studies 1998; 35(4): 615-626.

16 Cohen, J. Weighted Kappa: Nominal scale agreement with provision for scaled disagreement or partial credit. Psychological Bulletin 1968; 70(October): 213-220.

17 Peters, J. On vision and values. Management Decision 1993; 31(6): 14-17.

18 2005 World Summit Outcome Document, World Health Organization, 15 September 2005.

DESIGN OF REGIONAL INNOVATION STRATEGIES FOR SMART SPECIALIZATION WITHIN THE CONTEXT OF REGIONAL PLANNING IN EAST MARMARA REGION

Candan Umut Özden[1], Hüseyin Özgür Ünsal[2], Fatma Avşar[3], Hale Gülbaz[4], Cem Bayrak[5]

[1] *Planning, Programming and Coordination Unit, East Marmara Development Agency, Kocaeli, Turkey, c.umutozden@marka.org.tr*

[2] *Kocaeli Investment Support Office, East Marmara Development Agency, Kocaeli, Turkey, h.ozgurunsal@marka.org.tr*

[3] *Planning, Programming and Coordination Unit, East Marmara Development Agency, Kocaeli, Turkey, fatmaavsar@marka.org.tr*

[4] *Planning, Programming and Coordination Unit, East Marmara Development Agency, Kocaeli, Turkey, hale.m@marka.org.tr*

[5] *Planning, Programming and Coordination Unit, East Marmara Development Agency, Kocaeli, Turkey, cembayrak@marka.org.tr*

Having 7,2% of GDP, 12% of tax revenues, 11% of exports East Marmara Region is the production base of Turkey and an innovation base with high concentration of R&D workers and high levels of patent generation. As the economic resilience and sustainability are becoming widely dependent on smart regional strategies and innovative production, regional policies and plans must be designed parallel to these. Adoption of Regional Innovation Strategies for Smart Specialization (RIS3) in Europe and establishment of Regional Development Agencies in Turkey for Regional Planning, Financial Support for Niche Fields and Investment Support brought the necessity and opportunity for developing regional innovation strategies. In accordance with Horizon 2020 program of European Commission and 10th Development Plan process of Turkey and Regional Planning period of East Marmara Region; innovation strategies are being defined with comprehensive data analyses, expanded public and stakeholder participation and examining global trends for different sectors. One of the most important issues is that the quad helix (government, academy, business and public) model is adopted. Smart specialization will be the key concept of regional innovation strategy and strategies will be developed for clusters, innovation friendly business environment, universities and techno parks, key enabling technologies within the region, cultural and creative industries, internationalization, financing instruments, green growth and social innovation. Outcomes of the strategy will be considered as input for the East Marmara Regional Plan which will enable strategies to gain legal basis and receive financing instruments. The strategy will be one of the earliest in Turkey.

Keywords

Regional Plan, Innovation Strategy, Development Agency, Smart Specialization

1. Introduction

The economies of the developed countries along the world are simply depending on high value added and capital intensive production and high technology and innovation.

Developing communication and transportation infrastructure and opportunities has been decreasing the dependency to the location. This tendency causes the competitiveness of regions in terms of locational advantages and labour market aspects of regions to yield into the usage of technology, R&D and innovation in the production processes.

Furthermore, the increasing share of service sector in developed regions or countries and the increasing demand to the high-tech products and health services also supports this tendency in local level. As the information society emerges in developed and even in developing countries, along with the reverse brain drain, producing technology and innovation increases is local level.

Even the locational advantages of regions still maintain their importance in many products or services, innovative products have more competitiveness compared to such conventional products. As the world becomes smaller, these remaining conventional products are expected to lose their locational advantages if they do not provide minimum quality in terms of technology. Thus, most competitive companies or clusters always are the most advantageous in global production.

Yet, a single company cannot be sufficient to be the most innovative in any product or semi-product. Instead of that, an innovative value chain within a region for a specific product or semi-product can be more competitive in terms of technology, R&D and innovation. Also, the supporting academicians, advisors and public institutions for a specific product increase this competitiveness. The process of determining such niche products is the main issue in the paper.

This paper focuses on development and implementation of regional innovation strategies in accordance with international and academic guidelines, especially the RIS3 guide, in the case of East Marmara Region of Turkey.

2. Background

Above mentioned importance of information and creativity brought the necessity of technology development, R&D and innovation in production processes, and those processes brought the necessity of strategically planned regional innovation policies. On the other hand, international organizations such as the European Union have been adopting the competitiveness of regions instead of companies. In the case of Turkey, “ensuring regional development” is adopted as one of the social and economic development axes in the 9th Development Plan and Regional Development Agencies were established in NUTS2 (Nomenclature of Territorial Units For Statistics) level. The 26 newly established development agencies in Turkey boosted the regional planning and regional development efforts and as they were defined to be responsible for the regional development, regional strategies have started to be developed in economic, social, environmental and spatial scopes.

In today's world, global economy is mostly shaped by countries like United States of America, Great Britain, Germany, China, India and Japan. The competitive strategy of India and China which depends on cheap labour force, and priorities of European Union and U.S.A. which are areas such as information technologies, energy efficiency, bio and nanotechnology directly affects the production trends of developing countries.

International organisations such as United Nations Industrial Development Organisation (UNIDO), Organisation for Economic Co-operation and Development (OECD), World Bank and European Union see innovation as the key factor of economic and social development and each organisation has a guideline for countries or regions for preparing regional innovation strategies that stimulate the development of innovation strategies.

A common point of these guidelines is about the risks of defining wrong strategies. One of the most important risks is that, the lobbies of strong sectors or strong stakeholders tend to orientate them in the way they profit most. Another important risk is the adopting directly the international or national innovation strategies without including regional priorities, expectations or trends. To prevent these risks; regional strengths must be known well, international tendencies must be followed and analysed well, the process must include every stakeholder within the region and the strategies must be adopted by all of them. Such a strategy could become a necessity for resource management of local/regional authorities and private sector and a helpful guideline for the region's place within the global value chain.

In accordance with these inputs, ensuring smart specialization and developing distinctive regional innovation strategies were seen as a necessity for the East Marmara NUTS-2 Region, which is consisted of Kocaeli, Sakarya, Düzce, Bolu and Yalova provinces.

2.1 Conceptual Background

The rationale of developing regional innovation strategy depends on several academic researches and international guidelines which includes new theoretical approaches for such strategies. Most important ones are regional innovation system approach and smart specialisation.

As the global trend for regional competitiveness depends more and more on high value added production with high levels of technology, innovation and R&D, the necessity was born to develop a regional innovation strategy for smart specialisation for the East Marmara Region, as it is the production base of Turkey.

2.1.1 Regional Innovation Systems

Regional innovation systems are new approaches for regional development which began to appear in 1990's [1]. Many academicians likes Lundvall, Cooke and Dohse, regional innovation systems discussed the regional perspective, knowledge and technology exchange and innovative competiveness especially between the USA and EU. Porter's cluster approach for value chains is another important approach for competitiveness of regions.

Philip Cook gives clear examples for governmental efforts for boosting competitiveness by promoting regional innovation and cluster-building in his studies in 2003 [1].

2.1.2 Smart Specialisation

Smart specialisation has been settling at the focus of European economic development and growth policies in the last years and is seen as the mainstream of the Europe 2020 strategy. The term was developed by a group of academicians namely “Knowledge of Growth” including Paul David and Bronwyn Hall after firstly propounding by Dominic Foray and Bart van Ark in order to fill the pores in the transatlantic productivity. Two main different approaches exist within smart specialisation, which are the logic of innovation and system mechanism [2].

Smart specialisation is mainly about the potentials of the region and which potentials can be realised within the region. Even Barack Obama, the president of the USA, mentioned his countries growth policies will be spatial in his speech in June 21st, 2010 and smart specialisation was included in the agenda of OECD and regions were classified as knowledge regions, production regions and non-science and technology regions.

2.2 Legal Background

Some upper scale policies and guidelines supported the necessity of preparing a regional innovation strategy by defining whom to coordinate and how to prepare and to which the strategies should be in accordance with.

2.2.1 International Plans and Policies

In almost all international organisations which are mainly effected by the USA and EU, regional innovation policies have been developing. As they bring no necessity, to be known by the international actors and strengthen their places in global markets, regions should consider such guidelines.

2.2.1.1 World Bank

The innovation policy of World Bank, prepared in 2010, defines the frame of boosting regional development by supporting innovation capacities of developing countries. It defines regional governments and authorities as “gardeners” and key actors of setting regional strategies. Also, innovation, R&D and technology is seen as the main recovery tool for economic crises.

2.2.1.2 UNIDO

The policy paper of Philip Cook and Olga Memedoviç, strategies for regional innovation systems, defines the concept of regional innovation systems and explains the vehicles of regional development by contrasting different regions from different continents and advocates the promotion of systemic innovation with public and private partnership at regional level.

2.2.1.3 OECD

The Organisation for Economic Cooperation and Development examines the innovation structures of regions and analyses the outcomes of the regions in terms of production. After making such examination in details, they develop offers for transnational corporations and supports dissemination of best practices.

2.2.1.4 EU

Defining innovation and technology as the key element of economy in today's world is accepted by the EU since the Lisbon Strategy process in year 2000. The cohesion policy of Europe along with the Europe 2020 strategy which is the general strategy of Europe for smart, sustainable and comprehensive development; empowers establishing interregional learning processes and regional innovation systems.

Establishment of Innovation Union Flagship in Europe and new approach of "smart specialization" and S3 Platform are important steps for expanding the innovation systems over Europe.

2.2.2 National Plans and Policies

Although the regions have their own strengths, their policies should be in accordance with upper scale plans and their strategies.

2.2.2.1 9th Development Plan

'Development of R&D and Innovation' strategy is determined within the strategy of "increasing the economic and social competitiveness". It is referred to the necessity of the development of human and technological infrastructure, specifically cited nano and biotechnology area, due to the information and high value-added orientation at the production of goods and services.

It is also come into prominence at related strategy that lacking of operative cooperation between academia and industry, inadequate support of the interdisciplinary projects, the low rate of use of EU R & D projects.

It is aimed to achieve the goals such as, increasing the share of R&D share, dissemination of academic studies that address the needs of industry, development of infrastructure of technology-based entrepreneurship, research - development and innovation, strengthening of human resources. Nanotechnology, biotechnology, new-generation nuclear technologies, hydrogen and fuel cell technologies, the defense industry, vaccine and anti-sera, information and communication and space technologies identified as priority areas.

2.2.2.1 National Science, Technology and Innovation Strategy 2011-2016

This strategy covers scientific, technological and innovation strategy of Turkey. The strategic objectives of the plan are as follows;
Vertical Axes;

- Target-oriented Approaches where R & D and innovation capacity are strong
- Needs-oriented Approaches where R & D and innovation capacity areas required to Acceleration
- Bottom-up approaches to development of R&D and innovation capacity

Horizontal Axes;

- STI Human Resources Development
- Promotion of Research Results to the Transformation of Commercial Product and Service
- Dissemination of Cooperation Culture in multi-partner and multi-disciplinary R & D
- Enhancing the Role of SMEs in National Innovation System
- Increasing the contribution of research infrastructures TARAL'S to the power of knowledge production
- Effectiveness of International collaboration STI in the interests of our country

R & D and innovation capacity is strong fields in the document, determined:" Manufacture of motor vehicles and trailers (Automotive)", "Manufacture of machinery and equipment N.E.C" and "Information and Communication Technologies (ICT)".

2.2.2.1 Other Upper Scale Plans and Strategies

At the region scale, many different national strategies intersect. At the national level, each Ministry or Undersecretariat defines the sectoral strategy in Turkey. However in regional innovation systems and local level, different sectors intersect more distinctly. Main national level strategies other than National Development Plan and National Science, Technology and Innovation Strategy are; Turkey's Higher Education Strategy, Science and Technology Human Resources Strategy, SME Strategy, and Industrial Strategy of Turkey.

In terms of sectoral specialisation; automotive, machinery, electronics, iron and steel, wood processing, paper and furniture, chemical sectors are prioritized.

2.2.3 Regional Plans and Policies

Regional scale planning is not a new issue in Turkey and East Marmara. The first regional plan was prepared within the context of East Marmara Region in 1963. However, the number of regional plans in Turkey had been very limited until the establishment of Regional Development Agencies in the last decade to which authority was given for the preparation of Regional Plans.

In the current Regional Plan of East Marmara for the period of 2010-2013, high value added and agglomerated sectors were defined as automotive, base metal, chemicals, electrical machinery, plastics and machinery.

In terms of innovation, developing the regional innovation strategy was adopted along with the policies for increasing R&D activities in clusters and prior sectors and increasing the quality of innovation and product development activities.

3. The Process of Evaluation of the Status Quo

As smart specialization depends on competitive and strong sectors with high innovative potential, regional data were analysed to define the innovative sectors within the region. In accordance with the sectoral analyses, general aspects like education, human force, technical infrastructure, financing for technology are also important for regional innovation system, thus they have been considered as well. Turkey has a ratio of 0,85% in R&D expenditure in Gross Domestic Product, which is almost 4 for times below of the ratio of EU, USA and Japan. However, this ratio has a good increase rate like 10,2% according to the data of World Bank [4]. In this expenditure, private sector provides 41% of R&D expenditure, where the average of EU is 54,8%.

3.1 Defining Competitive Sectors

Most Turkish scholars complain from the unorganized and inadequately collected or obsolete data, or even mere absence of the required datasets. Regional planning should rely on systematically updated and robust databases, which allow for benchmarks across different regions and periods of time. However, such scarcity and complexity become excruciatingly challenging for the planners when it comes to make estimations and impact analysis regarding new investments and trade with the rest of the World. So the next best thing than using the actual figures is to depend on the available statistics routinely collected by the state institutions, one of which is the statistical information indicated on the incentive certificates. Min. of Economy (formerly Undersecretariat of Treasury) has a long tradition of issuing incentive certificates for the investments of above certain minimally required fixed costs. These documents bear the foreseen amount of fixed investment, employment to be created and amount of the machinery to be imported etc. Provinces of East Marmara, are notably among the most prosperous in the Turkey as recognized by the TURKONFED's report [3]; hence accumulate large stocks of investment in various sectors. With a population that corresponds to only %4.4 of that of Turkey, East Marmara Region accounts for %9.4 of the incentivized fixed investments for the period between 01.01.2001 and 31.12.2013. East Marmara has a versatile economy, with considerable presence in almost each sector, for some sectors having relatively greater share in the national economy though. The study focused on the share of the incentivized investment that East Marmara's provinces receive as to various sectors and the growth trends thereof. The first five rows of the Table 1 exhibits the sectors at which investments to East Marmara's provinces are relatively intense.

Table 1 Priority Sectors

	Iron-steel	Non-ferrous metal mills	Metal goods	Automotive main and supply sector	Electrical machinery and goods	Machinery	Chemicals	Rubber-Plastics	Glassware	Food & Beverages	Clothing & Garment	Forestry products	Paper	Energy	Tourism	Logistics	Ship-Building
Investment Intensity per Province (√ denote Foreign dominance)																	
Kocaeli	√	√	√	√	√	√	√	√		√		√	√	√	√	√	
Sakarya			√	√		√				√				√	√		
Düzce			√			√			√		√						
Bolu						√						√		√	√		
Yalova																	√

Table 2 Priority Sectors (continued)

Other Criteria																	
Growth rate		√	√		√	√	√		√	√		√		√	√	√	√
Exports	√			√	√	√	√			√							
Job creation	√		√			√				√	√				√		
In-house R&D premises				√	√	√	√										
Supporting R&D and services																	
SME prevalence	√		√	√ (supply sector)	√	√		√		√	√	√			√	√	

According to data above, iron-steel, non-ferrous metal mills, metal goods, automotive main and supply sector, electrical machinery and goods, machinery, chemicals, rubber-plastics, glassware, food & beverages, clothing & garment, forestry products, paper, energy, tourism, logistics and ship-building sectors are primary sectors of East Marmara Region.

3.2 Analysing Innovative Capacities of Competitive Sectors

After defining the priority sectors in the region, the situation of those sectors in terms of R&D, Technology and Innovation were taken into account.

To analyse the innovation infrastructure within the region, related data were needed to be gathered from different institutions and organizations which are inside the innovation ecosystem. Such bodies were categorised in the National Science, Technology and Innovation Strategy 2011-2016 (See figure 1).

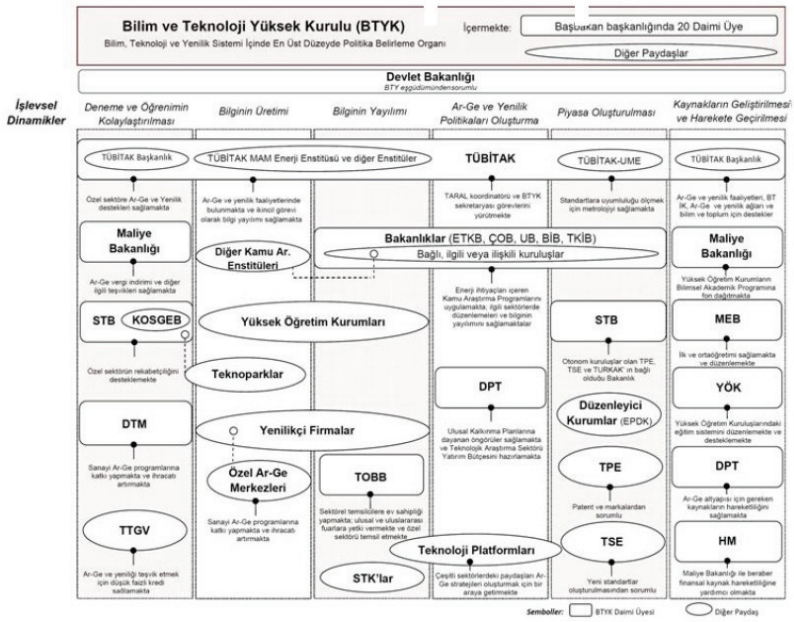


Figure 1 Basic Dynamics of National R&D and Innovation System of Turkey (Source: TÜBİTAK, 2011)

Following data was used for the determination of the innovative sector within the region and top sectors were determined according to their number and share in Turkey (Table 2).

Table 2 Data sets and Sources of Innovation Indicators

Data	Source	Top Sectors/Subjects
Exports	TURKSTAT, TİM (Turkish Exporters Assembly)	Automotive, Chemicals, Other Metals, Electrics And Electronics, Machinery, Iron and Steel
Foreign Direct Investments	The Ministry of Economy	Food, Textile, Chemicals, Construction, Transportation
Sectoral Distribution of OIZ's	OSBUK (the Supreme Board of OIZ's)	Food, Textile, Base Metal, Machinery, Automotive,
R&D Centers and Personal	The Ministry of Science, Industry and Technology	Chemicals, Medicine, Electrical Machinery, Other Metals, Automotive
Agglomeration – Added Value Analysis	MARKA (East Marmara Development Agency)	Refined Petroleum, Chemicals, Base Metal, Electrical Machinery, Automotive
Agglomeration – Sectoral Growth Rate Analysis	MARKA (East Marmara Development Agency)	Forest Products, Refined Petroleum, Base Metal, Automotive, Transportation
R&D, Innovation and Industrial Implementation Supports	SMEDO (Small and Medium Enterprises Development Organisation)	Machinery, Electronics and Optics, Fabricated Metal Products, Electrical Equipment, Forestry Products
Scientific Papers	Universities (Kocaeli, Bolu İzzet Baysal and Yalova Universities)	Medicine, Chemistry, Machinery, Electronics And Communication
Projects of Universities	Universities (Kocaeli, Bolu İzzet Baysal and Yalova Universities)	Chemistry, Environment, Medicine, Electronics And Communication, Machinery, Physics And Optics

Different classifications could be seen in the data of different institutions such as ISIC, US97, NACE1.1 and NACE2.0. This causes some of the subsectors to be included between different sectors and complicates the comparison process. For instance the data used for analysing the relation between agglomeration and added value of the sectors were productivity and employment. The data of productivity was produced in the classification of NACE1.1 whereas the employment data was in NACE2.0. To remove the incoherency, the data of 2006 were used as both were in NACE1.1.

According to data above, automotive, base metal, chemicals, electrical machinery, machinery, food, plastics, forestry products and electronics become prominent.

4. Ensuring Participation and Adoption

As stated almost in every guideline and scientific papers, adoption of the strategies and chosen innovative sectors is the most important issue for strategies to come to life. Each institution, company or even individual have their own perspectives for such policies. To make sure all of the stakeholders to adopt the common strategies, it is required to include them in the decision making process, even their approaches are imperfect. Seeing their ideas included in the policies and names included in the plans, in a sense, causes them to adopt the whole policy.

To ensure the adoption, participatory planning process was implemented in two different manners; technical committee and advisory board. Furthermore, questionnaires were taken from the web site of the East Marmara Regional Plan to public and another was taken to the institutions and companies within the East Marmara region.

Within the technical committee, the Regional Development Agency, Technology Transfer Offices, Technoparks and national institutions such as TÜBİTAK and TÜSSİDE were represented. In the advisory board, the chambers of commerce and industry and universities were represented for receiving feedbacks for the data and analysis studies and technical committee's decisions.

4. Determining Niche Areas for Smart Specialization

At the time this paper was submitted, the sub sectors for smart specialisation had not yet determined in terms of regional innovation. In the sectors such as automotive, base metal, machinery, food industry, electrical and electronic equipment, chemicals, plastics, forestry products, iron and steel and textile are to be examined in details within the scope of upper scale policies and plans, sectoral strategies and innovation performance.

5. Conclusion

At the end of the above introduced process, regional innovation strategies for smart specialisation for East Marmara Region are expected to be defined and adopted by the whole stakeholders.

Following benefits can be expected as results of the process:

- Developing Regional Innovation Strategy and promoting especially abroad.
- Developing the R&D Consultancy Sector
- Designating financial support programmes to the innovative sectors
- Stating the specialised sectors and innovative fields in East Marmara
- Representation of the region in platforms such as S3 and other EU bodies.
- To be used as a base for the Regional Plan
- To be used as a base for academic studies
- To be a guideline for the domestic entrepreneurs and foreign investors.

References

1 Cooke, P. (1992). "Regional innovation systems: competitive regulation in the new Europe." Geoforum 23(3)
2 Philip McCann and Raquel Ortega-Argilés, Smart Specialisation, Regional Growth and Applications to EU Cohesion Policy, 2011, pg 18
3 Turkonfed, Orta Gelir Tuzağı'ndan Çıkış: Hangi Türkiye?, 2012
4 World Bank, Research and development expenditure (% of GDP), http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS January 2013
5 Larosse J, The Discovery Of Smart Specialisations
6 The European Commission, Innovation Union Competitivenes Report,
7 Saublens C, What Smart Specialisation is About?,
8 The European Commission, Guide to Research and Innovation Strategies for Smart Specialisations (RIS 3)
9 The European Commission, Research and Innovation Strategies for Smart Specialisation
10 The European Commission, Innovation Union Flagship Initiative
11 McCann P, Ortega-Argilés R, Smart Specialisation, Regional Growth and Applications to EU Cohesion Policy
12 IRE Network, Bölgesel İnovasyon Stratejisi Hazırlama Kılavuzu
13 Foray D, David P.A. and Hall B, Smart Specialisation – The Concept
14 MARKA, the East Marmara Regional Innovation Strategy Current Situation Analysis Report Draft, 14.02.2013, Kocaeli.

EU INNOVATION STRATEGY AND GLOBAL COMPETITIVENESS

Slavica Rocheska [1], Olivera Kostoska [2], Marjan Angeleski [3], Gjorgji Mancheski[4]

[1]*Faculty of Economics – Prilep, Macedonia, sroceska@t-home.mk*

[2] *Faculty of Economics – Prilep, Macedonia, okostoska@t-home.mk*

[3] *Faculty of Economics – Prilep, Macedonia, angeleskimarjan@gmail.com*

[4] *Faculty of Economics – Prilep, Macedonia, gmanceski@t-home.mk*

The new strategic EU orientation defined within the Europe 2020 agenda highlights the relevance of strengthening its competitive position on the global market. Delivering sustainable competitiveness in the new multi-polar world requires the analysis of the advantages and potentials, in addition to weaknesses of the European system, as a basic precondition to project and properly forestall the changes in the competitive environment. Thereby, development of science, technology and innovations are considered driving forces to achieve the objectives. The forecasts of the prospective EU development are based upon the concept of innovation union. The evidence clearly indicates that EU lags behind the major competitors (US and Japan) on technological development and innovations, but relative to emerging economies (China), as well. The prospective changes have inevitably imposed a necessity for significant improvements of the framework conditions to boost innovations and structural changes as a prerequisite to achieving EU sustainable competitiveness. Therefore, this paper primarily aims at analyzing the new EU strategic directions to strengthen the innovation capacity as a precondition for attaining sustainable competitiveness in the global economy. Having in mind a complexity of the researched issues the paper will comprise some aspects of the interaction between innovation and competitiveness.

Keywords
EU, innovation strategy, competitiveness

1. Introduction

Nowadays, the EU faces a challenge to increase innovation capacity as a precondition for achieving sustainable growth and competitiveness on the global market. The new EU strategic directions are based upon the ambitious goal to maintain its position in the group of leading world economies. Several measures have been already undertaken in an attempt to modernize the EU economy. Since the adoption of the Lisbon strategy in 2000, the EU has opened a new page in its development agenda, with the goal to become “the most competitive and dynamic knowledge-based economy in the world”. The Lisbon strategy defines new landmarks of the EU policy focused on the “creation of an information society for

all, establishing a European area of research and development, developing a business-friendly start-up environment, completing the single market, establishing efficient and integrated financial markets, building a knowledge society, ensuring more and better jobs for Europe, modernizing social protection, promoting social inclusion and enhancing sustainable development“ (World Economic Forum 2010). Europe 2020, the strategy for “smart, sustainable and inclusive growth“, provides for a continuation of the Lisbon strategy. Namely, the Europe 2020 Strategy comprises seven flagship initiatives - Innovation Union, Youth on the move, A digital agenda for Europe, Resource efficient Europe, An industrial policy for the globalization era, An agenda for new skills and jobs, European platform against poverty. Most importantly, these seven pillars shape the new competitive framework of the EU. The essential part of the strategy is the Innovation Union Flagship Initiative aimed at fostering the EU’s innovation capabilities. The new innovation strategy strongly relies upon the concept of knowledge triangle, whereby the policy areas of research, innovation and education are integrated and their strong interdependence is acknowledged (Soriano and Mulatero, 2010). Hence, the policy makers have increasingly incorporated measures and mechanisms to support innovation as to be a principal commitment of the economic activity holders.

2. Comparative analysis of innovation performance and the external competitiveness

The Lisbon Agenda sets an ambitious objective, i.e. 3% of EU’s GDP to be invested in R&D by 2010. However, this goal has proved out of reach since the funds devoted to R&D have shown just a slight increase from 1.86% in 2000 to 2.00% in 2010.The EU27 innovation performance lags behind the major global competitors (US, Japan and South Korea). In accordance with the UNESCO statistics, the highest R&D intensity, among the G20 members, was recorded in South Korea (GERD amounts to 3.74 % of GDP in 2010), followed by Japan (3.36%), the United States (2.86%) and Australia (2.37%).

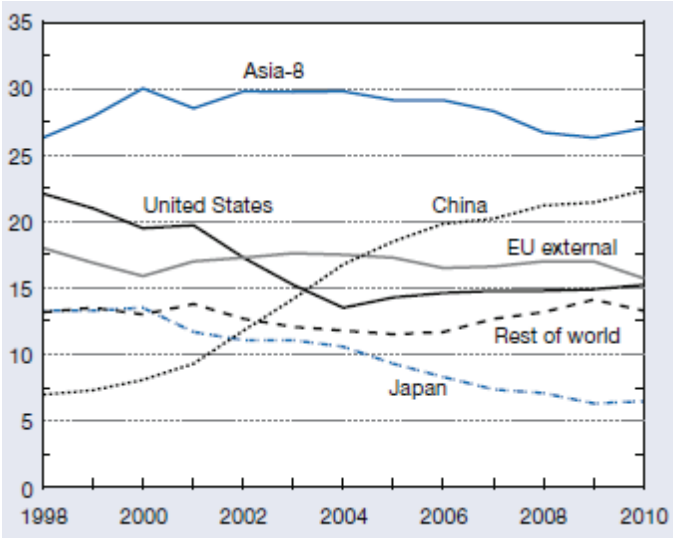
The rise of China in the world economy is closely related to strengthening its innovation performance and joining the group of innovation leaders. The China’s GERD reached up to 1.77% of GDP in 2010 whereas the business sector accounts for 72% of GERD (1.30% of GDP) (OECD,2012). This is enormous growth compared to 1996 when the China’s R&D/GDP ratio amounted to merely 0.6%. These developments are expected to continue since the China’s “innovation agenda” predicts a certain rise of R&D expenditures up to 2.5% of GDP by 2020. This would permit the country to transform itself to an innovation-driven economy. Or in wording of the European Commission "if the recent trends continue, in 2025, the United States and Europe will have lost their scientific and technological supremacy for the benefit of Asia." China, along with India and Japan, will get a leading position in the world with the 20 percent of total world investments in R&D.

Likewise, the EU is lagging behind as to the number of researchers and availability of highly skilled labor force. In 2008, the share of researchers in the total labor force was estimated to 6.3 researchers per 1000, compared to 9.4 in the US and10.7 in Japan. More than half (54 %) in the EU work for the public sector, and just about 46 % work for the business sector. The foremost EU economic competitors reveal much higher estimates about the number of researchers engaged in the private sector, e.g. 69 % in China, 73 % in Japan and 80 % in the United States (EC,2011)

Despite the fact that growth of the EU’s R&D&I activities has not been achieved with the expected dynamics, yet it still belongs to the world’s leading countries in the field of science, technology and innovation.

The EU is the largest exporter of commercial knowledge-intensive services (excluding intra-EU exports), which account for about 30% of the world’s total, followed by the United States

(22%) and Asia-8 (15%, mostly coming from India and Singapore). However, China becomes the world's largest exporter of the high-technology goods, followed by the EU and the U.S.(Figure1).



Source: *Science and Engineering Indicators 2012*

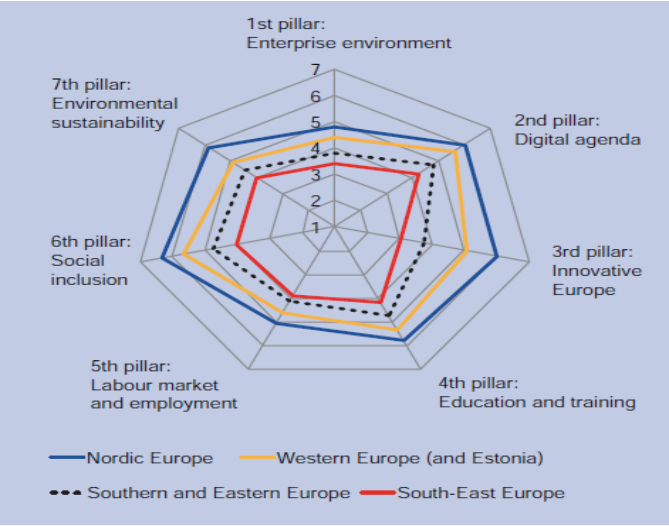
Figure 1 **Share of the global high-technology exports, by selected region/country: 1998–2010**

A research conducted by the Austrian Institute of Economic Research examines the economic complexity of the country and international trade patterns. The complexity score indicates capability of the country to produce products that contain high levels of accumulated knowledge and capability to produce products with different knowledge bases. The study points towards a higher level of competitiveness performed by the complex economies. The sectoral analysis exhibits a relatively high average complexity of the product categories where the European firms appear as one of the most significant exporters, while the average product complexity scores have been relatively stable at the sector level in the EU over the period 1995-2010. However, over the same period the BRIC countries, especially China, have upgraded the complexity of their business sector's output and they are getting closer in certain sectors to those in Europe. Thus the competitive pressure on European producers is likely to further increase. The EU has to increase the diversification and exclusivity of products across sectors so as to effectively cope with this pressure, but it has to upgrade the quality levels inside the existing product categories, as well (A. Reinstaller, W. Hölzl, J. Kutsam, C. Schmid , 2012).

The analysis made about the EU competitiveness based upon the World Economic Forum's methodology specifies that several of the "old" EU 15 members apply to the most competitive countries in the world, while the new member states exhibit much lower in the rankings (Bernd-Joachim Schuller, Marie Lidbom, 2009). At the same time, the highest-ranking economies, according to their competitiveness, are those EU Member States recording the greatest R&D intensities in 2010, e.g. Finland (3.87 %), Sweden (3.42 %) and Denmark (3.06 %) (Eurostat, 2012).

Figure 2 shows the difference in competitive performance of the Member States as measured by the seven indicators. The WEF report indicates that the "spread in performance across European countries is particularly stark in areas such as innovation, where a three point gap (on a scale of one to seven) separates the best from the worst

performer"(WEF,2012). Therefore, the countries recording a low level of R & D intensities are found at the bottom of the competitiveness ranking.



Source: World Economic Forum[1]

Figure 2 **Competitiveness profiles of the four European groups**

3. Towards more competitive Europe

The above analysis clearly points toward the necessity for the EU to undertake further efforts so as to improve innovation and knowledge intensity as the basic preconditions for the possibility to effectively cope with the competitive pressures, as well as to achieve a sustainable competitiveness.

The evidence available suggests that R&D expenditure has a multiplier effect on GDP-every euro invested in R&D generates 6 to 7 euros of GDP.2 The possibility to increase the R&D intensity up to 3% of GDP by 2020 is therefore expected to significantly boost the EU's growth. At the same time, the target projected about the R&D intensity is going to enable EU to remain in the list of the world's leading economies since its major competitors have also projections about the significant increase in R&D spending. Thus, China intends to increase the R&D spending up to 2.5% of GDP by 2020, South Korea 5% by 2022, Brazil 2.5% by 2022 and the USA over 3% of GDP (The Royal Society, 2011).

Additionally, the EU has to improve the overall "knowledge intensity" including all the components of the Knowledge Triangle - R&D, innovation and education, as the focal point of the Europe's future economic and social development. Namely, the proposed target of 5% investment in "knowledge intensity" is to be achieved by 2020. It combines R&D and the

[1] *Nordic Europe*, composed of Sweden, Finland and Denmark
Western Europe (and Estonia), composed of the Netherlands, Austria, Germany, United Kingdom, Luxembourg, Belgium, France, Estonia and Ireland
Southern and Eastern Europe, composed of Slovenia, Portugal, Spain, the Czech Republic, Cyprus, Malta, Latvia, Lithuania, Italy, Slovak Republic, Poland and Hungary
Southeast Europe, composed of Greece, Romania and Bulgaria.

[2] How to turn the EU into an innovation Union: Europe needs a wake-up call

higher education expenditure/investment. “It is important to note that the 5% target does not render the 3% target invalid; rather, it reinforces the effectiveness and impact of the R&D investments by supplementing them with investments in higher education.”(EC,2009)

In this context, the EU has to induce certain investment in the higher education (currently comprising only 1.4% of GDP) as considered to be significantly lower than the USA (3% of GDP). Although direct support for producing new knowledge and innovation is an important aspect of innovation policy, yet it is not sufficient to effectively respond the severe competitive pressure. Therefore, the EU needs to overcome the supply side approach in innovation policy based upon supporting innovation by public and private resources. This “one-way” approach in designing innovation policy should be complemented by the demand-side measures. Demand-side innovation policies are important policy instruments aimed at increasing the demand for innovations, improving the conditions for the uptake of innovations or increasing the articulation of demand (Edler, 2007). The recent research indicates that innovation policy is “increasingly more broad-based and combines different kind of policy instruments to address a specific challenge, theme or sector with increasing emphasis on a user-driven approach”. (K. Izsak, J. Edler, 2011). This approach requires innovation policy to be integrated with the industrial policy. In this context, the new EU industrial policy highlights the importance to achieve innovative competitiveness of the industry. “The concepts of innovation and industrial policy are converging: both are now following a demand-driven approach, the strategic approach is a common aspect, and both are instrumental for competitiveness and serving or linking other policy fields. Policy drivers for both policy fields include European integration, standardization, good governance and framework conditions”. (European Parliament, 2011).

4. Conclusion

Facing with the growing competition in global economy, the EU needs to strengthen its efforts so as to create a knowledge-based economy. The European Strategy 2020 provides for a new competitive framework based upon the promotion of knowledge intensity as an essential precondition for boosting the economy’s long-term growth. However, despite the attempts to intensify the R&D&I activities and the clearly defined strategic guidelines, the EU has revealed a slower pace in the innovative performance as compared to the main competitors-the U.S., Japan, China, South Korea. Therefore, the new policy concept is to be focused on promoting measures that will reinforce structural changes based on significantly improved innovation performance. This certainly points toward the increased complementarities of innovation- and the industrial policy. Likewise, the new EU innovation landscape is to be created by conceptual shifts of the innovation policy including the synergy between the supply-side and the demand-side approach. The new approach of the innovation policy is going to support the Europe’s transformation towards a knowledge-based economy and it is expected to effectively respond the long-term challenges.

Bibliography

1 Bernd-Joachim Schuller, Marie Lidbom, Competitiveness of Nations in the Global Economy. Is Europe Internationally Competitive? Economics and Management, 14, 2009
2 Next generation innovation policy, The future of EU innovation policy to support market growth CEPS, Ernst &Young
3 Edler J. (2007). Demand Based Innovation Policy. Working Paper 9, Manchester Institute of Innovation Research
4 Edler, J. (2009), Demand Policies for Innovation in EU CEE Countries, The Workshop Innovation for Competitiveness INCOM, Prague

5 Kincsö Izsak, Jakob Edler, (2011), Trends and Challenges in Demand-Side Innovation Policies in Europe, www.technopolis-group.com
6 European Commission, Innovation Union Competitiveness report, 2011 edition
7 European Commission, A Knowledge-intensive future for Europe, Expert Group Report, 2009
8 World Economic Forum, The Europe 2020 Competitiveness Report: Building a More Competitive Europe, 2012
9 Innovation and Industrial Policy, Policy Department Economic and Scientific Policy European Parliament, Fevruary 2011
10 Andreas Reinstaller, Werner Hölzl, Johannes Kutsam, Christian Schmid The development of productive structures of EU Member States and their international competitiveness, Final report, Austrian Institute of Economic Research (WIFO), Vienna, 2012
11 National Science Board, Science and Engineering Indicators 2012, Arlington 2012, USA
12 How to turn the EU into an innovation Union: Europe needs a wake-up call
13 Albert Bravo Biosca, New evidence on 'creative destruction' in Europe and the US, Innovation: How Europe can take off, Edited by Simon Tilford and Philip Whyte, Centre for European Reform, 2011
14 Eurostat, Statistics in focus, 1/2013
15 European Union, 2012, Innovation Union Scoreboard 2011
16 Eurostat, The EU in the world 2013, A statistical portrait
17 OECD Science, Technology and Industry Outlook 2012: China
18 Robert Stehrer, Convergence of Knowledge-intensive Sectors and the EU's External Competitiveness, Vienna Institute for International Economic Studies (wiiw), Research report, April 2012
19 Knowledge, networks and nations: Global scientific collaboration in the 21st century The Royal Society, 2011, Policy document 03/11

A REGIONAL INNOVATION STRATEGY: R&D PROJECT BROKERAGE EVENTS IN BURSA AND ESKİŞEHİR

Dr. Mehmet Sait Cülfik[1], Adem Bölükbaşı[2]

[1]BEBKA (Bursa Eskişehir Bilecik Development Agency), Buttim Plaza 6th Floor, Osmangazi/Bursa, Turkey, mehmet@bebka.org.tr

[2]BEBKA (Bursa Eskişehir Bilecik Development Agency), Buttim Plaza 6th Floor, Osmangazi/Bursa, Turkey, adem.bolukbasi@bebka.org.tr

As a factor of competitive advantage, r&d and Innovation strategies are of central importance for the attainment of sustainable regional development. For this reason, r&d project brokerage events are unique opportunities especially in competitive industrial regions to bring together innovative business ideas and entrepreneurs at the same platform. In this paper, we primarily tried to make a general sketch of BEBKA's (Bursa Eskişehir Bilecik Development Agency) r&d and Innovation policies through its 2010-2013 Regional Plan and its industrial incentive programs. Based on this general policy, we focused on r&d project brokerage events carried out in Bursa and Eskişehir with the support of BEBKA. Our purpose is to show descriptively what kinds of technological developments are introduced in these events and quantitatively using statistical data in what percent these events are successful in bringing together the relevant parties, focusing specifically on two sectors; textile and ceramic. It is found that these r&d project brokerage events are increasingly gaining importance in following developments in textile and ceramic sectors which are competitive industries of the region. We also found that these events have positive implications about cooperation between public and private sectors and universities. However, we mentioned, as a limitation, some difficulties about the realization of project-based cooperation among those parties. To conclude, we made some policy recommendations about the method and content of these events to increase its influence in those sectors.

Keywords: Innovation, R&D, Regional Development, Textile and Ceramics Industries.

1. Introduction

R&D and Innovation have a very central importance in regional development policies. In Turkey, R&D project brokerage events are generally arranged by exporter unions, universities and some other public institutions. The main goal of these events is to match successful and innovative projects with the firms in relevant sectors or new entrepreneurs. Thus, these events serve as a meeting platform for innovative ideas and enterprise. R&D is a problematic area in Turkey because of the institutional and financial deficiencies. Therefore, these deficiencies make these events more important than ever because by virtue of these events public authorities and entrepreneurs can see the shortfalls and needs in R&D and innovation policies in theory and practice.

Table 1: R&D Spending in Turkey

	The share of R&D spending in GDP (average of the highest 15 country) (2009)	Turkey (2010)	Turkey - 2023 Goals
The share of R&D spending in GDP (%)	3,03	0,84	3,00
The share of private sector R&D spending in GDP (%)	2,10	0,36	2,00

Source: TÜİK, TÜBİTAK, OECD-MSTI 2011/1

Table 1 shows us the level of R&D spending in Turkey and in the highest 15 country. According to these data, Turkey's R&D spending level is very low relative to the highest OECD countries. [1] For this reason, R&D Project Brokerage events arranged and funded by development agencies, exporter unions and chambers of industry are very crucial opportunities in reaching to 2023 goals of Turkey. In this paper, we will try to propose a more integrated and operative model for both parties involving in these events in terms of the formation and implementation of the projects presented in these events. Concrete policy recommendations about this model will be presented in conclusion part. First we try to state BEBKA's general policies and financial support programs for R&D and innovation to understand the role of R&D project brokerage events in this general framework.

2. BEBKA's General Policies and Financial Support Programs for R&D and Innovation

One of the BEBKA's development axis in 2010-2013 Regional Plan is "Industrial Efficiency and Competitiveness". In accordance with the national plans and programs and other sectoral policy documents, this development axis aims at increasing the efficiency and competitiveness of the industries in TR41 Region. In this context, BEBKA defined 4 main goals and 2 aims for each main goal.

Table 2 BEBKA's Goals and Aims for Industrial Efficiency and Competitiveness

Industrial Efficiency and Competitiveness	GOAL 1. Increasing Efficiency with the institutionalization and cooperation in industrial production	Aim 1. Increasing the institutionalization level of SMEs and other family firms and dissemination of the use of new information technologies.
		Aim 2. Promoting the integration of local clusters with outside world by developing the cooperation among the actors in these clusters
	GOAL 2. Increasing industrial competitiveness with the promotion of industrial R&D and Innovation	Aim 1. Increasing the number of institutions, cooperative businesses and other new bodies which can promote r&d and innovation
		Aim 2. Increasing the number of new developed products, utility model, industrial design and patent
	GOAL 3. Increasing competitive power and efficiency by supporting	Aim 1. Increasing the number of enterprises and entrepreneurship by supporting the activities towards innovation and branding

	branding and entrepreneurship activities	Aim 2. Enhancing the investment climate and increasing the investment promotion activities.
	GOAL 4. Increasing the industrial production with high added value	Aim 1. Increasing the percentage of products in industrial production which have high added value.
		Aim 2. Increasing the added value of existing products.

Source: BEBKA TR41 2010-2013 Bursa Eskişehir Bilecik Bölge Planı

In Table 2 we can easily observe that the 2nd goal (r&d and innovation) is one of the indispensable goals in achieving the industrial efficiency and competitiveness. [2] Besides, we can say that the other three goals are problems which are not very prominent in developed economies, but this 2nd one is a worldwide need for developing industries to open up innovative ways for various industries. BEBKA's these goals and aims within the axis of industrial efficiency and competitiveness have also shaped the financial support programs in 2010 and 2011. In 2010, BEBKA takes 241 projects from three cities (Bursa Eskişehir Bilecik) as a part of the financial support program about industrial efficiency and competitiveness. This program includes various r&d and innovation projects in different sectors of the region. Similarly 161 projects have been taken as a part of the financial support program in 2011 about r&d and innovation. In 2010 47 projects and in 2011 29 projects are accepted by BEBKA respectively and these projects are implemented in TR41 region. [3]

This method of call for projects is the conventional way of picking the best projects up within a competition process. However, we can say that this method is not operative at all. On that point alternative mechanisms come in and try to become more operational in choosing and implementing r&d and innovation projects. Then we can evaluate project brokerage events as one of these alternative mechanisms in TR41 Region. BEBKA tries to promote this type of alternative mechanisms in cooperation with ESO (Eskişehir Chamber of Industry) and UTİB (Uludağ Textile Exporter Unions). In the next part we will explain the content and scope of these events currently and we make a proposal for the enhancement of these events.

3. The Cases of Bursa and Eskişehir Project Brokerage Events

3.1. Esinkap Project Brokerage Events

Esinkap is an acronym for the Turkish expression of the project of capacity building for Eskişehir innovation strategies. Esinkap is a national r&d project brokerage event which is held in different sectors such as metal machinery, rail systems, informatics or ceramics. It has been arranged for the 6th time in the year.2012. It has been arranged by ESO and BEBKA. It has been supported by TTGV(Turkey Technology Development Foundation), TÜBİTAK (Turkey Scientific and Technological Research Institute) and other relevant institutions since the year 2009. BEBKA has also been involved in these events since the 3rd r&d project brokerage event with its financial support. The last event has been arranged under the title of "ceramic, glass and baked clay". The main goals of these events may be stated with three points;

- Developing networks for business cooperation
- Developing r&d and innovation policies
- Developing human capital

These three points are very important for the strategies of these events. [4] Esinkap has also a comprehensive communication plan before the organization. Organizing committee forms an advisory board consisting of the key players from public and private sector, university and media. They perform the whole process in cooperation with this advisory board. Project brokerage event's online platform www.esinkap.net serves as the meeting point for participants.

When we look at the table we can see the problem about the possibility of project partnership. This can be evaluated as the lack of a sustainable platform for the realization of these projects. This may be explained partly by the lack of financial support and partly lack of an organizational deficiency. Forasmuch, creating project partnerships is not an easy work because these projects have to be developed to turn into a partnership for the firms and project owners according to the needs of different industrial cases. Therefore, this requires a long and difficult endeavor for organizers.

Table 3 ESO Project Brokerage Events Data

Projects & Partnerships in Numbers	2011 Event 3	2012 Event 4	2012 Event 5
Total Number of meetings about projects	90	26	34
Number of the possibility of project partnership	13	-	-
Total Number of Participants	450	422	247
Total Number of Projects	136	54	36

Source: www.esinkap.net

3.2. UTİB Textile Project Brokerage Events

UTİB has arranged an international project brokerage event since the year 2009. They try to bring together textile producers and exporters in Bursa where is a significant textile center of Europe. It has been arranged for the 4th time in the year 2012. It has been arranged by UTİB, BTSO (Bursa Chamber of Commerce and Industry) and BEBKA. It has been supported by several national and international research institute and university. BEBKA has also been involved in these events since the 3rd r&d project brokerage event with its financial support. Organizing committee of the event is BUTEKOM(Bursa Textile and Confection R&D Center) which is a r&d unit within UTİB. The main goals of these events may be stated with three points;

- Transformation of textile sector towards innovative technologies
- Providing the sustainability of textile export
- Enhancing the qualities and standards in textile sector
- Developing new r&d and innovation policies
- Supporting the use of cost effective new technologies

These goals are very strategic for the development of the competitiveness of the textile sector in the region. [5] BUTEKOM organizes project brokerage event with all relevant parties taking advisory support from academic authorities in the sector. BUTEKOM's organizing committee are always in contact with the pioneering firms in the sector naturally because those firms are already members of UTİB. They perform the whole process in cooperation with this advisory board. Project brokerage event's online platform

www.uibargeprojepazari.com/ serves as the meeting point for participants. In recent years, this event tries to encompass different stakeholders of textile sector such as technoparks, some important r&d centers, research institutes and representatives of industrial firms involving in r&d activities. UTİB call for project usually accepts r&d projects under these topics:

- Construction Textiles
- Automotive Textiles
- Geotextile and industrial textiles
- Other textiles (conventional and other technic textiles)
- Graduation theses, master theses and doctoral dissertations implemented in industry

When we look at the table we can see that the possibility of project partnership is better than the case in Esinkap. However, only the numbers may be misleading because these numbers express the possibility but there are no concrete projects that creates partnership in industry in UTİB'S events either. We will make some policy recommendations about this deficiency in conclusion part. As we stated above in the case of Esinkap, the reasons for this lack of the partnership of projects can be rooted in financial and organizational reasons.

Table 4 UTİB Project Brokerage Events Data:

Projects & Partnerships in Numbers	2010	2011
Number of Declared Project Partnership	10	20
Number of the Possibility of Project Partnership	-	10-15
Total Number of Participants	500	1600
Total Number of Projects	81	144 (56 of them are foreign projects)

Source: www.uibargeprojepazari.com/

We can say that there are several important industrial clusters in TR41 Region such as textile, automotive and furniture in Bursa, ceramic, rail systems and aviation in Eskişehir, and ceramic and marble in Bilecik. We can suggest specialized international project brokerage events for all these clusters especially for textile and ceramic clusters because ceramic is a common industry for Eskişehir and Bilecik in TR41 Region. On the other hand, Bursa has already succeeded in internationalizing textile project brokerage events especially in new innovative textile technologies but it has also a need to be developed in terms of the project partnerships and financial sustainability of funding of these projects. TR 41 Region represents %12 of Turkey in terms of the number of firms and %10 in terms of the employment. Furthermore, textile exports constitutes %21.5 of Turkish exports.

Ceramic industry is also a prominent sector especially for Eskişehir and Bilecik. In TR41 Region, %47 of the employment in the industry of products other than metals (predominantly ceramic, cement, glass, etc.) is in Bilecik and %31 is in Eskişehir. As we stated above Eskişehir and Bilecik has a clustering advantage in EBK (Eskişehir Bilecik Kütahya) ceramic cluster. Additionally, Eskişehir and Bilecik will have a logistical advantage thanks to the high speed railway system and Bozüyük Gündüzbey logistic center. In these circumstances, project brokerage events can focus on these two competitive sectors of the region.

3. Conclusion and Policy Recommendations

After all these considerations about the current situation and our proposal for the industrial cluster in the region, we can mention our policy recommendations. These suggestions can be classified under three groups;

- Organizational Dimensions
- Financial Dimensions
- Human Capital Dimensions

3.1. Organizational Dimensions

When we look at the organizational dimensions we can mention some points to be improved about these project brokerage events.

- It should not become a solely academic platform (such as a symposium) but scientific innovations should become concrete projects by means of these events.
- The view of the private sector about these events must be upgraded by making these events as a platform for innovative entrepreneurship than an academic activity.
- Public sector, private sector, university and other relevant parties should be represented equally. Event should not turn into the activity of one or two of them
- Each firm or institution should provide high profile participation in these events.

3.2. Financial Dimensions

We can say that an alternative financial model should be developed regarding financial dimensions of these events. For example;

- A financial pool can be formed by some state funding agencies (such as KOSGEB, Development Agencies, TÜBİTAK etc.) tu support the implementation of innovative r&d projects.

- This call for projects can be integrated into the project call processes of other funding public agencies. Thus, these projects can be revised and developed according to the needs of other parties.

- Phd candidates can also be integrated into this process both to make this process more dynamic and to provide scholarship for Phd candidates' education.

3.3. Human Capital Dimensions

As regards human capital dimensions we can enlist some significant points;

- These events should have a dynamic communication strategy before and after the event to create a sustainable communication among relevant parties.
- Each event should have
- Bodies (such as Sangem and Butekom) should be enhanced and supported in terms of human capital in cooperation with other institutions involving in these activities.

- Some entrepreneurs, academics should be called to these events and presented as role models for other participants. They should take part in something like an honorary board of the event.

References

1 TÜBİTAK, "Ulusal Yenilik Sistemi 2023 Yılı Hedefleri", http://www.tubitak.gov.tr/tubitak_content_files/BTYPD/BTYK/btyk23/2011_101.pdf Ankara: 2011; 19.02.2013.

2 BEBKA, TR41 Bursa Eskişehir Bilecik Bölge Planı (2010-2013) Bursa: 2010; 210 - 214.

3 www.bebka.org.tr

4 www.esinkap.net

5 www.uibargeprojepazari.com/

USING PRE-COMMERCIAL PROCUREMENT AS A DRIVER OF INNOVATION FOR THE REGIONAL PUBLIC SECTOR: THE CASE OF GREECE

Lefteris Antonopoulos[1], Elpida Samara[2], Chrysostomos Stylios[3], Ioannis Bakouros[4]

[1]*University of Strathclyde, Glasgow, UK*

[2]*University of West Macedonia, Sialvera & Bakola, Kozani, Greece,*

[3]*TEI of Epirus, Greece*

[4]*University of West Macedonia, Sialvera & Bakola, Kozani, Greece*

This article studies pre-commercial procurement (PCP) as a driver of innovation for public bodies and provides policy recommendations for the effective proliferation of PCP in Greece. Two main research methods were employed in this study. First an in-depth literature review focused on pre-commercial procurement and the relevant to it EU policy developments. Second fieldwork research based on semi-structured interviews with key stakeholders in a Greek region, namely West Macedonia, was undertaken to identify regional responses on PCP and assess the overall state of progress of the region and Greece in relation to the rest of the EU. The literature review reported a significant impact of PCP on the mid- to long- term efficiency of public services as well as on the innovation performance and competitiveness at regional level. The empirical findings of West Macedonia point to a more limited influence of increased awareness. Further uptake of PCP can be facilitated through an overhaul of oppositional institutional structures and targeted interventions of EU funds. The empirical part rests on the single case study of West Macedonia however the findings are generalisable to a regional level. Practical implications of PCP processes include assisting Greek regions deliver innovative public services, and induce structural adjustments to secure growth and jobs. This article is the first to report on preparedness for PCP in Greece and provide policy recommendations for integrating PCP in regional innovation policy-making.

Keywords
Greece, Innovation policy, Pre-commercial procurement, Regional public procurement

1. Introduction

Public bodies in the EU face important societal and financial challenges. There is a requirement for the regional public sector to exploit its budget, to impel innovation and growth in order to provide innovative public services. Public sector's needs require technologically demanding improvements that are either not available on the market, or existing solutions exhibit shortcomings which require new R&D. By looking for procurement strategies that address these challenges, the public sector can have a significant impact on the mid- to long-term efficiency of public services as well as on the innovation performance and competitiveness at regional level.The combined need to enact effective remedies for current societal challenges and secure an innovative competitiveness lead for the future has forced Western and EU governments to rethink their innovation policy mix. Demand-side instruments at the disposal of policy-makers comprise (i) systemic policies, (ii) regulation, (iii) public procurement, (iv) stimulation of private demand (1). Other scholars add university

knowledge spillover, and R&D subsidies to the instruments available (5) but there is a wider consensus about public procurement and regulation being demand-side instruments.

This paper examines pre-commercial procurement, a particular form of public procurement for R&D services. It describes how the concept is defined in the academic and policy literature and gives particular emphasis on the approach put forward by the European Commission. In addition, it presents the benefits of PCP for the state sector, firms as well society and delineates pitfalls to avoid along the way of its implementation. The methodology of a case study in the Greek region of West Macedonia is discussed, followed by the empirical findings from the region in the context of wide-ranging procurement reforms under the EU-IMF-ECB adjustment programme. Finally, the article provides a number of policy recommendations for the successful participation of Greek public entities in PCP schemes.

2. Literature review on PCP

Economic rationales based on market and system failures stress that supply-side innovation policy is, on its own, insufficient to serve policy objectives (1). any instruments affect innovation. The scale and characteristics of demand in a location are a determinant of competitiveness and innovation dynamics (2). The existence of a large group of innovative actors and enabling framework for learning-oriented interactions are central aspects from an innovation systems perspective. The need to optimise the interaction of the system components and demand and create innovation-friendly framework conditions are essential determinants of the success of innovation systems. Regulation, standards and the concept of promoting lead markets, which can be served through public procurement, are indispensable ingredients of demand side innovation policies (1).

Numerous studies have shown the comparative merits of public procurement. It has been suggested that public procurement provides a greater stimulus for innovation than R&D subsidies (3). An analysis of the quantitative and qualitative meaning of state demand concluded that procurement policy '*is a far more efficient instrument to use in stimulating innovation than any wide range of frequently used R&D subsidies'*(3). In addition, a comparison of R&D subsidies and state procurement contracts without direct R&D procurement has shown that in the long run state procurement prompted greater innovation tendencies in more areas than R&D subsidies (4). Research attests that the major positive effects of public procurement on innovation success may depend on firm characteristics. Research on German firms found heterogeneous effects of public procurement on firms' innovative performance, Public procurement was more effective in smaller firms, in regional areas under economic stress and in distributive or technological services (5).

Some critical views on the role of public procurement as a policy instrument that can be used to stimulate innovation have also been expressed. Public procurement has been portrayed as the least important factor for the origin of innovations (6). Moreover, despite emphasis on the demand-side in the literature, reception of such approaches has not been equally popular with policy-makers and some policies appear to be serving contradictory goals. For instance, the introduction of stricter competition rules in the EU has been considered a major factor behind the declining use of public procurement for innovation (1). Scholars recognise other risks associated with R&D procurement such as the risk of idiosyncratic demand for R&D products, the risk of R&D failure and the under-researched role of public procurement as a tool to enhance innovation and make firms more successfull (5).

Although criticism exists, public procurement remains 'the cornerstone of a coordinated and technology or sector-specific mix of policies' (1). As a public policy tool procurement is used (i) to provide and enhance the supply of public services and (ii) to serve political goals by

stimulating demand (5). The use of innovations by the government sends positive messages to the private sector and facilitates the dissemination of innovations. Interaction between demand and supply has crucial implications for innovation dynamics. A main task for systemic innovation policy is the opening of a discourse involving, users, consumers and others affected by innovation (1). An alternative approach draws parallels between public procurement for innovation and the older concept of public technology procurement, and locates the rationale in the generic need to satisfy human needs and solve societal problems but also meet needs of public agencies themselves; it stresses that Public Procurement for Innovation (PPI) can address aspects of greater societal challenges (7). Procurement is categorised in antithetical poles as (i) general versus strategic, (ii) direct versus catalytic and (iii) commercial versus pre-commercial, without the antithetical couples being exactly watertight (1). General procurement is carried out by centralised procurment bodies with recent trends showing some form of 'mainstreaming' of innovation (at least in the UK). On the other hand, strategic procurement is focusing more on sectoral concerns and catalytic procurement, with an aim to establish lead markets, is an approach pioneered in Sweden which comprises awareness raising measures, organised discourse between users and the state but sees the purchased innovations ulimately used exlusively by the private end user.

Beyond the instrumentalised view of procurement as a vehicle of innovation, public procurement in the EU is a subject of sheer economic importance. Public procurement accounted for almost 20% of EU-27 GDP in 2010 (8). However, the lack of R&D procurement contributes to a sizeable amount of the EU's R&D gap with the USA. The situation has prompted EU member states to consider a more proactive procurement policy for innovation both at the national and EU level. Some member states have followed a more structured approach and in general the EU has also moved towards a more structured position on innovation procurement. The UK was an early starter in terms of innovation procurement with a government report stressing the increasing research and innovation impact of public procurement as early as 2003 and the NHS and DEFRA procurement being prominent operative-level cases. Likewise Ireland and Spain have made similar moves while Germany followed a more cautious approach by examining the prospect of encouraging innovation dynamics from the marketplace through general strategic procurement (1).

At the EU level, in 2004 a common report from French, German and UK governments supported the use of procurement to stimulate innovation. The subsequent 'Kok report' again saw procurement as a vehicle to 'pioneer markets for new research and innovation-intensive products'(9). The 2005 European Council focused on growth and jobs and prompted member states to reaffirm their attention to the procurement of innovative products and services. The European Commission assigned an expert group to study issues of procurement and innovation (10) and issued a research investment action plan to meet the target of 3% R&D expenditure. Subsequent action involved the dissemination of information to public buyers and 'initiative to set procurement in the broader context of policy mixes thereby exploiting synergies with other research and innovation policy measures'(1). Aho *et al* built up a momentum for the use of procurement for innovation that showed the limits of the R&D-driven strategy and recommended using public procurement to boost demand for innovative goods and explore further opportunities of using procurement for innovation and growth in new lead markets (11, 12). The report focused precisely on (i) creation of innovation-friendly markets, (ii) strengthening R&D resources, (iii) increasing structural mobility, (iv) fostering a culture that celebrates innovation. Seven key sectors for intervention were identified: e-Health, Pharmaceuticals, Energy, Environment, Transport and Logistics, Security, and Digital Content. The 2006 Finnish presidency of the Council emphasised demand as a driver for innovation and examined horizontal measures to stimulate the first. More concrete developments were triggered at that juncture as the EU initiated studies on public procurement and the European Commission issued a policy paper that underlined the

importance of public procurement for innovation and the creation of lead markets especially in fields of significant government purchasing.

The initial work on PCP was undertaken by an independent expert group assisting the ad hoc national IST directors forum working group which gathered information of underutilisation of R&D in Europe (13). The idea discussed at EU level was modelled on US approaches that have been implemented for many years by US multi-stage and multi-competitor R&D programmes in defence, energy, transport, and Small Business Innovation Research (SBIR) (1). In December 2007 the European Commission issued a communication and working paper on pre-commercial procurement which outlined the barriers to PCP and included an example of PCP procedure. Following policy dialogue with other EU bodies the first calls for EU projects raising awareness for PCP were published in the end of 2008 (14). A 2008 study for the Commission on the opportunites for public technology procurement in ICT including PCP showed how PCP had been underutilised in the EU for sharing IPR with suppliers and the development of parallel solutions (11).

2.1. Defining Pre-Commercial Procurement

PCP is the phase of procurement that concerns the R&D phase before commercialisation. Its scope is limited to R&D services only, while risks and benefits are shared at market conditions between public authorities and industry. PCP can involve the designing, prototyping and testing of new products. It is a competitive process designed to exclude state aid (15). However, the official definition given by the European Commission differs from the process followed in practice by the EU. It is noted that PCP schemes cover phase 1 to 3 of the innovation cycle from solution exploration definition to the production of test series and field-testing just before the commercial stage (16).

However, doubts have been expressed about the demand-side nature of PCP. One of these accounts distinguishes PPI from PCP and considers the latter not a demand-side innovation instrument but a supply-side R&D contract and suggests that the older term pre-competitive procurement should be prefered to describe the phenomenon (7, 17). Nevertheless the discussion at the EU level seems settled around the premises that PCP is a mutual learning process for procurers, users and suppliers, both about the functional needs on the demand-side and capabilities and limitations of new technological development on the supply side (16, 18). The EU also stresses the complementarity of PPI and PCP while for the OECD PCP seems to be crucially a demand-side innovation policy instrument (14,19).

2.2. Features of PCP

Particular advantages of PCP for the procurer are the freedom of selection and definition of the desired R&D services and the interaction with the suppliers. This relates the justification for PCP, as R&D-intensive procurement requires more intensive interaction and cannot be concluded on the basis of written specifications and proposals. Competition rules are satisfied when at least two competitors enter the field-test stage. An additional advantage of PCP is that innovation risk at procurement is reduced since it takes place more upstream from the procurement. The innovation risk of PCP can be reduced through the parallel award of multiple R&D contracts and the gradual verification of the optimal solutions based on interim evaluations and selections (20). Innovative solutions have the potential to enhance the quality of public services delivery in IT-related fields such as e-Government, e-Health and e-Education. Besides the supplier gains a boost in public reliability from large orders by reliable public authorities (5). PCP as a form of procurement offers a number of benefits to the market. It can stimulate local demand which is a key determinant for the competitive

advantage (2); and through the promotion of lead users it establishes lead markets (21); and it is an effective means of targeting market and system failures (1). Experts suggest that national governments in Europe should exploit every opportunity to share risks and benefits of promoting novel services with the providers, as 'a European dimension on pre-commercial procurement would build critical mass on the demand side, stimulate competition and exploit economies of scale and scope for the benefit of innovative services' (22).

PCP itself constitutes an additional challenge for procuring government bodies. Agencies procuring innovations may face public obstruction when suppliers from abroad win the contract and when novel technologies do not provide immediate returns. The administrative cost of engaging in PCP schemes, co-ordinating the large number of stakeholders involved, overseeing and monitoring overly technical PCP stages is also a potential disincentive for procuring agencies. Organisational change and learning is a prerequisite for involvement with novel processes. In leading PCP countries these issues have been addressed through embedding inter-ministerial coordination in the procurement process and a cultural approach of systematic orientation towards innovation, which is served through the bundling of competences. In the current climate of economic downturn enterprises and lending institutions remain highly risk-averse and the implementation of financial adjustment programmes has not been spearheaded by emphasis on innovative procurement.

Furthermore market failures due to information asymmetries and system failures due to poor interaction explain why the successful execution of PCP schemes relies on seamless inter-departmental coordination. However the tools employed for increasing guidance and awareness during early encounters with PCP processes cannot indicate the trends of future performance. A key is to define early on which markets and technologies to tackle and use foresight strategies between procurers and users (1). The conventional wisdom of lowest initial cost rationale for most economically advantageous tender (MEAT) does not lend itself to the inducement of innovation and tenders should be defined based on functionality rather than design and tender submissions assessed according to life-cycle costs.

Based on the CORDIS data EU member states are grouped in three categories with regard to the diffusion of PCP processess: (i) frontrunners, (ii) followers and (iii) laggards. The *first category* comprises EU innovation leaders such as the UK and the Netherlands, Nordic countries and other major European states (Germany, France, Italy). Partners for the four PCP projects co-financed by the EU through FP7 (CHARM, SMART@FIRE, V-CON and SILVER) are drawn from the same pool of countries. The *second group* consists of countries that are working on the framework of PCP or are preparing pilots. A common characteristic (except Ireland) is that their GNI is less than 90% of the community average and are eligible for Cohesion fund support. Hungary stands out here as it is the first of the 2004 EU Enlargement countries to investigate the feasibility of incorporating PCP in the Észak-Alföld Regional Operational Programme and prepares to launch a PCP pilot. *Lastly* eleven countries still in an awareness raising phase form a sizable group with representatives mainly from the South and Eastern Europe, which find themselves in a less favourable economic position characterised by structural and cultural barriers to innovation and PCP in particular. On the basis of the innovation decision process (23) the last group of countries are in a knowledge or persuasion stage, the intermediate group is in a decision stage and the first group in an implementation or confirmation stage. However it should be noted that the adopters groups are not internally homogeneous especially with respect to different sectors and that the categorisation constitutes ideal type construction.

The European Commission has followed a proactive stance with regard to PCP and co-finances the creation of cross-border procurer public networks at 100% through the 7th Framework Programme for Research (FP7) and the Competitiveness and Innovation Programme (CIP) (24). The first calls for proposals on networking for PCP opened in 2009 and in the 2011-12 work programme for ICT, EU supported joint PCP proposals; and there

are ongoing calls promoting PCP. Furthermore EU regions can apply for structural funds support for PCPs(24). The Commission's proposal for Horizon 2020 introduces PCP in all areas of research and innovation (25). EU support groups of procuring entities from the member states and EU funding bodies can engage in PCP with groups or individual member states. Lastly, the new EU public procurement directives for government authorities and utilities currently under legislative process maintain the exemptions for R&D services which form the legal basis for PCP as was also the case with the defence procurement directive which was revised in 2009 (26).

3. The methodological approach

Two main research methods were employed in this study. First desk research undertaken from September 2012 to January 2013 focused on a thorough literature on pre-commercial procurement and global best practices. Second, taking into account the desk research results fieldwork was carried out for the case study of West Macedonia. In West Macedonia twenty semi-structured interviews with key stakeholders were conducted in November 2012 broadly based on pre-identified themes and concepts which were developed by the Andalusian Institute of Technology in the framework of IKTIMED phase 3.3. Purposive and availability sampling was used to select (i) procurement departments of organisations covered by public law, (ii) local businesses –suppliers and (iii) research institutes consultancies and RDAs. The responding institutions are listed in Table 1. The fieldwork study provided empirical evidence on the status of implementation of innovative pre-commercial procurement measures at the regional level in the case study. A qualitative data analysis approach was followed both for fieldwork interview material, notes and documentary resources. Methodological constraints encountered were the self-reported and subjective assessments. Scarce previous research containing outputs on Greece makes triangulation of empirical findings more difficult as for example a very rare EU survey on PCP received only partial replies from Greece (27). To resolve the issue, detailed definitions and examples were used to increase response accuracy as suggested in the literature (5). Future research may face difficulties in measuring outputs of innovation activities for PCP.

Table 1 Respondents of the West Macedonia case study.

Procuring entities (7)	**Local businesses - contractors (7)**	**Research institutes, consultancies & RDAs (6)**
-Region of West Macedonia -Kozani municipality -Eordaia municipality -Municipal Water and Sewerage Utility of Kozani -Municipal District Heating Company of Ptolemaida -University of West Macedonia carreer service; research committee	-Public Power Corporation (PPC) -Mpetokat S.A. -DIADYMA S.A. -AT Brushes -Polydynamiki construction company -Kountis mechanical engineering and construction company - Georgiades electromechanical company	-ANKO S.A. -MELLON Ltd -TRC -Institute for Solid Fuels Technology and Applications -Balkan Business Centre of West Macedonia -Arailopoulos consultancy

4. The case for PCP in West Macedonia in the context of national governance challenges and sluggish regional innovation

The speed of PCP adoption in Greece is negatively affected by the country's overall macro-economic and governance condition. Under the ongoing programme of macro-structural and

financial stabilisation, Greece has pledged to overhaul its public procurement structures and systems and downsize its procurement spending. The existing procurement market is unfavorable to the use of procurement to trigger innovation, and can benefit greatly from tightened controls, accountability checks and more transparency. Reforms comprise e-procurement and centralised procurement as well as initiatives to promote green procurement. Progress in these fields can provide solid ground for the subsequent development of PCP initiatives as instruments developed in one field can lead to positive innovation spillovers in other domains (28). It is remarkable that 'there is enormous scope for Greece to enhance the efficiency of its public procurement markets'(29). The size of the Greek procurement market is small relative to OECD average, slightly less than 11% of the Greek GDP per annum is spent on the acquisition of goods, services and works (8). The efficiency of (above threshold) public procurements in Greece is also one of the lowest among the OECD countries: a procedure for award of public contract lasts on average 230 days, more than twice the EU average, and involves the investment of 60 person days -40 for the firm and 20 for tendering companies-(30). The European Commission and IMF attribute this underperformance in procurement to some structural conditions: (i)extremely complex and gold-plated legislation, (ii)overlapping competences between different government ministries and agencies, (iii)insufficient control of procedures by management authorities, (iv)excessive exposure to litigation, (v)tenders which frequently do not result in contract award without clear justification (29, 30) (vi)payment arrears of public sector bills and tax refunds inflate procurement costs and damage corporate sector liquidity (31).

The painful process of fiscal and structural adjustment in Greece may prove a mixed blessing. If the necessary political will and steering both from the EU and the Greek authorities are sustained throughout the implementation phase of the new public procurement architecture in Greece, heavy investment and technical support can pay off. Substantial benefits include increased transparency and supervision of public purchasing, lower expenditure and better procurement outcomes, and better operating conditions for business as simplified legislation will make procurement faster and more transparent and reduce the administrative burden (32). The end result of a highly reliable public procurement system utilising e-procurement and IT tools to enhance needs awareness and risk assessment will also create an appropriate institutional environment for mobilising procurement resources strategically, showing aptitude to engage in and coordinate pre-commercial procurement schemes.

West Macedonia is a landlocked, border region of Greece in the North-West of the country. In economical and employment terms it has been traditionally based on energy generation. Lignite coal extracted from fields in the region fuels locally located power plants of the Public Power Corporation, the production of which accounts for half of the country's energy output (33). Environmental and health externalities are the other side of the coin while regional market needs, dominated as they are by the energy sector, have not encouraged dynamism in terms of R&D and innovation. In fact from 2000 to 2008 gross domestic expenditure on research and development (GERD) was only 0.2% of the regional GDP and business enterprise expenditure on research and development (BERD) stood at a negligible level of 0.03% (34). This is an outlier even by the already low Greek standards of a GERD stagnating around 0.60% of GDP until 2011 (35). Institutions established in the region (University of West Macedonia, Technological Education Institute, etc) constitute an attempt to recover some of the lost ground in research, development, technology and innovation (RDTI). The bulk of regional RDTI activities focuses on energy production, clean energy, greener solutions and biofuels (33, 34). Nonetheless, the economic crisis resulted in rapid decline in the already low private R&D investment in the region leaving as a main source of funding the 2007-2013 ROP although only 1.2. of the 12.2 million euros earmarked for RDTI had been absorbed until the end of March 2012 (9.8% absorption rate) (34). Given that the

OECD forecasts a decline in R&D spending in Greece and considers the EU structural funds as the only reliable source of funding (35), the increase in EU co-financing to 95% for the Greek 2007-13 programme and the proposed halving of EU Cohesion policy envelope for Greece in 2014-20 can only result in shrunken regional R&D spending.

The responses to the fieldwork questions were quite differentiated among the three groups of respondents. First, the responses revealed limited general awareness of PCP processes at the regional level. All of the public entities' responses were in line with the EU definition of PCP as a service-only form of procurement. However more than a half of the business contractors and research and consultancy interviewees stated that PCP finds application in works or supplies, which is in stark contrast with the EU definition of PCP. Second, the interviews showed that a top-down approach to public procurement is predominant in the region. The public entities interviewed confirmed the limited familiarisation with ICT tools, and the non-existent networks of suppliers and procurers as well as organised discourse. With the exception of one business contractor, there was lack of interest in PCP processes across the board. Furthermore procurement needs where overwhelmingly covered by existing market solutions and although the vast majority of respondents reported themselves to be aware about innovation, there was no relevant strategic framework in the public entities examined. Lastly, almost all public entities cited bureucratic and regulatory risks and time delays as major obstacles to PCP while the business and consultancy sectors stressed more financial mitigation risks and the lack of expertise.

5. Discussion and Conclusion

The findings from the case study of West Macedonia show limited awareness about PCP processes at the sub-national level in Greece. However this is mostly confined to public entities as among business suppliers and consultancy service providers, there seems to be lack of understanding of what constitutes a PCP process in EU terms. The empirical results show that regional public entities generally follow a top-down approach to procurement, networks of suppliers and procurers are nonexistent as is organised discourse. The needs of the public sector are wholly covered by existing market solutions and are not being instrumentalised to assist demand-side innovation. Capacity deficiencies exhibited at the subnational level can be associated with the limited resources available during a severe depression (evident in public service cuts, financial institutions and firm deleveraging) but may also be attributed to more structural aspects. Technical incapacity characterises the inability of sub-national bodies to engage in, monitor and coordinate procurement procedures involving high numbers of suppliers because of lack expertise in workload management and familiarisation with IT and e-procurement tools (traditional channels of communication). Furthermore cultural aspects of incapacity are also evident from the case study. The public entities examined were the least inclined to innovate of all groups and this lack of innovation culture can be a long-term obstacle to the implementation of demand-side instruments. The legalistic-bureaucratic culture poses emphasis on public services delivery as a quasi-judicial activity enshrined in law, therefore the adoption of processes such as PCP which are based on exemptions from EU law lies outwith standard procedures.

In Greece, the absence of demand-side innovation policies from the innovation agenda is not only a characteristic of the sub-national level but also of central government policy. At the regional level only one lead market initiative has been reported in Western Greece (28). As the policy literature review showed, the fragmented Greek public procurement market makes it difficult to stimulate demand for innovative products'(28). The new 'policy mix' adopted under the fiscal austerity programme is tackling structural barriers through centralisation, framework agreements, e-procurement, rationalisation of expenditure and

capacity building. The challenge is for policy-makers in Greece to bolster PCP through the reform process. PCP is an effective mechanism of risk mitigation for SMEs and could be some solution of chronic problems of R&D underinvestment by Greek firms. PCP can be embedded in the new public philosophy, introduce innovation-oriented public procurement and improve the macro-economic attractiveness of the country to foreign investment (18).

Given Greece's lagging initial conditions, support from the EU level is crucial for the success of any attempt of demand-side innovation let alone PCP. Co-opting public procurement into the innovation policy without sufficient backing and follow-up can be counter-productive and a prerequisite for a successful policy are incentives, skills and capacity to 'allow public purchasers to make strategic decisions on a case-bycase basis that will also stimulate (or at least not hamper) innovation'(36). In this regard a feasible recommendation for taking PCP forward in Greece is to encourage the country's participation in joint schemes at EU level as the barriers to PCP in Greece are similar to those in the rest of the EU, albeit more protracted e.g. low risk procurement, lack of capabilities for complex procurement, unease with legislation, limited use of multiple suppliers (11). This will dispel fears that a North-South divide in innovation terms in Europe is perpetuated even through FP7. It is of critical importance to use every possible financial leveraging means at EU level for instance through the setting up of funds to assume risks or the establishment of special agencies in line with OECD recommendations (19). The European Commision proposals for Horizon 2020 incorporates this through the provision for an EU debt facility, but the Greek participation in EU PCP schemes requires concerted effort and a specific division of labour of EU institutions. In that case the future Structural Funds programmes may undertake intensive capacity building by emphasising the establishment of a stable regulatory and institutional framework, encouraging innovative procurement through learning by doing, and assisting in the mapping out of procurement needs and risks for Greek public entities.

Acknowledgements

This study is conducted in the framework of the territorial cooperation project "Increasing Knowledge Transfer and Innovation in the Mediterranean Area (IKTIMED), financed by the European Regional Development Fund (ERDF) through the transnational programme MED.

References

1 Edler J, Georghiou L. Public procurement and innovation—Resurrecting the demand side. Research Policy. 2007;36(7):949-63.
2 Porter ME. The competitive advantage of nations : with a new introduction: Basingstoke : Macmillan; 1998.
3 Geroski PA. Procurement policy as a tool of industrial policy. International Review of Applied Economics. 1990 1990/06/01;4(2):182-98.
4 Rothwell R, Zegveld W. Government regulations and innovation—industrial Innovation and Public Policy. In: Rothwell R, Zegveld W, Industrial Innovation & Public Policy. London1981. p. 116-7.
5 Aschhoff B, Sofka W. Innovation on demand—Can public procurement drive market success of innovations? Research Policy. 2009;38(8):1235-47.
6 Palmberg C. The sources of innovations – looking beyond technological opportunities*. Economics of Innovation and New Technology. 2004 2004/03/01;13(2):183-97.
7 Edquist C, Zabala-Iturriagagoitia JM. Public Procurement for Innovation as mission-oriented innovation policy. Research Policy. 2012;41(10):1757-69.
8 OECD. OECD Economic Surveys: European Union 2012: OECD Publishing2012.
9 Kok W, Bausch R, FitzGerald N, Gutiérrez Vegara A, Hutton W, Idrac A-M, et al. Facing the Challenge. The Lisbon Strategy for Growth and Employment. Report from a High Level Group. Luxembourg2004.

10 Edler J, Edquist C, Georghiou L, Hommen L, Hafner S, Papadakou M, et al. Innovation and Public Procurement. Review of Issues at Stake. Final Report. Brussels2006.
11 Rambøll Management. Opportunities for Public Technology Procurement in the ICT-related sectors in Europe2008.
12 Aho E, Cornu J, Georghiou L, Subira A. Creating an Innovative Europe. Report of the Independent Expert Group on R&D and Innovation appointed following the Hampton Court Summit and chaired by Mr. Esko Aho. Brussels: European Communities2006.
13 ad hoc National IST Directors Forum Working Group. Pre-commercial Procurement of innovation: A missing link in the European innovation cycle2006.
14 European Commission. Pre-Commercial Procurement: Overview. Brussels 2011 [cited 2012 11-12]; Available from: http://cordis.europa.eu/fp7/ict/pcp/overview_en.html.
15 European Commission. Pre-commercial Procurement: Driving innovation to ensure sustainable high quality public services in Europe In: Commission of the European Communities, DG IS, editors. Brussels 2007.
16 ECORYS. Study on pre-commercial procurement in the field of Security Within the Framework Contract of Security Studies – ENTR/09/050. Rotterdam: Ecorys Macro & Sector Policies2011.
17 Edquist C, Zabala-Iturriagagoitia JM. Why Pre-Commercial Procurement is not Innovation Procurement: CIRCLE (Centre for Innovation, Research and Competence in the Learning Economy) Lund University, Sweden2012.
18 European Commission. PRE-COMMERCIAL PROCUREMENT: Public sector needs as a driver of innovation. Brussels2006.
19 OECD. Demand-side Innovation Policies. Paris: OECD Publishing2011.
20 Schibany A, Berger M, Buchinger E, Dachs B, Dinges M, Ecker B, et al. Austrian Research and Technology Report, Section 8(1), Research Organisation Act, on federally subsidised research, technology and innovation in Austria. Vienna: Joanneum Research (JR), Austrian Institute of Economic Research (WIFO), Austrian Institute of Technology (AIT), Statistik Austria2010.
21 von Hippel E. Lead users: a source of novel product concepts. Management Science. 1986;32(7):791-805.
22 PRO INNO Europe. Challenges for EU support to Innovation in services - fostering new markets and jobs through innovation. Brussels: DG Enteprise and Industry, European Commission; 2009.
23 Rogers EM. Diffusion of Innovations. Third Edition ed. New York: The Free Press; 1983.
24 Bos L. Policy related Frequently Asked Questions on Pre-Commercial Procurement (PCP) and the link with Public Procurement of Innovative Solutions (PPI) In: CORDIS, editor.2012.
25 European Commission. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Horizon 2020 - The Framework Programme for Research and Innovation (Text with EEA relevance). 2011.
26 CORDIS. Pre-Commercial Procurement: Policy Framework. 2012 [cited 2013 31-01]; Available from: http://cordis.europa.eu/fp7/ict/pcp/policy_en.html.
27 European Commission. Compilation of Results of the EC survey on the status of implementation of Pre-commercial Procurement across Europe. In: Directorate-General ISaM, editor. Brussels2011.
28 Izsak K, Edler J. Trends and Challenges in Demand-Side Innovation Policies in Europe: Thematic Report 2011 under Specific Contract for the Integratio of INNO Policy TrendChart with ERAWATCH (2011-2012) Contract number X07. Manchester: technopolis |group|2011.
29 European Commission. Task Force for Greece Second Quarterly Report (March 2012). In: Greece TFf, editor. Brussels2012.
30 European Commission. Task Force for Greece 1st quarterly report. In: Greece TFf, editor. Brussels2011.
31 IMF. Greece: 1st & 2nd Reviews Under the Extended Arrangement Under the Extended Fund Facility, Request for Waiver of Applicability, Modification of Performance Criteria, and Rephasing of Access-Staff Report; Staff Supplement; Press Release on the Executive Board Discussion; and Statement by the Executive Director for Greece. Washington: International Monetary Fund2013.
32 European Commission. Task Force for Greece Quarterly Report December 2012. .
33 Samara E, Galanakis K, Bakouros I, Platias S. The Spin-off Chain. Journal of Technology Management & Innovation. 2010;5(3):51-68.
34 DG Enteprise and Industry. Region of Dytiki Makedonia. Regional profile. Research Development and Innovation. Brussels2012 [cited 2013 3.2.]; (http://www.rim-europa.eu/).

35 OECD. OECD Science, Technology and Industry Outlook 2012: OECD Publishing.2012.
36 Uyarra E, Flanagan K. Understanding the Innovation Impacts of Public Procurement. European Planning Studies. 2009 2010/01/01;18(1):123-43.

SMART CITIES AND THE FUTURE INTERNET: INNOVATION ECOSYSTEMS OF EMBEDDED SPATIAL INTELLIGENCE

Nicos Komninos

URENIO Research, Aristotle University Campus, Thessaloniki, Greece,
komninos@urenio.org

Intelligent or smart cities rely on collaboration networks among human communities, innovation ecosystems, and digital infrastructure, applications and e-services, which enable the urban challenges of competitiveness, sustainability and inclusion to be addressed more efficiently. This urban paradigm is characterized by continuous transformation, fuelled by evolutions in innovation ecosystems, broadband networks and web technologies. This paper explores changes which are currently being introduced by future Internet research and outlines how cities and regions are affected by emerging Internet technologies, smart environments, and the resulting changes to innovation ecosystems. The paper is based on a corpus of foresight exercises, roadmaps to future Internet technologies and FIRE experimental facilities, OECD and governmental reports on the future of the Internet economy and surveys on hype cycles for smart city technologies. The first section is a short introduction to intelligent city concepts and looks at the turn towards future Internet technologies. Sections two and three are about the drivers of embedded spatial intelligence of cities guided by the rise of sensor networks and solutions embedded into the physical space of cities. The next four sections discuss the technological context of the future Internet and the expected impact of the Internet-of-Things, sensors, tags and RFID, semantic web, and cloud computing on smart cities. The final section is concerned with the new innovation ecosystems emerging from embedded spatial intelligence where citizen empowerment meets with smart environments.

Keywords: Embedded spatial intelligence; future Internet; innovation governance; intelligent cities; smart cities.

1. Introduction

New Internet technologies, the Internet-of-Things (IoT), networks of sensors and smart devices, embedded systems, the semantic web, the Internet of users and people, cloud computing, in two words the 'Future Internet', marks a technological turn that introduces a new type of spatial intelligence of cities, namely an embedded spatial intelligence. This form of intelligence is advancing the information and knowledge capabilities of communities which were created by web 2.0 applications, social media, and crowdsourcing platforms, and opens a new cycle of innovation and e-services in cities.

The concept of spatial intelligence of cities refers to the ability of a community to use its intellectual capital, innovation institutions, physical space and smart infrastructure to create intelligent environments that more efficiently address the challenges of competitiveness, sustainability, and inclusion [1], [2]. This concept allows the terms of 'intelligent city' and 'smart city' to be unified into a common field of research focusing on the underlying cognitive processes and combined deployment of ICTs, institutional settings for innovation,

and physical infrastructure, which taken altogether increase the problem-solving capability of communities and cities.
Collective intelligence and social media have been major drivers of the spatial intelligence of cities. They offered the appropriate technology layer for organizing the involvement of citizens and end-users in the creation and use of information with crowdsourcing platforms, mush-ups, web-collaboration, and other means of online participation. Now, the turn towards new Internet technologies, smart environments and embedded systems offers a new type of spatial intelligence of cities; an embedded spatial intelligence, based on sensors, augmented reality, real-time information and gigabit data generated by the functioning of cities. Embedded spatial intelligence has a direct impact on location-based services that cities offer to citizens and on the optimization of urban networks. It bring us closer to the way in which William Mitchell has described the intelligence of cities as the effective combination of digital telecommunication networks, ubiquitously embedded intelligence, and software for knowledge and cognitive competence [3]. Future Internet technologies with instrumentation and interconnection of mobile devices and sensors can collect and analyze urban data in real time, improve the ability to forecast and manage urban flows, and thus push city intelligence forward. In this context, new research questions have arisen concerning (a) the technology drivers of embedded spatial intelligence, (b) the new e-services that can be created in cities, and (c) the governance of innovation ecosystems within smart environments embedded in the urban space.

The paper discusses these questions while outlining the impact of future Internet technologies on smart cities. It is based on a combination of literature about future Internet research, cases studies on smart city projects and experimental facilities in smart cities, foresight exercises about the rise of future Internet technologies and smart city technologies, and trends about the future of cities. The reference corpus that we have taken into account includes a variety of sources and documents:

- EU FP7 research on future Internet technologies, future media Internet, future media networks, and Future Internet experimental facilities; research on smart cities in the context of the Competitiveness and Innovation Programme and the Strategic Energy Technology Plan.
- OECD reports and governmental papers on the future of the Internet economy outlining strategic policy directions.
- Large corporate research programmes and platforms in the field of intelligent and smart cities and white papers by large consulting groups on smart city solutions.
- Gartner's Hype Cycles on emerging technologies and smart city technologies, which illustrate societal expectations and innovation cycles of technologies.
- Foresight exercises about the future of cities presented by academic institutions, the Institute for the Future and related academic literature.

This corpus helps us describe how smart / intelligent cities are changing with the rise of new Internet technologies and how the internal mechanisms of information, innovation and knowledge-creation within smart cities are affected by embedded systems, cloud-based solutions, and smart-object centered services.

2. Drivers for embedded spatial intelligence of cities

The paradigm of intelligent cities appeared at the turn of the 21st century as a fundamental component of the global knowledge economy and model for organizing people-driven innovation ecosystems and city-based global innovation hubs. By injecting information technologies and innovation capabilities into the ecosystems of cities, they become more open, innovative, efficient, and manageable. City infrastructure and utilities benefit from the

deployment of broadband networks because of lowered operating costs, real-time alert and response, and better prediction capability. The entire urban system of products, services, and infrastructure becomes more sensitive to changing demand and needs, by adopting more intelligent ways of operation and via rapid adaptation to changing external conditions.
Since 2009, within this paradigm of urban development and planning, smart environments, embedded devices, and real-world user interfaces have attracted significant attention following a wider uptake of embedded technologies and future Internet solutions. Emerging information and communication technologies, high speed broadband networks, cloud computing and mobile smart devices have become enablers of sustainable urban development and new e-services in areas such as transport, environment, business, and government. Large companies in the ICT sector, such as IBM, Cisco, Microsoft, and Accenture are involved to a considerable degree in and are contributing to shaping the smart city agenda. EU research in the context of the FP7 and CIP is also stimulating a wider uptake of innovative ICT-based services for smart cities, linking smart city solutions with user-driven innovation and future Internet infrastructure. Quite new fields of research and experimentation have opened up, redefining the way innovation ecosystems and smart environments are combined to address urban challenges.

A major milestone in this turn towards an embedded intelligence of cities has been the IBM initiative '*Smarter Planet - Smarter Cities'* (SP-SC) launched in 2009 [4]. Proposed as central strategy for a sustainable future, this initiative was intended to stimulate economic growth and quality of life in cities and metropolitan areas with the activation of new technology systems and infrastructure. The SP-SC initiative sees the city as an agglomeration of ecosystems (a system of systems) and as a platform, which - more than states, provinces or even nations - can make 21st century life more productive, efficient and vibrant. The model for making cities more efficient and sustainable was described as a combination of connectivity, instrumentation, and intelligence.

- Connectivity offers communication capability among a sea of networked things, buildings, cars, roadways, pipelines, appliances, infrastructure, and people.
- Instrumentation offers real-time information from all city sub-systems captured by meters and embedded devices.
- Intelligence comes from algorithms, analytics and visualization that turn data into informed decisions and actions.

In 2009 CISCO also launched the global '*Intelligent Urbanization'* initiative from the city of Bangalore, India, and signed a MoU with the local government authority to develop a roadmap for an intelligent and sustainable Bangalore. '*Intelligent Urbanization'* was designed to help cities around the world, by using broadband networks as a utility for integrated city management, better quality of life for citizens, and economic development. Bringing together a broad portfolio of products, services, partners and solutions across CISCO, the initiative was initially focused on intelligent, sustainable solutions for public safety and security, transportation, buildings, energy, healthcare and education. As an example of how technology can be used to improve security operations, CISCO described its own internal Security Operations Centre with real-time security monitoring and alert, video surveillance tools, acoustic sensors, card-readers with biometric recognition, automatic alerts and security activation systems. Later, the company moved to the '*Smart Connected Communities*' initiative to help communities transform themselves and realize sustainable economic growth, resource management and enhanced quality of life. The broadband network was seen as a 'fourth utility' and as a platform to connect everything. Areas of implementation were transportation, utilities, real estate, safety and security, and government. Recently, CISCO endorsed the IDC concept of '*Intelligent X'* as a technology ecosystem which

integrates smart devices (involving M2M and telemetry capabilities), high-speed ubiquitous communications networks, and intelligent software and services that can process, consolidate and analyze data in order to support industry-specific business processes. At the core of '*Intelligent X'* solutions lie three key enablers: (a) increased computational power available through high-performance chipsets and hardware and high-performance networks, (b) improved maturity in business intelligence and analytics, and (c) the introduction of new delivery models based on cloud computing [5].

ACCENTURE, a global management consulting and technology services provider, presented a similar smart city concept focusing on city infrastructure and utilities. The company argued that rapid urbanization and rising population place enormous pressures on ageing city infrastructure for gas and electricity, water supply, waste management, and transportation. In parallel, the mobility of populations and businesses, as the world is now more open, requires that cities remain globally attractive. Cities increasingly compete in four different arenas: (a) for businesses that generate wealth, (b) for public and private investments, (c) for residents - mainly well-educated, entrepreneurial people, and (d) for visitors. Intelligent infrastructure is the technological response to these challenges: "The intelligent infrastructure is both analogue and digital. That is, in addition to the physical infrastructure - roads, buildings, rail, power and utility grids - an information and communications technology infrastructure serves as the basis for most of the monitoring and optimization capabilities of an Intelligent City, and for the interaction between citizens and service providers" [6]. For ACCENTURE, the most important enabler for Intelligent Cities is an open, interoperable and scalable platform that provides intelligent infrastructure-as-a-service for optimal resource management. Among the fundamental characteristics of this platform are the existence of an environment for partnering and cooperation, fully automated service via a central hub, efficient data exchange, flexibility for service and product combination, modular architecture, scalability, Internet-based service; in effect all the core features of cloud computing. The proposed platform makes the delivery of services feasible in seven key domains of cities: transportation, health and safety, waste management, education and culture, public administration, office and residential uses, and nature resource management. As technologies and solutions evolve, new components can be replaced and integrated on demand.

The European Commission set up several funding lines for research and experimentation on Smart Cities in the context of Future Internet research, the Competitiveness and Innovation Programme (CIP), and the Strategic Energy Technology Plan (SET-Plan). FP7-ICT projects focused on smart cities were mainly part of *Future Internet Research and Experimental* (FIRE) action line. The most well-known one is the Smart Santander testbed currently composed of around 3,000 IEEE 802.15.4 devices, 200 GPRS modules and 2,000 joint RFID tag/QR code labels deployed both at static locations (streetlights, facades, bus stops) and on-board mobile vehicles (buses, taxis) envisioning the deployment of 20.000 sensors. The architecture supports a secure and open platform of heterogeneous technologies and the facility applies user-driven innovation methods (through competitive open calls) for the design of innovative applications and implements 'use cases' in the city of Santander in northern Spain, such as bus tracking, air quality monitoring, urban waste management, and others. FIREBALL was another FIRE project that established a coordination mechanism among a network of cities across Europe engaging in long-term collaboration for user-driven open innovation to explore the opportunities of Future Internet in smart cities. The coordination process was grounded on exchange, dialogue and learning between Smart Cities, which were considered as key demand-side drivers of Future Internet innovation, and

by bringing together European communities of Future Internet research, Living Labs, and Smart Cities.

The Directorate General of Energy, in the context of the SET-Plan and SETIS (the SET Information System) introduced the '*European Initiative on Smart Cities'* to demonstrate the feasibility of implementing advanced energy and climate technologies at a local level. The Initiative fosters the dissemination of the most efficient models and strategies for a low carbon and low emissions future throughout the Smart Cities Stakeholders Platform. It supports cities and regions in ambitious and pioneering projects and cooperative schemes, such as an 80% reduction in greenhouse gas emissions through green energy by 2050. The SETIS smart cities initiative is based on systemic approaches and organizational innovations related to energy efficiency, low carbon technologies and smart management of supply and demand. Three main domains for applications are energy efficiency in buildings, energy supply networks, and energy in mobility and transport.

The Competitiveness and Innovation *Programme* (CIP) has also included an action line for '*Open innovation for future Internet-enabled services in smart cities*', which combined three co-related perspectives: (a) user-driven open innovation, (b) innovative Internet-based services, and (c) cross-border networks of smart cities. In the first round of experimentation, seven smart city pilot projects were funded by the CIP- ICT-PSP (Epic, Life 2.0, Open Cities, People, Peripheria, Smart IP, and Smart Islands) with the participation of many cities in Europe. These pilot projects focused on accelerating the uptake of smart technologies in cities, creating user-driven innovation ecosystems, improving the capacities of small companies, and strengthening the role of the user / citizen. The emphasis was on fostering innovation in services under realistic conditions, taking-up completed R&D work, extending tested prototypes and combining partial solutions for an innovative outcome. Priority technology areas were those of real-time interaction, open-trusted service platforms, sensors and RFID, multimodal user interface, simulation, location-based technologies and services. Priority domains for application were those of smart education, smart energy, e-participation, e-government, smart retail, well-being and transportation.

Both in large multinational companies and research institutions, the recent turn and interest in smart cities and the future Internet has been driven by two objectives. On the one hand, we have the use of new Internet technologies, such as sensor networks, smart devices, RFID, the semantic web and the Internet-of-Things, cloud computing for offering new e-services to citizens and optimizing the functioning of cities. On the other hand, there is the pursuit of sustainability as cities are looking for a more inclusive and sustainable future, transforming themselves into green cities with less energy consumption and fewer CO_2 emissions. From an interdisciplinary perspective, intelligent / smart cities are implementing the latest advancements in mobile and pervasive computing, wireless networks, middleware and agent technologies as they become embedded into the physical spaces of cities, moving towards a more sustainable and environmentally-friendly form of development. By implementing a wide range of technologies and user-driven innovation, intelligent cities are replacing smart growth and New Urbanism principles for a sustainable future.

3. Future Internet and smart cities

The social, economic and technological perspectives of new Internet technologies and their potential impact on cities and spatial ecosystems were described in two foresight reports prepared by the Institute for the Future. The report entitled '*Future Knowledge Ecosystems'* identified fourteen trends that will broadly set the context for technology-based cities and

regions over the next 5 to 20 years [7]. Changes were described in three domains: economy and society, science and technology, and models and location sites of R&D. In each domain weak signals and early indications of upcoming trends were identified as well as the expected impact on technology-led urban spaces. In science and technology, most important trends were (a) the spread of **ubiquitous computing**, which is expected to create massive streams of data, while simultaneously providing new tools for scientific collaboration in the lab, and (b) the shift from artificial intelligence to **hybrid sensemaking** and hybrid identities which combine inputs from social networks and more limited forms of machine intelligence. The second report entitled '*A Planet of Civic Laboratories. The Future of Cities, Information and Inclusion*' was ten-year forecast covering the period up to 2020 that focused on the intersection between urbanization and digitalization and the massive stream of data generated within cities by IoT solutions, which is expected to turn every city into a unique civic laboratory, a place where innovations driven by citizens are born to meet local needs [8]. In both foresight reports, technologies that mattered most for smart cities were those of smart sensors and devices, open data, and cloud computing. The same group of technologies was also pointed out in Gartner's estimations about emerging technologies. Gartner's analysts reviewed more than 1,800 technologies and highlighted a series of technologies relating to smart cities, such as cloud computing, sensor networks, consumer generated media, location-aware applications, and predictive analytics.

4. The Internet-of-things, sensor networks and smart cities

The Internet-of-Things (IoT) is probably the most important component of the current technology shift in smart cities, combining active sensors and RFID for robust and cost-effective identification of many different objects in terms of functionality, technology and application fields in cities. Sensor networks in cities can gather enormous amount of information from connected smart objects and grids over utility networks. Real-time response to this data and prediction of behavior patterns become possible with high capacity processing and computing power. Also, the web is going out from PCs and user interfaces embedded into the physical space of cities

These technologies can overcome the fragmented market of smart city applications and provide generic solutions for cities. Examples of generic architectures include networked RFID tags (passive and active tags, mobile devices), sensor networks (multimodal sensors and actuators, built-in intelligent agents), and connected objects, such as distributed intelligent systems, intelligent objects and biometrics. A new round of applications, such as location aware applications, near field communication, speech recognition, Internet micro payment systems, and mobile application stores, which are close to mainstream market adoption, are expected to offer a wide range of services via embedded systems. Augmented reality is also becoming a hot topic enabled by smart phones, eye glasses, and is creating next generation location-aware information and services projected over the built space of cities.

The IoT is growing exponentially. Thomas Frey mentions an estimation of GSMA that 24 billion devices will be connected by 2020, while Cisco and Ericsson project the number to be 50 billion. In 2009 the number of connected devices exceeded the number of people on earth; the number of connected devices per person reached 1.84 in 2010 and is expected to reach 3.47 by 2015 and 6.58 in 2020 [9]. This new infrastructure of embedded sensors in cities paves the way for spatial intelligence, further advancing the capabilities created by web 2.0, social media and crowdsourcing: a real-time spatial intelligence based on automated information processing, M2M communication, and response available on smart phones and

mobile devices. For this type of embedded spatial intelligence, an important issue is the development of Urban IoT platforms over city clusters or districts offering a common framework for ambient sensor networks such as intelligent information infrastructure and universal ubiquitous sensor network architecture [10].

While the future uses of IoT technologies that will bridge the physical and virtual worlds are still largely a matter for speculation, there are estimations that they will bring significant economic benefits. The OECD policy guidance encourages research in this field, investments in business R&D, technological neutrality, open global standards, and harmonization of frequency bands [11]. There are however significant technological barriers to overcome. Sensor communication requires the cooperation of all devices over all communication technologies and different networks, including GSM and WLAN. Hildenbrand estimates that this is not feasible with current networks, devices and communication technologies, as technology cannot convert all devices operating on a certain communication technology or protocol. There is a need for a new technology that virtually overlays all others and allows communication between the different protocols [12].

5. The semantic web and smart cities

Data-driven decisions, techniques for forecasting and predictive analytics are a follow-up to the IoT and data generated by sensor networks. What is needed, however, is semantic M2M communication as gigabit data generated by the functioning of cities can be processed and analyzed only by machines. Use of ontologies and other semantic technologies open up a new domain for smart city applications as they can combine information from multiple sources and inform users when information matches their interests.

Semantic meaning provided by ontologies, like the Good-Relations annotator tool for creating rich RDF meta-data, can describe products and services more accurately. The introduction of HTML5 was also an important step. The cloud will offer additional opportunities for linked data as any object can be related to other objects contained in the cloud. The semantic web is expected to break down barriers, merging data from different sources and presenting data in ways one has never thought of before. Social media collaboration and collective intelligence can reach higher levels of efficiency and information accuracy. Future media research and technologies can offer a series of solutions that might work in parallel with the Internet-of-Things and embedded systems providing new opportunities for content management. Media Internet technologies at the crossroads of digital multimedia content and Internet technologies encompass media being delivered through Internet networking technologies and media being generated, consumed, shared and experienced on the web. Technologies enabled by the functionalities of the Future Internet Media, such as content and context fusion, immersive multi-sensory environments, location-based content dependent on user location and context, augmented reality applications, open and federated platforms for content storage and distribution, are expected to provide the ground for new e-services within the ecosystems of cities.

6. Cloud computing and smart cities

Cloud computing offers complementary to IoT and M2M communication advantages. It is based on several technological advances related to high-speed networks, virtualization and standardization of platforms and applications. However, "cloud computing is a new way of delivering computing resources, not a new technology", providing computer services through

the Internet and new business models of outsourcing [13]. The cloud is another way to think of the Internet itself. People can access applications, software development tools, and store files remotely from a computer via the Internet. The cloud is Google's Gmail, Google Docs and Dropbox. In these type of applications data are not stored on the PC of the user, but on servers and at massive data centers of the hosting company. i-Phone applications which million of users download, and platform and development tools to build these applications are also cloud-based. The US National Institute for Standards and Technology offered a clear description of cloud computing as composed of *five essential characteristics* (on-demand self service, ubiquitous network access, metered use, elasticity, and resource pooling), *three service models* (software as a service - SaaS, platform as a service - PaaS, and infrastructure as a service -IaaS), and *four deployment modes* (private, community, public and hybrid clouds) [14].

Foresight estimations about developments in cloud computing were given by Gartner Hype Cycle for Cloud Computing, which positioned 38 technologies from this field at different stages of the Hype Cycle [14]. Expectations are very high. Most technologies, however, are at the 'technology trigger' stage, and cloud computing overall is at the 'peak of expectations' stage; a few solutions are at 'experimentation' stage and none at the stage of demonstrated results. The time frame for all solutions is from 2 to 10 years, and only virtualization and software-as-a-service are closer to mainstream adoption.

The impact of cloud computing on smart cities has been discussed in forecast studies for 2020 [7] [8]. While in the short-term cloud computing will be delivered by large commercial clouds, government G-clouds are promising models for (larger) cities, creating urban clouds that reduce IT costs, and offering platforms for small business applications and e-services. Fenn argues that Governments are realizing the benefits of cloud computing but are concerned about the level of security for their data in the private cloud [15]. Cloud computing is opening also new possibilities in the virtualization of physical spaces and their substitution by digital ones. Already because of the 2009 global crisis, many city activities relating to trade and services have gone virtual -killing their physical part- allowing companies and organizations to maintain operations in times of austerity, gain flexibility and lower fixed capital costs. Cloud computing is also expected to sustain new growth sectors of cities, which are now moving from manufacturing to services in the context of a wider movement from products to services, as material and intangible infrastructures start being provided by the cloud. Equally important is the expected standardization of smart city solutions, platforms, and applications, which is necessary to provide on-demand self services. Standardization will accelerate technology diffusion and learning curves as city administrations and their IT departments will become aware of proven solutions for main districts and sectors of the city. We should expect a standardization of platforms and applications in many different domains of cities related to economic activities (trade, manufacturing, services, logistics), quality of life (safety, environment, social care), utilities (transport, energy, water, broadband), and city management (administration, democracy, planning).

7. Internet of users and people in smart cities

The engagement of users and user-driven innovation are important preconditions for turning future Internet technologies to new services in smart cities. The Web 2.0 era has pushed cities to consider the Internet (including mobiles) as a more participative tool for engaging citizens and tourists. Many initiatives were launched by city-based Living Labs for investigating and anticipating how digital technologies will change the way people live in the

city and their implications for urban dynamics. Future Internet, Living Labs and Smart Cities together form a new innovation ecosystem comprising users/citizens, ICT companies, research scientists and policy makers. In such ecosystems, Future Internet technologies are the technology push driver, Smart Cities represent the application pull demand, and Living Labs form the exploratory and participative playground in between.

Crowdsourcing is the usual form of citizen participation in smart cities. The word comes from the combination of 'crowd' and 'outsourcing' and the main idea is to assign a task to a large group of people or a community [16]. It is an extreme form of open innovation in which tasks are not assigned to selected external providers, but to crowds. Crowdsourcing is also strongly related to online platforms and collaborative web spaces because the participation of large communities (crowds) presupposes the use of digital media. It is an online, distributed problem-solving and production model. It also marks a distinctive stage in the evolution of the intelligent cities standard model during the first decades of 21st century.

The two cases below illustrate the contribution of crowdsourcing to smart cities: 'NYC Simplicity Idea Market' and 'Improve-my-City' correspond to applications for citizen participation and city improvement that can be found in many places all over the world.

'NYC Simplicity Idea Market' was launched in February 2011 by the City of New York and remained in operation for about one year. Employees of all levels of administration and city agencies were invited to suggest and share ideas about improvements to city government. Each one could upload ideas, comment on the ideas of others, and vote for those considered best. Then most popular proposals were reviewed by experts and the best ones were implemented by the city administration [25]. A large community of the city, estimated at 300,000 employees, was invited to elaborate ideas about education, safety, and maintenance of the city's infrastructure. Innovation was based on the combination of ideas generated by employees, user-driven evaluation of ideas, feasibility assessment by experts, and idea implementation by the city. A content management system and crowdsourcing platform was used to enable employee participation and assessment through voting. Everything revolved around crowdsourcing, the engagement of a large community of the city, selecting ideas based on the preferences of the same community, and enabling participation through social media.

'Improve-my-City' was developed by URENIO in 2012 in the context of the project 'People', a smart city project of the EU Competitiveness and Innovation Programme (CIP-ICT-PSP). Improve-my-City is an open source application created under AGPL v3 license. Anyone can download the code from the GitHub for use or improvement. Because ImC is a free application it has been used already in many cities in Europe and America. It is already offered in about 20 languages. Citizens can report local problems and suggest improvements, write comments on other posts, and vote to support suggestions and demands. Reported issues go directly into the city's government queue for resolution, and users are informed by the responsible authority about the progress of their request. Again the main concept is about motivated crowdsourcing. The entire community of a city can be involved. Citizen reporting ideas and suggestions are listed in 25 categories related to improvement of the environment. Innovation is based on a combination of crowdsourcing about city problems and solutions, while implementation relies on institutional action from city hall.

In crowdsourcing and user-driven innovation, user involvement is the main driver of spatial intelligence. In the first step, the city, citizens and communities define challenges that need to

be addressed. Any form of intelligence starts by defining the problems to address, which also sets the metrics of success. Challenges are specific to each city, its sectors, districts, utilities, quality of life and governance. From the open innovation – crowdsourcing perspective challenges are defined collectively by aggregation and prioritization of citizens' views and demands. Then a problem-solving roadmap is prepared. User-driven innovation is called upon to customize the building blocks of the roadmap in terms of information collection, use of proven solutions, inventing new solutions, and disseminating selected solutions. Digital media and open platforms facilitate the entire process by offering e-tools that help a large number of participants to become involved, sharing insights, combining skills and aggregating resources. The outcome is urban empowerment: an increase of collective capability in defining problems and solutions, and implementation mechanisms through collaboration and agglomeration of resources.

8. Innovation ecosystems of embedded spatial intelligence

The instances of Future Internet described in previous the sections – Internet-of-Things, semantic web, cloud computing, Internet of people – are cornerstones of the new innovation ecosystems emerging in smart environments. Within environments of embedded spatial intelligence, the building blocks of innovation - products, markets, business models, funding – take on new forms and new types of innovation ecosystems are formed. The nodes of ecosystems multiply geometrically, become sentient and interactive; hybrid identities are formed with semantically rich labels; all interactions become location-aware [17].

Technologies and products: Products and services based on future Internet technologies are not stand-alone products. Complex system are needed to offer them, composed of broadband infrastructure comprised of wired and wireless networks; systems embedded into the physical space of cities, sensors, smart devices and smart meters; APIs for interoperability and data integration; data hosting and security; predictive modeling; applications for optimization of smart city utilities and activities; provision of e-services, and much else besides. Layers of hardware, devices, and software are interwoven with the physical space, infrastructure and functions of cities. Sensors, activators, RFID, smart meters, cameras, routers, switches, storage, authentication and firewall servers have to work together in order to capture and process the information generated by the operation of cities.

To deal with such complex systems, leading ICT organizations have advanced the concept of *Urban Operating Systems* or *Integrated Urban Infrastructure* enabling all smart city components, applications and services to run on a common system. The argument is that an urban operating system can provide the protocols for the operation of cities, collect data about everything going on in a city and respond in real time. While the concept of one common operating system integrating all devices and smart solutions is an exciting prospect, offering potential economies of scale and scope, the structure and governance of cities does not endorse a unified global architecture. Data integration is feasible at the level of city districts or smaller city clusters only, which are endowed with governance and control capacity, but not at the level of the entire city. The reason is that within market economies there is no overall authority with full control over cities. On the contrary, there are pockets of decentralized decision making, exercising control over different city districts. Technology solutions should adapt to existing city governance instead of assuming an all-inclusive city administration and management. City districts, clusters and utility sectors are appropriate levels for organizing smart infrastructures and services using future Internet technologies rather than the entire city with its different subsystems and fragmented governance.

Markets: Within this ecosystem of data generation and integration, products and services circulate with their virtual identities. The Internet-of-Things and smart objects blur the line between digital and physical worlds, making their distinction hard to define. In every vertical market, the aspects of product design, development, marketing and exchange work primarily with the digital identities involved. Because of the priority of the virtual, the potential market of smart city solutions covers all vertical markets located within the city. Estimations about the size of smart city market vary considerably, but in all cases forecasts describe huge markets. The smart city market was estimated at 8 billion in 2010 and 39 billion in 2016 by ABI Research; at 108 billion for the period 2010-2020 by Pike Research; at 160 trillion for the next 30 years by the Center for Urban Science and Progress. Ovum predicted a spending per city at 35-55 billion of which 15% would be on software and 85% on hardware and services. A recent report from Pike Research estimates that explosive urbanization will create smart city markets covering the fields of sustainability, citizen well-being, and economic development. “The smart city technology market will surpass $20 billion in annual value by 2020. This represents a compound annual growth rate of 16.2%” [18]. Many of the market drivers, continues the report, technology innovations, and decision-making processes associated with smart cities are focused on existing industry and operational silos: energy, water, transportation, buildings management, and/or government services. Now, though, the smart city is also becoming a space for the testing and implementation of cross-functional technologies and solutions. IDC Government Insights estimation for the smart city market in 2013 predicts that 70% of worldwide spending on smart city projects will be focused on energy, transportation, and public safety; smart city information challenges will begin to be framed as big data cases, and cities with open data initiatives will drive 50% more private, citizen, and crowdsourced mobile applications [19].

Cloud-based business models: In creating smart city products and services, cloud computing offers significant advantages, such as external economies, lower capital entry requirements and maintenance costs, and security, while its scalability enables quick adjustment to changing demand. There are also technical advantages related to software updates and new version installations, which become easier if applications are maintained on the cloud. However, the transition to the cloud should be done by taking cautious steps because these technologies are still evolving and have not yet fully addressed the issues of service standardization, security, and privacy. Policy white papers provide valuable guidance to city authorities about the deployment of cloud-based services. An important source of advice is the report of the Australian government, which provides information about public policies and programmes addressing the transition to cloud computing in the US, UK, EU, Canada, and Japan [11]. The recommendation is for streams of consultation work, providing public agencies with guidance and documentation, cost - benefit analyses, testing of services in less important areas initially, and then moving on full deployment of new cloud-based services, and eventually the creation of G-city clouds.

Creativity and funding: The new technology stack of ‘IoT- Semantic web- Cloud’ does not automatically lead to the development of new e-services. User involvement is necessary to provide skills and resources for new product / services designs and development. User-driven approaches, such as Living Lab and open innovation initiatives, promote a more proactive role for end users and citizens in service innovation, assuring a good coordination between the technology offer from vendors and the service demand from citizens. In developing such smart city solutions, there are a number of methods for involving users which are described in abundant detail in the literature, such as Lead Users, User Driven Innovation, User Centered Design, User Created Content, and User Co-Creation perspectives. Crowdsourcing platforms can make citizen participation a reality. A large

collection of platforms is presented on *Crowdsourcing Landscape* that can support the entire cycle of innovation. As crowdsourcing rises in popularity and use, platforms are evolving and specializing. A recent report on crowdfunding presented 41 platforms for different funding purposes: general crowdfunding platforms, crowdfunding for social causes, for health and medical, for small and local businesses, for science, for music, for education, for gaming and apps, crowdfunding for startups and companies [20]. Two types of innovation funding are supported. Innovators can pledge support for an idea or project as a donation or in exchange of some kind of reward or use value. On the other hand, innovations can ask for 'crowdinvesting'. However, the latter requires that funding regulations been loosened to permit more people to invest in what they consider a promising venture to take part.

City authorities are gradually becoming aware of solutions, applications and use cases based on the Future Internet technology stack. Moving toward such solutions substantially increases the demand for broadband connections because of the transition from connecting people to connecting things. Network interoperability and merging of network and media technologies, as well as mobile-to-mobile communication (M2M) become necessary to manage and give meaning to the streams of data generated. Policy and experimentation are needed to turn these possibilities into a reality. The OECD report on the future Internet economy [11] provides a series of policy recommendations to deal with these challenges, such as building next generation network infrastructure, making Internet access available to everyone and everywhere, promoting Internet-based innovation, competition and user choice, empowering consumers, creating public digital content and user-driven content, ensuring the protection of personal data, intellectual property rights, trusted Internet-based services, and creating environments that encourage infrastructure investment, broadband connectivity and innovative services and applications.

References

1. Deakin, M. The embedded intelligence of smart cities. Intelligent Buildings International, 2011, 3(3), 189-197.
2. Komninos, N. Intelligent cities: Variable geometries of spatial intelligence. Intelligent Buildings International, 2011, 3(3), 172-188.
3. Mitchell, W. Intelligent cities. e-Journal on the Knowledge Society. 2007.
4. IBM Institute for Business Value. A vision of smarter cities: How cities can lead the way into a prosperous and sustainable future. 2009. IBM Global Business Services Executive Report.
5. Carter, P., Rojas, B., and Sahni, M. Delivering Next-Generation Citizen Services: Assessing the Environmental, Social and Economic Impact of Intelligent X on Future Cities and Communities. IDC White Paper, 2011.
6. Accenture. Building and Managing an Intelligent City. Accenture Management Consulting. 2011.
7. Townsend, A., Soojung-Kim Pang, A., and Weddle, R. Future Knowledge Ecosystems: The Next Twenty Years of Technology-Led Economic Development. 2009. Institute for the Future, IFTF Report Number SR-12361.
8. Townsend, A., Maguire, R., Liebhold, M., Crawford, M. A Planet of Civic Laboratories. The Future of Cities, Information and Inclusion. 2011. Institute for the Future.
9. Frey, T. Empowering "Things" for Our Internet of Things. 2012. Online http://www.wfs.org/blogs/thomas-frey/empowering-%E2%80%9Cthings%E2%80%9D-for-our-internet-things. Accessed 12-2-2013.
10. Hernández-Muñoz, J.M., Vercher, J.B., Muñoz, L., Galache, J.A., Presser, M., Hernández Gómez L. A., and Pettersson, J.. Smart Cities at the Forefront of the Future Internet. In: J. Domingue et al. (Eds.), The Future Internet, Springer, 2011, 447-462.
11. OECD (2008). Shaping Policies for the Future of the Internet Economy. OECD Ministerial meeting on the Future of the Internet Economy, Seoul, Korea, 17-18 June.

12. Hildenbrand, D., A World Full of Sensors. 2011. Online http://www.vector1media.com/article/features/22047-a-world-full-of-sensors.html,
13. Australian Government (2011). Cloud computing strategic direction paper. Department of Finance and Deregulation.
14. Mell, P., Grance, T. The NIST Definition of Cloud Computing. 2011,NIST Special Publication.
15. Fenn, J. Emerging Technology Hype Cycle 2010: What's Hot and What's Not, Gartner. Online http://blog.bimeanalytics.com/english/analysis-gartners-emerging-technology-hype-cycle-2010-hot. Accessed 12-2-2013.
16. Howe, J. The rise of crowdsourcing. Wired Magazine, 2006, No 14.6.
17. Komninos, N. Smart Cities and the Future Internet: Innovation for All within Smart Environments. 11th Students Spring Symposium, Thessaloniki, 18 May 2012. Online http://www.urenio.org/wp-content/uploads/2008/11/Smart-Cities-and-Future-Internet-Innovation-for-All.pdf.
18. Pyke Research. Smart Cities: Infrastructure, Information, and Communications Technologies for Energy, Transportation, Buildings, and Government. 2012. Online http://www.pikeresearch.com/research/smart-cities. Accessed 17-2-2013.
19. Clarke, R.Y., Yates, M., Chulani, M., Brooks, A. Wu L., Sasahara, E. Worldwide Smart City 2013 Top 10 Predictions. IDC Government Insights. 2013. Online http://www.idc-gi.com/getdoc.jsp?containerId=GI239209. Accessed 17-2-2013.
20. Kim, R. A GigaOM guide to Kickstarter wannabes. Online http://gigaom.com/2012/11/28/kickstarter-copycats/. Accessed 17-2-2013.

CORPORATE ENTREPRENEURSHIP IN MACEDONIA

Ljubomir Drakulevski[1], Angelina Taneva-Veshoska[2]

[1]Faculty of Economics, Ss. Cyril and Methodius University, Skopje, Macedonia, drakul@eccf.ukim.edu.mk

[2]FON University, Skopje, Macedonia, angelina.tanevaveshoska@fon.edu.mk

Purpose: The purpose of this paper is to examine how existing organizations in Macedonia represent the concept of an entrepreneurial organization within the sphere of corporate entrepreneurship.
Design/methodology/approach: Research instrument in a form of a questionnaire was used to obtain data about corporate entrepreneurship in Macedonia.
Findings: The results from the study will help corporate organizations to appreciate and develop entrepreneurial organizations and pursuit innovations within their borders.
Research limitations/implications: There is a literature gap in the area of corporate entrepreneurship studies in Macedonia. Most studies concerning entrepreneurship are about small and medium enterprises.
Practical implications: This study will increase the understanding of how corporate organizations in Macedonia can encourage entrepreneurial behavior and enhance innovations and better performance.
Originality/value: This research contributes to the field by offering support and new findings. This study adds to the body of literature in what is considered relatively new and unexplored area of study. The survey conducted among Macedonian organizations contributes a lot for the knowledge about corporate entrepreneurship in Macedonia.

Key words: Corporate entrepreneurship, Entrepreneurial Behavior, Management, Macedonia

1. Introduction

The world of globalization is all about change and speeding the paste for every organization. Their environment constantly changes and creates difficulties to maintain normal processes. Organizations are faced with accelerated development of new technologies, highly innovative competitors, more demanding and complex customers, more aggressive regulations, more sophisticated suppliers, competitive advantage achieved through global outsourcing and international strategic alliances, more rapid resource obsolescence, unpredictability of prices, costs, exchange rates, interest rates, tax incentives and more dramatic changes.
These turbulence in the environment is pressuring the organizations to find new paths to sustainable competitive advantage. Usually, their path leads back to their organization, to their internal operations and enhancing internal changes as response to the external ones. This also

models of rewarding, control and leadership style, which can be overcome with entrepreneurial behavior inside the organizations.

2. Corporate Entrepreneurship

There are lot of definitions and research done in the field of entrepreneurship over the last decades. The most common terms identified in content analysis of 75 contemporary definitions of entrepreneurship are: starting/founding/creating; new business/new venture; innovation/new products/new market; pursuit of opportunity; risk taking/uncertainty; profit seeking/personal benefit. [1] According to the definitions, entrepreneurship is a process that can happen in different organizational contexts.
Very explicit and wide definition of entrepreneurship is given by Stevenson and Jarillo-Mossi: "the process of creating value by bringing together a unique combination of resources to exploit an opportunity". [2] This definition has four crucial elements which describe entrepreneurship the best way:

- Process – which can be applied in any organization settings (micro, small, medium and large organizations);
- Creating value – through this process entrepreneurs create new meaning for their product, market, or within the organization;
- Unique combination of resources – entrepreneurs find new or improved ways to use their resources, like technology, people, money, distribution channels etc.;
- Exploit opportunity – entrepreneurs see their weaknesses, strengths, threats as opportunities and with controlled risks make them challenges and possibilities for success.

Today's business owners are tuning their mind set and behavior in this mode of entrepreneurship in order to survive and become better and more profitable than the competition. They have entrepreneurial behavior inside their mid-sized and large organizations. This kind of entrepreneurship is usually named as "intrapreneurship", "organizational entrepreneurship", "corporate venturing" and "corporate entrepreneurship".
Corporate entrepreneurship involves generation, development, and implementation of new ideas and behaviors by a company. [3] According to this definition, corporate entrepreneurship centers on enhancing the organization's ability to be innovative and creates new products, services or programs. Other definitions, add the ability of established organizations to renew themselves. Also, some definitions add that corporate entrepreneurship is about corporate venturing which leads to creating new business organizations within the corporation. [4]

3. Corporate Entrepreneurship versus Start-Up Entrepreneurship

When we hear the word "entrepreneurship" the first association, most likely, will be individual with an idea, creating new business. We may also say that entrepreneurs are idealists but they are also persistent, hard-working and energetic persons; they don't waste time, rather, they use their talent and knowledge, their skills, their time and energy. But the nature of entrepreneurship is universal. It can be applied when starting a new business, but also exploiting new opportunities in mid-sized, large conglomerates, non-profit organizations and public institutions.
There are great numbers of similarities between corporate and start-up entrepreneurship: [5]

- Both involve opportunity recognition and definition;
- Both require a unique business concept that takes the form of a product, service, or process;

- Both are driven by an individual champion who works with a team to bring the concept to fruition;
- Both require harvesting strategies;
- Both are predicated on value creation and accountability to a customer;
- Both require that the entrepreneur be able to balance vision with managerial skill, passion with pragmatism, and proactiveness with patience;
- Both involve concepts that are most vulnerable in the formative stage, and that require adaptation over time;
- Both entail risk and require risk management strategies;
- Both find the entrepreneur encountering resistance and obstacles, necessitating both perseverance and an ability to formulate innovative solutions.

The reality is that lot of start-up businesses are highly entrepreneurial, but also some large organizations as well. They both struggle during the process and have lot of obstacles to prevail and succeed at the end.

Still, we can find number of differences between start-up and corporate entrepreneurship, which reside on the nature of the organization, the existing management processes, number of employees etc. For instance, entrepreneurs take risks, they "own" the innovative idea, they are very vulnerable and have little security and safety net, but they have speed of decision making, independence, flexibility in trying new things. On the other hand, corporate entrepreneurs have more room for failure, are more insulated from outside influence, have access to finances, have job security and extensive network for bouncing ideas, but also have interdependence, lot of rules and procedures to follow, longer approval cycles and more bureaucracy.

Large organizations have inherent problem of being entrepreneurial for a lot of reasons. These barriers can be systematized in 6 categories: systems, structures, direction, procedures, people and culture. Some of the constraints are: oppressive control systems, overly rigid, formal planning systems, too many hierarchical levels, restricted communication channels, top-down management, no formal strategy for entrepreneurship, no vision from the top, no entrepreneurial role models at the top; long, complex, approval cycles; unrealistic performance criteria; fear of failure; short-term orientation; inappropriate skills and talents for managing entrepreneurial change; values that conflict with innovativeness, risk-taking, and proactiveness. [6]

4. Corporate Entrepreneurship in Macedonian Organizations

The purpose of this paper is to examine how existing organizations in Macedonia represent the concept of an entrepreneurial organization within the sphere of corporate entrepreneurship. The research was conducted to provide an understanding of corporate entrepreneurship in Macedonian organizations. The research question posed is that do organizations in Macedonia have corporate entrepreneurship? Are Macedonian managers oriented toward corporate entrepreneurship?

The primary objective of this research is to look of the inherent manifestation of corporate entrepreneurship in Macedonia. The secondary objective of this research is to identify manager's perceptions and importance of corporate entrepreneurship in their organizations.

The expected results from this study were:

1. Macedonian managers take moderate level of risk in their organizations.
2. Managers are aware of organizational barriers to corporate entrepreneurship.

Methods

Sample

The sample group consisted 62 managers from different organizations in Macedonia. Because of incomplete data 8 managers were not included in the final analyzes of the results, which induced the sample to 54 managers. The sample group consisted 15 males (27,8 percent) and 39 females (72,2 percent). According to their age respondents in this survey were divided in 5 groups:

- 20-30 years: 12 (22,2 %)
- 31-40 years: 29 (53,7%)
- 41-50 years: 9 (16,7%)
- 51-60 years: 2 (3,7%)
- More than 60 years: 2 (3,7%)

The respondents had different educational background:

- High school diploma: 1 (1,9%)
- Bachelor diploma: 25 (46,3%)
- Master of science: 21 (38,9%)
- Ph. D.: 7 (13,0%)

They were all working on managerial positions, among which 17 (33,3%) were top managers, 27 (47,1%) were middle level managers and 10 (19,6%) were first line managers. The respondents had between 1 and more than 30 years of working experience: 0-5 years – 28 (51,9%) managers, 6-10 years – 15 (27,8%) managers, 11-20 years – 6 (11,1%) mangers, 21-30 years – 4 (7,4%) managers, more than 30 years of working experience – 1 (1,9%) manager. The respondents are working in different organizational settings in different sectors: production, service, education, health, construction, retail.

Data collection

The survey was conducted by creating a questionnaire which was send through e-mail to managers in lot of organizations in Macedonia. They received an explaining of the study and were invited to participate. Data was collected during the winter of 2012.

Measurement of variables

In this survey respondents answered questions concerning corporate entrepreneurship and their orientation to entrepreneurial behavior: innovativeness, risk-taking, proactiveness, need for achievement and autonomy. Here are some questions that we asked our students to assess themselves:

1. How committed are you in experimentation within your organization?
2. What are the levels of barriers in your organization you have to overcome?
3. To what extend you are open to new ideas or information?
4. To what extent your organization encourages the employees to take risks?
5. To what extent do you agree with the saying: Conventions and rules are meant to be broken?

Data analysis
For all the questions descriptive statistics were calculated.

4.1. Results

On the first question the respondents rated themselves on the level of risk-taking. From the results we got 39,5% of the respondents take risk very often, 48,8% of the respondents take moderate level of risk and only 11,6% of them rated themselves with low level of risk-taking.

The second questions: How committed are you to experimentation within your company?, the respondents who answered always were 37,2%, regularly were 55,8% and rarely only 7%.

On the third question: To what level would you rate your desire to achieve in your company?, 86% of the respondents rated themselves with high and 14% of the rated themselves moderate. There was nobody from the respondents to rate himself with low level of desire to achieve.

The next question: How much do you like doing following types of work?, showed that most of the respondents rarely want to do work which requires lower effort (60,47%) and work which is repetitive (62,79%). On the other hand, most of the respondents want to do work which is challenging (79,07%) and abstract work where they have autonomy (62,79%).

The next questions: What are the levels of barriers you have to overcome in your organization in terms of:

- Established control systems: very high (17,07%), high (26,83%), moderate (43,9%), low (12,20%)
- Organization structure: very high (14,63%), high (36,59%), moderate (36,59%), low (12,20%)
- Policies and procedures: very high (19,51%), high (24,39%), moderate (36,59%), low (19,51%)
- Management and leadership: very high (20,00%), high (30,00%), moderate (32,50%), low (17,50%)
- Strategic direction: very high (14,63%), high (36,59%), moderate (36,59%), low (12,20%)
- Organizational culture: very high (14,63%), high (29,27%), moderate (43,90%), low (12,20%)

When the respondents were asked to rate themselves how much they agree or disagree with the following questions, they gave these answers:

- I evaluate the potential success of any project with the level of risk undertaken: 69,05% agreed, 16,67% strongly agreed;
- I do not act under conditions of uncertainty: disagree (53,66%), agree (26,83%), strongly agree (7,32%);
- The company encourages employees to take certain calculated risks: disagree (38,10%), agree (45,24%), strongly agree (14,29%);
- I act toward attaining the needed action to achieve the results desired: disagree (2,44%), agree (46,34%), strongly agree (46,34%);
- Knowledge flows freely and openly at my work place and assists in decision making: disagree (11,90%), agree (45,24%), strongly agree (40,48%);

- I constantly give due consideration to the expectation of success or failure on my action: disagree (7,32%), agree (56,1%), strongly agree (31,7%);
- I am aware of perceived barriers (personal and external) to my achievement and seek help to overcome such perceived barriers: disagree (4,76$), agree (45,24%), strongly agree (47,62%).
- According to the results from this study we may conclude that the respondents take risk while working. Third of the respondents always take risks when they have a chance, while half of the respondents regularly take risks. Most of the respondents desire to achieve in their organization. There was nobody from the respondents to rate himself with low level of desire to achieve. They would like to achieve their results working work which is challenging and where they have autonomy. They would rather not choose work which requires lower effort and is repetitive. These answers show us that the respondents prefer work which is sometimes new for them or which creates new products or services.

The results also show that the respondents are aware of the barriers present at their organizations which may be an obstacle for entrepreneurial behavior. They noted that most of their established control systems are perceived as a barrier, as well the organization structure. In lot of situations the management and leadership, as well as the strategic goals of the organizations can be barriers for entrepreneurial behavior.
When the respondents were asked about the relationship they evaluate between success and risk taken in every project, most of them replied that this the way they function. On the other hand, almost one third of them said that they would not act under conditions of uncertainty.

Also, most of the respondents are concentrated on the results of success or failure, which in some extent shows us that they feel pressured to have success and don't allow themselves or empower other to experiment and behave entrepreneurial. These conclusions can be confirmed with another answer, on how much their organization encourages employees to take certain calculated risks. The respondents also showed big awareness of the organizational processes and barriers to their achievement.

5. Conclusions

The results from this research show that Macedonian managers take moderate level of risk in their organizations. All of the respondents strive for success and great achievements, but very often they take only good calculated risk. They are also aware of organizational barriers to corporate entrepreneurship. Advice for them would be to analyze their organizational structures and control systems, modify them if necessary to enhance creative work and entrepreneurial thinking. Also, they should consider different management and leadership style which will develop organizational culture which enhance entrepreneurial learning, different control mechanisms, and openness to creative and innovative ideas, changing the mindset of the employees and their acceptance of changes, as well as orientation to improving the existing products, services and processes. Good starting point for developing corporate entrepreneurship is developing R & D centers, learning from good practices, searching for

talented employees and encouraging them to think outside the box. Try to have different approaches to problems, for instance when making a decisions they can use techniques for creative and critical thinking. Changes must start from the top management and then go down through the organization.

The research done during the study of the topic corporate entrepreneurship in Macedonia showed that there are only few articles written on the topic, but no research was yet done and published. The response from the managers when we started the research was that they perceive corporate entrepreneurship as something very important for their organizations, and see this process as needed for creating competitive advantage. On the other hand, most of the organizations in Macedonia still have rigid organizational structure, ineffective communication channels and lot of other barriers for creating entrepreneurial organizations. Still, there are good examples in Macedonia that have well developed corporate entrepreneurship. One of these organizations is Seavus, which nowadays operates as a multinational company, which is concentrated in developing new products and services. They are operating in the spirit of innovation, creativity and challenges for greater success. This example can serve as a good role model for other organizations in Macedonia and may be a case study for our next research in the field of corporate entrepreneurship.

References

1. Kuratko D. F. Morris M. H. Covin J. G. Corporate Innovation & Entrepreneurship 3rd Ed. South-Western. Cengage Learning. 2011: 11
2. Stevenson H. H. Jarillo-Mossi J. C. Preserving Entrepreneurship as Companies Grow. Journal of Business Strategy: 10. 1986
3. Damanpour F. Organizational Innovation: A Meta-Analysis of Determinants and Moderators. Academy of Management Journal. 34. 1991: 355
4. Kuratko D. F. Entrepreneurship: Theory, Process and Practice, 8th Edition. Mason: Cengage /South Western Publishing. 2009: 12
5. Kuratko D. F. Morris M. H. Covin J. G. Corporate Innovation & Entrepreneurship 3rd Ed. South-Western. Cengage Learning. 2011: 36
6. Morris M. Entrepreneurial Intensity Westport, CT: Quorum Books. 1998: 97

COMPARISON OF FLEET MANAGEMENT SYSTEMS AND FUTURE STRATEGIES FOR PARTNERSHIPS WITH REGIONAL TECHNOLOGY LEADERS

Dashmir Istrefi[1], Betim Çiço[2], Branko Trajkovski[3]

[1]*Polytechnic University of Tirana, Tirana, Albania, d.istrefi@gmail.com*

[2]*SEEU, Tetovo, Macedonia, bcico@abcom-al.com*

[3]*Fleet Consulting, Skopje, Macedonia, branko.trajkovski@bransys.com*

Anytime, anywhere access to real-time intelligence from remote devices is changing the way that businesses operate. The purpose of the paper is compare existing Fleet Management systems and brings together Fleet management solution enablers with regional technology leaders to shorten time to market of new products and grab the opportunities that machine to machine (M2M) market has to offer in the region. The research focuses on different marketing models of the existing solutions reselling models, in-house development model and also external innovation model. Although the number of connected devices, machines that require connectivity is increasing, so far they have not been widely adopted in the South East European region. The paper explores the key business drivers behind machine to machine (M2M) communications, the different hardware, software and communications elements involved, and describe how to introduce the technology effectively.

Keywords

Corporate Entrepreneurship, Fleet Management Solution, Open Innovation, Strategy Development Process

1. Introduction

Recent technological developments in several of industries such as automotive industry, Healthcare, Electricity, Banking and Retail have led to discovering new business models and created new market potential. On the other hand Telecom companies that have already achieved a high penetration level on most of the existing markets are in a search for new challenges that would enable them further growth within the industry. This growth would be in the field of M2M communication where the number of connected devices increases and is estimated that the number of connectable machines is five times greater than the amount of humans [1].

The research paper evaluates available Fleet Management solutions and explores the possibilities for regional partnerships using M2M technology. The effectiveness of a company's transport and logistics system has a major impact on cost structure, revenues, and competitiveness of the business. However it still leaves room for further improvements and providing solutions for specific types of businesses that operate locally, with main focus on Transport and Logistics Company that is included in the research paper.

Previous successful use case on taxi companies is elaborated in [2] which describe the benefits of Fleet Management system for route, fuel monitoring, all resulting on higher number of trips per car, higher revenues and reduced costs.

Fleet management system has brought GPS technology into every type of vehicle used for both tracking and navigation. The tracking part of the device helps the system detect and notify where the vehicle is moving, whereas the navigation part helps the driver to reach the destination. Companies that run several of businesses and are in need of such solution can be identified in different segments, and those mainly include:

- Transport and logistics companies, they operate large fleets that need to know where they are located and how to optimize their transport routes, or ensure that the goods which are transported are secure
- Taxi companies, real-time tracking of their vehicles and additional monitoring functionalities to keep costs under control
- Public transport companies, mainly include bus transportation system for local, regional or international transport
- Security agencies, mainly track their fleet for security reasons
- Other companies or institutions, that are in need to track their fleet in order to reduce their operational costs, ambulances, municipalities, banks

As we take into consideration Fleet Management system in transport and logistics in this paper, the devices used for this research paper include terminals like TELTONIKA FM1100 and FM4200 [3]. The software for reporting, monitoring and managing the fleet is hosted on cloud infrastructure (offering as SaaS, Software as a Service) and can be easily accessed by the end customer without any additional need of expensive servers, or additional software/hardware installations. This presents a different model from what previous systems offer as a solution where mostly customers have to take care locally about the data that is collected from the devices.

Part 2 gives a literature review based on some published work on Fleet Management features or solutions. The following part of the paper compares current business models and which models create competitive advantage for the company allowing it to connect to the overall innovation process. It gives an overview on the solutions in Macedonia and which are the factors of introducing innovative product on the market. Part 4 of the paper shares the result of the experiment and the last part the derived conclusions.

2. Literature review

Several researches are conducted for various solutions which are dedicated for solving several problems. Persson in [4] describes how multi-agents are illustrated within a smart parking management application. Other research papers in the field of fleet management [5], [6], [7]; describe basic implementation, where the research paper [7] describes how the Alcohol detection module is implemented in the vehicles. When alcohol will be detected the led from the experiment will glow. Research paper presented in [8] explains how SMS technology can help to locate the vehicle. The proposed work collects positions of the vehicle via GPS receiver and then sends the data of positions to specialized server by the SMS service. After that the position of the mobile vehicle will be displayed on Google Map. The main disadvantage with this solution is that the system offers only live tracking and historical reconstruction.

Paper [9] mainly consists of three steps including vehicle region extraction, vehicle tracking and classification. After vehicle detection, a graph-based vehicle tracking method is used for building the correspondence between the vehicles detected. The communication through satellites can be used as a substitute technology but this has many disadvantages and those include the cost of implementing such solutions is expensive for a one time investment and monthly/yearly licenses. The only benefit is that it does not require additional costs such for

GPRS traffic, neither roaming DATA charges which at the moment are high and are not regulated in the South East European market by regulatory agencies as they are on European Union markets [10]. However running satellite solution is more expensive and provides worse experience due to the fact that parameters send to the server require longer period [11].

3. Situation in Macedonia and region

Fleet management can optimize capital assets while minimizing operations and maintenance costs. Unlike in the case of manufacturing, large-scale installations offer limited economies of scale. While the cost of vehicle tracking technology decreases over time as volumes increase, the cost of installation and logistics remains the same and it is estimated to account for half of the total cost. Thus the ability to execute an efficient rollout is therefore the most critical factor for achieving high return of investments in vehicle tracking. These are one of the main reasons why such systems are not yet widely deployed in Macedonia and countries in the region. Currently there are different vendors that offer such solutions with different set of functionalities but most of them do not take into consideration the particular needs of general use cases.

Parties involved that could offer such solution include:

- Solution provider
- Hardware manufacturer
- Network operator
- Open business model

Results of the analysis for all available option are summarized in the table 1. Conclusions are derived from interviews with solution providers, end customers and market monitoring of actual sales in the region.

Table 1 Advantages/Disadvantages of solution approach.

	Solution Provider	**Hardware manufacturer**	**Network Operator**	**Open business model**
Know-How	High	High	Low	High
Billing system expertise	Very Low	Very Low	High	High
Target potential customers	Medium	Low	Medium	High
Marketing	Very Low	Very Low	High	High
Financial benefit	Medium	Medium	Medium	High
Cloud Infrastructure	Medium	Low	High	High
Sales force	Medium	Low	High	High

From the table 1 solution provider companies are the experts when building such solutions but they lack the following important points:

- Billing system for maintaining and revenue collection from end user for providing such service
- Marketing and sales force to promote and sell the solution using their CRM system.

On the other sides mobile network operators lack the developing experience (Know-How) due to being focused into mainly core business solutions.

That is the reason that the model in this paper combines both parties with involvement of end customers in form of partnership model which is a win-win situation for all parties involved.

The changing forces in the economics of innovation are forcing companies to open up their innovation process. According to Chesbrough in [12] this forces include the rising costs of technology development, combined with the shortening of marketing live products.

With open business model companies are broadening the potential markets by utilizing all the resources by not restricting the markets that are close to the core businesses. This is shown in figure 1.

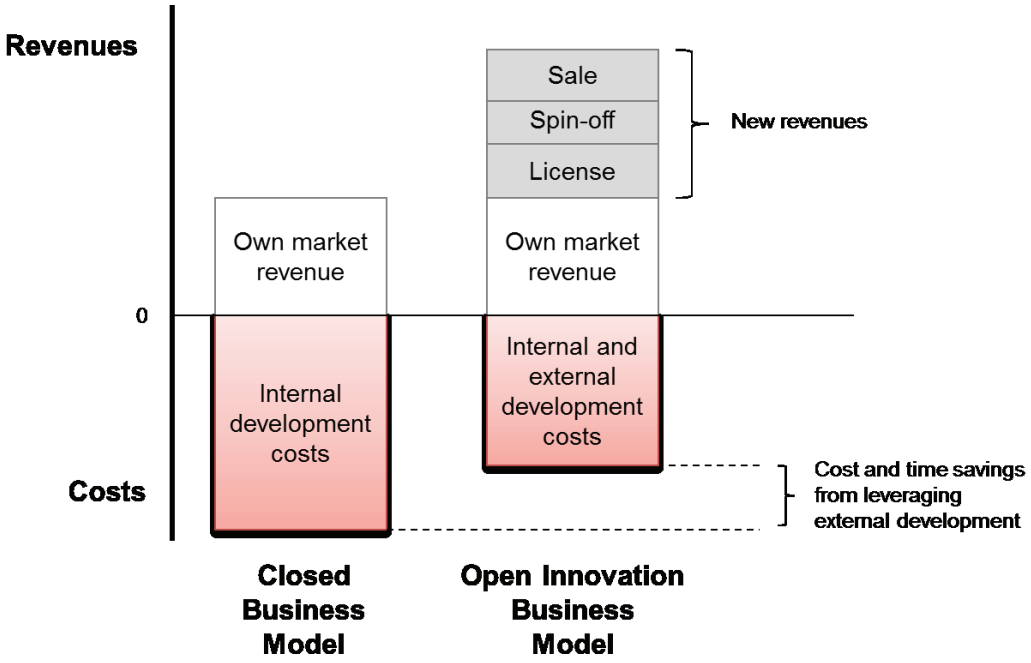


Figure 1 The new business model of Open Innovation [12].

3.1 Challenge of introducing new product in short time

Common features which most of the Fleet Management solutions provide are explained in Table 2 and there are several features that need to be upgraded to fit certain types of businesses.

Table 2 Common features and improvements.

	Existing solutions	Room for improvement
Live tracking of one or more vehicles	X	
Follow speed of movement	X	
Graphical reconstruction of trajectory of movement in map	X	
Report for point of interest (time spent and length from point to point)	X	
Report for total usage of vehicle, highest speed, average speed, engine on/off	X	

Defining route (control if vehicle is out of interest zone)	X	
Position of vehicle through SMS (when on roaming network)	X	X
"Panic button" – alarming button for certain situations	X	X
Engine blockage		X
Radius alarm – vehicle movement without engine on	X	
Geo-fencing – alarming in case of entrance/exit of a defined zone	X	X
Fuel consumption		X
Temperature level		X

The case which was studied in this research paper has to do with solving specific need for special target group of customers resulting in new revenue stream. One such special target group was described in previous paper [2] which was intended for taxi companies. With companies that work with transport and logistics different unmet needs were identified. Drivers that work for a transport and logistics company travel longer than average drivers making them exposed to more potentially dangerous situations. The existing Fleet Management system does not provide the functionality to alert the driver when certain hazardous situations are about to occur.

3.2 External innovation for addressing costs and revenues

Mobile network operator through their business channels are constantly in contact with end customers and regularly conduct market research to measure what types of services customer needs and identify new markets for generating new revenue streams. By using external innovation the lifetime of launching new product is shorter and at the same time reducing the costs for development by cooperation with Fleet Management solution provider that have the know-how. The main challenge was to find a hardware vendor that would provide a system for collision preventing because Teltonika devices do not provide such functionality. Then the system for collision preventing has to be integrated with the Fleet Management system to be able to track all information.

Figure 2 shows some of the features that the system provides and those include:

- Reports or alerts when vehicles are used out of working hours for private purposes
- Places that are visited outside of the defined zone that is allowed
- Fuel sensors – detect the fuel level of the vehicle
- Driver identification – whether an authorized driver is driving the vehicle

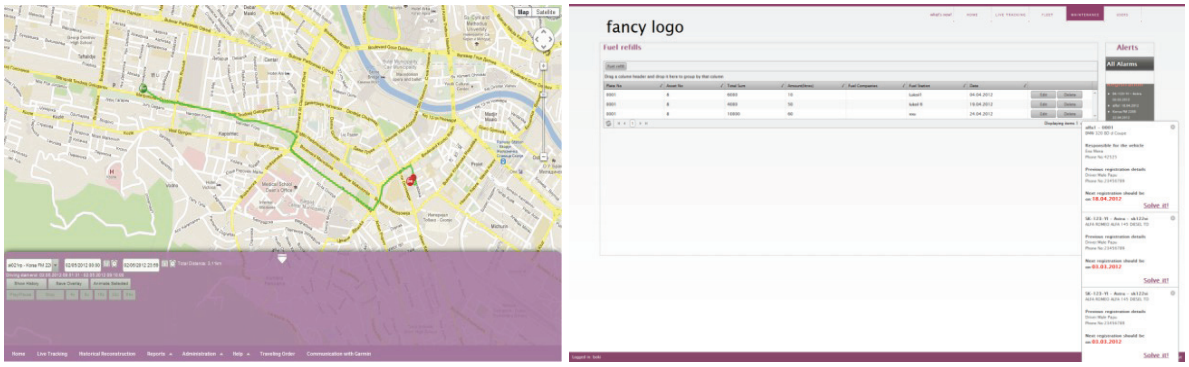


Figure 2 Live tracking and reporting of Fleet Management system.

The collision preventing system is a system that is provided by MobileEye [13] a development center for Advance Driver Assistance Systems (ADAS) that cooperates with OEM (Original Equipment Manufacturer) in automotive industry and Fleet Management Systems Providers worldwide. Their Collision Prevention System is consisted of the following components (Figure 3):

- Camera/Buzzer Unit
- Display and Control Unit

Figure 2 Components of Collision Prevention System.

The camera/buzzer unit identifies lane markings, vehicles and pedestrians that are ahead of the driver. It also instructs the system display unit as to which alert to display.

The display and control unit provides with visual alerts like visual indication of the driving distance from the vehicle ahead, system status indications like low visibility indication.

The system alerts in several cases for example when the driver is in danger to collision with the vehicle, pedestrian ahead, or also when the driver is about to unintentionally swerve outside of the lane he is driving in.

4. Results

The implementation was successfully implemented on one of the leading companies in the country for transporting beverages. The whole components of the system were installed on 83 vehicles. The main challenges for the project are that there is no blueprint for development and standards are still being set. Developing an in-house solution from scratch would have taken longer time and increased cost for R&D. The connection scheme is displayed in figure 3.

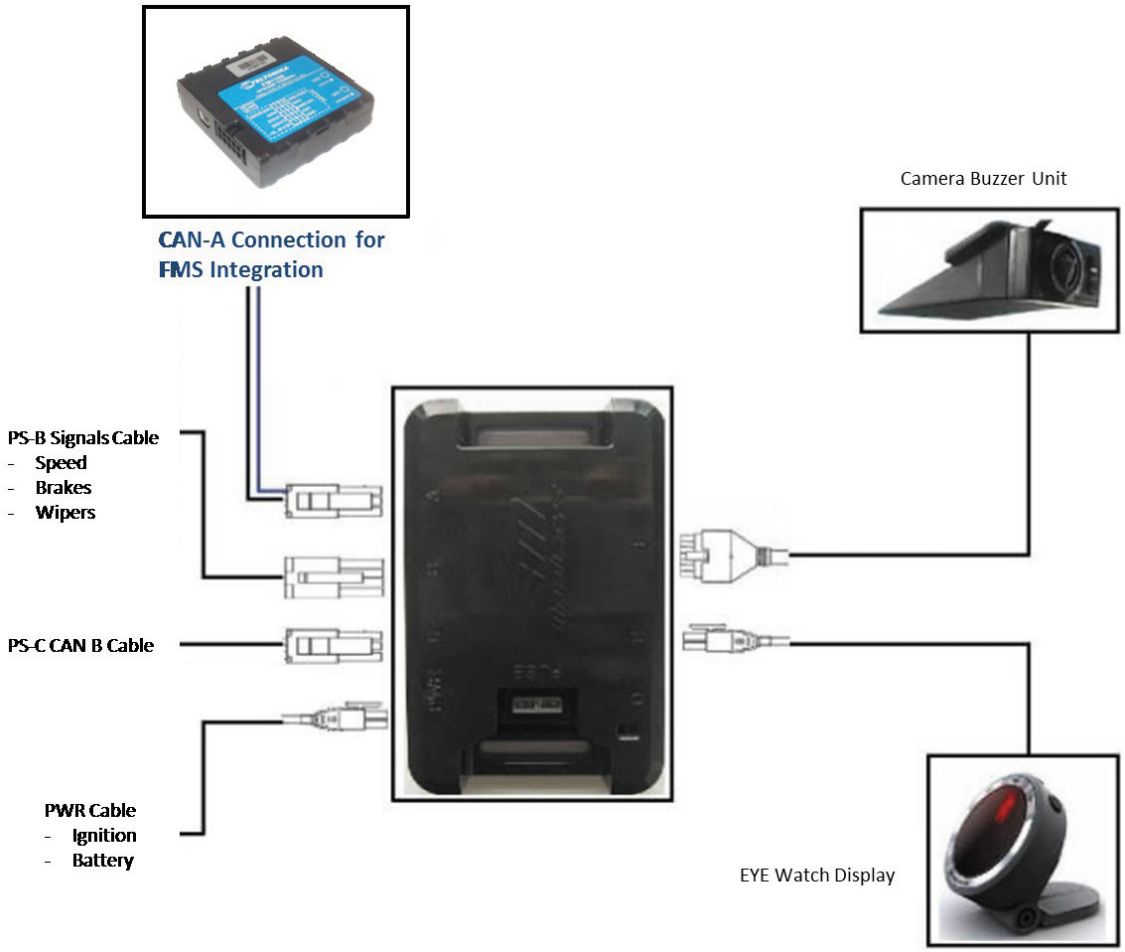


Figure 2 Collision Prevention System connection scheme.

The camera/buzzer unit identifies lane markings, vehicles and pedestrians that are ahead of the driver.

Display and Control Unit gives indications what is the distance from the vehicle ahead.

5. Conclusions

It is now possible to link almost any type of remote machine to critical information systems and gather real-time field intelligence that can be used to improve efficiency, reduce costs, introduce new services and gain competitive advantage. The new product developed could target as well as international markets thus bringing opportunity for revenue generation and improved customer satisfaction. M2M projects are specific to a vertical industry, requiring expert knowledge of that sector [14]. Large enterprises have large IT departments with the resources and business knowledge to develop in-house systems but they still need suppliers and partners for sourcing sensors, devices, hardware, wireless connectivity and Fleet Management software platforms. Future research will include developing similar scenarios using innovation SIT tools [15] (multiplication technique) to introduce new product for different M2M vertical.

References

1 European Telecommunications Standards Institute, Machine to Machine Communications, MWC, Barcelona February 2011, [Online]. Last accessed May 2012, http://www.etsi.org/WebSite/document/EVENTS/ETSI%20M2M%20Presentation%20during%20MWC%202011.pdf.
2 D. Istrefi, B. Cico, Fleet Management Solutions: Effective fuel management and lowering operating expenses, International Journal of Science, Innovation and New Technology, 30 November, 2012
3 Teltonika, *Official Web Site* [Online]. http://www.teltonika.lt/en/pages/view/?id=10), Last accessed 25 April, 2012
4 C. Persson, G. Picard, F. Ramparany, A Multi-Agent Organization for the Governance of Machine-to-Machine Systems, International Conference on Web Intelligence and Intelligent Agent Technology, 2011
5 P. B. Jeon, et al., Semantic Negotiation-based Service Framework in an M2M Environment, International Conference on Web Intelligence and Intelligent Agent Technology, 2011
6 G. Coulson, et al., Flexible experimentation in Wireless Sensor Networks, Communications of the ACM, January 2012
7 A. Alexe, R. Ezhilarasie, Cloud Computing Based Vehicle Tracking Information Systems, IJCST, Vol. 2, Issue 1, March 2011
8 Thuong Le-Tien, Vu Phung, Routing and Tracking System for Mobile Vehicles in Large Area, The Dept. of Electrical Electronics Engineering, HCM University of Technology, Vietnam
9 Jin-Cyuan Lai, Shih-Shinh Huang, Chien-Cheng Tseng, Image-Based Vehicle Tracking and Classification on the Highway, Dept. of Computer and Communication Engineering, National Kaohsiung First University of Science and Technology
10 Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union [online] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:172:0010:0035:EN:PDF Last accessed 28 February, 2013
11 D. Hart, Satellite Communications, August, 1997 [online] http://www.cs.wustl.edu/~jain/cis788-97/ftp/satellite_nets.pdf
12 H. Chesbrough, Open Business Models: How to Thrive in the New Innovation Landscape, Haas School of Business UC Berkley, 6 December, 2006
13 Mobile Eye, C2-270 Collision Prevention System User Manual, [online] http://www.c2sec.com.sg/Files/Mobileye%20C2-270%20UserManual.pdf, Last accessed 13 February 2013
14 Vodafone, Global Machine to Machine Communication, Whitepaper, 2010 [online] https://m2m.vodafone.com/insight_news/white-paper/the-machine-to-machine-whitepaper.jsp, Last accessed 15 February 2013
15 Goldenberg J, et. al., Finding Your Innovation Sweet Spot, Harvard Business Review, R0303J, March 2003

CORRELATION BETWEEN FDI AND GDP GROWTH RATE IN TRANSITION ECONOMIES – EXAMPLE OF SERBIA

Branislav Fodora[1], Suzana Kolar[2]

[1] Secondary school of Economics, 23 Trg Bratstva i jedinstva Street, Bačka Palanka, Serbia, ekobp@neobee.net
[2] PhD student at the Faculty of Economics, University of Novi Sad, Serbia, Secondary school of Economics, 23 Trg Bratstva i jedinstva Street, Bačka Palanka, Serbia, suzana.kolar@yahoo.com

Abstract: The aim of this paper is to analyse methodical and practical aspects of FDI and its impact on the GDP growth rate in Serbia. The need for extensive enterprise restructuring and modernization in view of limited domestic resources creates an environment where the potential benefits of FDI are especially valuable. Also, transition economies are well placed to benefit from the technology and knowledge transfer associated with FDI. As a result, attracting FDI has become a prominent item on the policy agenda, especially in transition economies. In this paper we rely on the analysis of empirical studies, which in combination with the analytical approach and econometric methodology, is supposed to show whether FDI have influence on GDP growth rate. The first part deals with literature review. The second chapter presents benefits Serbian government provides to attract FDI and level of FDI since a beginning of transition process. The third chapter analyse through regression model whether FDI have influence on GDP growth rate in Serbia. GDP growth rate is used as an independent variable and FDI is used as a dependent one. Finally, we presented some findings whether FDI play a key role in economic development in Serbia.

Keywords:
Correlation between FDI and GDP growth rate, FDI in Serbia, GDP growth rate in Serbia

1. Introduction – Literature Review

During the last decade a number of interesting studies on the role of foreign direct investment in stimulating economic growth has appeared. In an excellent survey de Mello lists two main channels through which FDI may be growth enhancing. [1] First, FDI can encourage the adoption of new technology in the production process through capital spillovers. Second, FDI may stimulate knowledge transfers, both in terms of labour training and skill acquisition and by introducing alternative management practices and better organizational arrangements. The way in which FDI affects growth is likely to depend on the economic and technological conditions in the host country.
Macroeconomic studies – using aggregate FDI flows for a broad cross-section of countries – generally suggest a positive role for FDI in generating economic growth especially in particular environments. [2] For instance, Borensztein, De Gregorio, and Lee argue that FDI has a positive growth-effect when the country has a highly educated workforce that allows it to exploit FDI spillovers. [3] While Blomstrom, Lipsey, and Zejan find no evidence that education is critical, they argue that FDI has a positive growth-effect when a country is sufficiently rich in terms of per capita income. [4] In turn, Alfaro, Chandra, Kalemli-Ozcan, and Sayek draw attention to financial markets as they find that FDI promotes economic

growth in economies with sufficiently developed financial markets, [5] while Balasubramanyam, Salisu, and Sapsoford emphasize trade openness as being crucial for acquiring the potential growth impact of FDI. [6]
Choe analyse bi-directional causality between FDI and growth, although he finds the causal impact from FDI to growth to be weak. [7] Basu, Chakraborty and Reagle emphasize trade openness as a crucial determinant for the impact of FDI on growth, as they find two-way causality in open economies, both in the short and the long run, whereas the long-run causality is unidirectional from growth to FDI in relatively closed economies. [8]
Romer argues that there are important *idea gaps* between rich and poor countries. [9] He notes that foreign investment can ease the transfer of technological and business know-how to poorer countries. These transfers may have substantial spillover effects for the entire economy. Thus, foreign investment may boost the productivity of all firms, not just those receiving foreign capital. [10] In contrast, some theories predict that FDI in the presence of pre-existing trade, price, financial, and other distortions will hurt resource allocation and slow growth. [11] Thus, theory produces ambiguous predictions about the growth effects of FDI and some models suggest that FDI will only promote growth under certain policy conditions. Carkovic and Levine find that the exogenous component of FDI does not exert a robust, positive influence on economic growth. [12] Hansen and Rand we find that, on average, FDI has a significant long-run impact on GDP irrespectively of the level of development. [13]
FDI is growth-enhancing in the long run, via both knowledge transfers and the accumulation of capital stocks embodying newer technologies, and then this impact is likely to be lower in technological leaders than laggards. [14] As a result, the impact of FDI on growth seems to depend inversely on the technological gap between leaders and followers, even though there is evidence that the bulk of FDI occurs across technologically advanced economies. [15]

2. Volume and Structure of FDI in Serbia

The first regulations on foreign investment in the Yugoslav economy were adopted in July 1967, while more comprehensive foundations for regulating this field were established by the 1971 Constitutional Amendments. Ever since then this formulation has become a permanent provision of all the laws on foreign investments in the economy of Yugoslavia and, today, in the Republic of Serbia.
The level and dynamics of FDI in the period from 2001 to 2011 proved to be very uneven and such trends were the result of both internal and external factors. The leading internal factors included perceived instability, undeveloped institutions, as well as political differences in terms of reforms and European integration – particularly since the vast majority of EU members recognised Kosovo's independence in early 2008. The key external factors of FDI standstill were a relative abundance of capital up until late 2007 and the financial crisis, followed by the withdrawal of foreign investors, especially portfolio investors, from 2008 onwards. The level of FDI in the period from 2004 to 2011 we can see in the Chart 1.

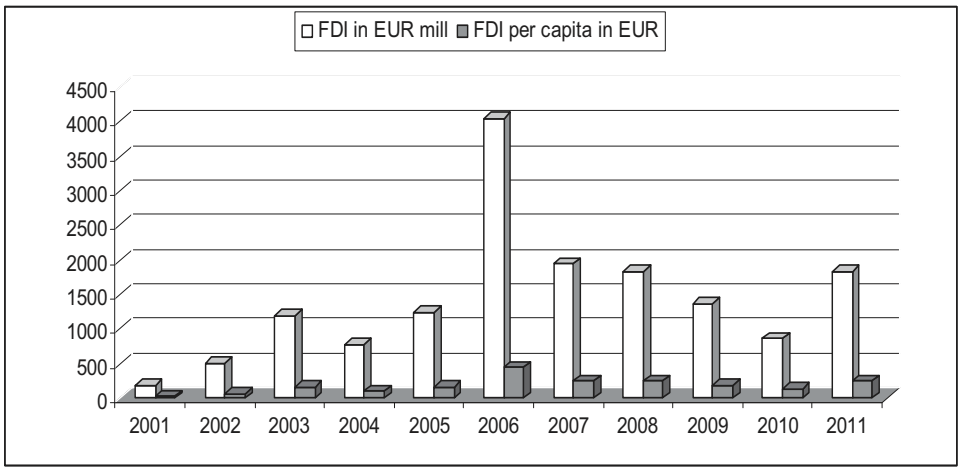


Chart 1 FDI in million EUR in Serbia in the period from 2004 to 2011 – annual data

According to the level and dynamics of foreign direct investments (FDI), the entire 2001-2011 period can be divided into three sub-periods; the first from 2001 to 2005, second from 2006 to 2008 and third from 2009 to 2011.

During the first period FDI in Serbia reached a level of around €3.1 billion. The largest portion of this amount was invested in the privatisations of companies with a profitable scope of activities (cement plants, tobacco industry, breweries, some food processing and metal processing industrial groups) and the acquisitions of banks. The share of Greenfield investments was very small and was mostly generated through retail and real estate investments.

The second period, from 2006 to 2008, saw FDI amount to about €6.3 million, but substantial Greenfield investments were not forthcoming in this period either, nor were there significant investments in so-called interchangeable goods sectors. The greatest volume of FDI during this period was realized in 2006 (€3.3 billion) when the largest transaction in the history of direct investments in Serbia was realised through the sale of mobile operator Mobtel to Norwegian giant Telenor.

Finally, during the financial and economic crisis from 2009 to 2011, FDI fell by about 50%, though investments in the manufacturing industry increased, especially in the domain of automotive machinery and spare parts. During this period FDI reached a total of around €4.2 billion, with the biggest single deal coming in 2011 through the sale of Serbia's biggest retail chain, Delta-Maxi, to Belgian chain Deleuze for €933 million. Total net FDI in Serbia during the entire period from 2001 to 2011 amounted to about €15.1 billion.

By far the greatest volume of FDI during the period from 2004 to 2011 was invested in the service sector; about 42% of total FDI volume. About 90% of FDI was related to the purchase of the assets of private, state-owned and socially-owned enterprises and banks in the process of tender and auction privatisation, while Greenfield investments remained in a very low level.

The biggest share of GDP was in 2006 (14.3%) which is in accordance with above mentioned period when Telenor bought Serbian mobile operator. The Chart 2 presented FDI level as percent of GDP in the period from 2001 to 2011.

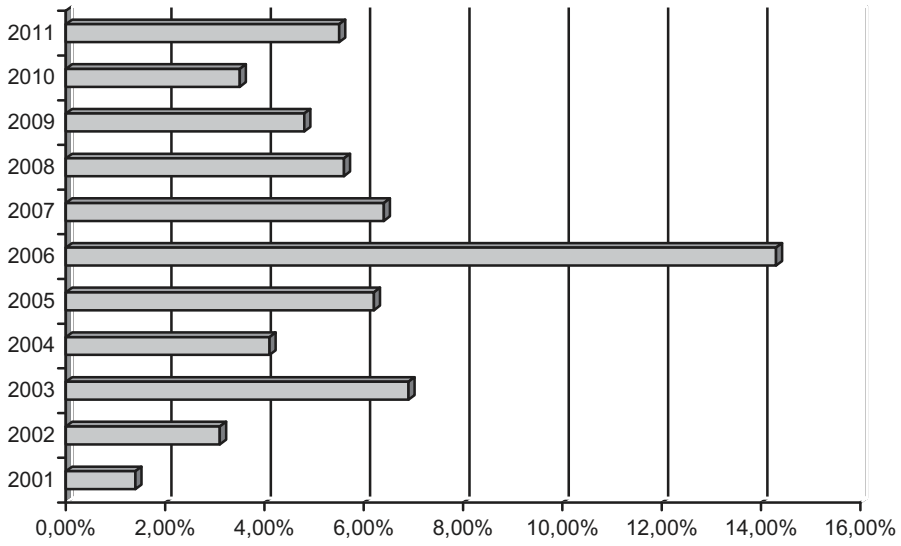


Chart 2 FDI level as the percent of GDP in the period from 2001 to 2011

As geography, climate and other specific benefits Stepanovic quotes: location along Corridor 10, linking Europe and the Middle East, central position in Southeast Europe and along the longest international waterway on the River Danube; free trade agreements with the Russian Federation, Southeast European countries (CEFTA), EFTA, Belarus, Kazakhstan and Turkey, simplified and liberal regulations on foreign trade and foreign investments, particularly within the seven free trade zones, shortened company registration procedure (one stop shop), competitive workforce, knowledge of foreign languages, computer literacy, very favourable, moderate continental climate, good and favourable supply of high-quality commercial and housing property, cheap natural foods and a great number of restaurants with diverse offers, a wide variety of cultural and entertainment facilities, natural rarities and environmental landscape treasures. [16]

According to Andreas Beikos (head of the EIB regional office in Belgrade), the climate for foreign investments have improved over the last three to four years and the perception might be that FDI will be on the rise considerably after Serbia obtained candidate status. Broad political, economic and social reforms – not to mention the dismantling of unnecessary bureaucracy – must be implemented, as these reforms lay the foundations for the promotion of a friendly business environment. This would unlock the momentum for much-needed FDI, as the Western Balkans are well placed to attract FDI due to a relatively low cost base, a skilled labour force and good geographical position.

According to Ernst Bode (president of Delegation of German Economy in Serbia), difficulties are created by sometimes appalling and confused procedures of the public administration, as well as its suffocating tardiness. The natural gas price is extremely high, the highway fees are too high, there are many hidden costs and the quality of infrastructure should be improved. There is a frightening lack of liquidity in the market. The advantages include the education of the people, the eagerness of many of them to move ahead, and their still relatively healthy attitude towards work and success compared to others. Tax rates are very stimulating and the electricity price is favourable.

3. Whether FDI have Influence on GDP Growth Rate in Serbia?

About level of FDI in Serbia we discuss in previous chart. Here we try to link FDI level and GDP growth in Serbia during the period from 2004 to 2011. First of all we decided to present FDI level in RSD million and GDP level in RSD million in Serbia in the period from 2004 to 2011 graphically.

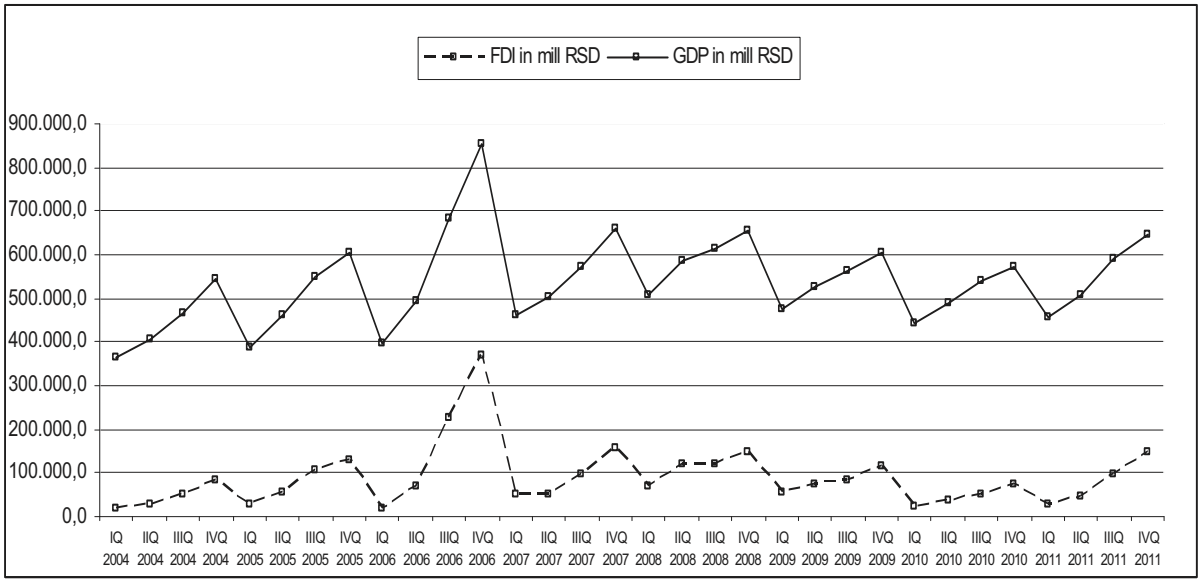


Chart 3 FDI in RSD million and GDP in RSD million in Serbia in the period from 2004 to 2011

In the next step we used the Least Squares method. As a dependent variable we used GDP in million RSD and as a dependent one we used FDI in million RSD. There are 32 included observations, because we observed quarterly data from January 2004 to December 2011. The observed model is:

$$GDP = c(1) + c(2) \times FDI + \epsilon$$

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	422506.2	10398.19	40.63268	0.0010
C(2)	0.310022	0.094520	3.279956	0.0026

R-squared	0.263950	Mean dependent var.	448655.6
Adjusted R-squared	0.239415	S.D. dependent var.	43299.67
S.E. of regression	37762.30	Akaike info criterion	23.97647
Sum squared resid.	4.28E+10	Schwarz criterion	24.06808
Log likelihood	-381.6235	Durbin-Watson stat	0.989475

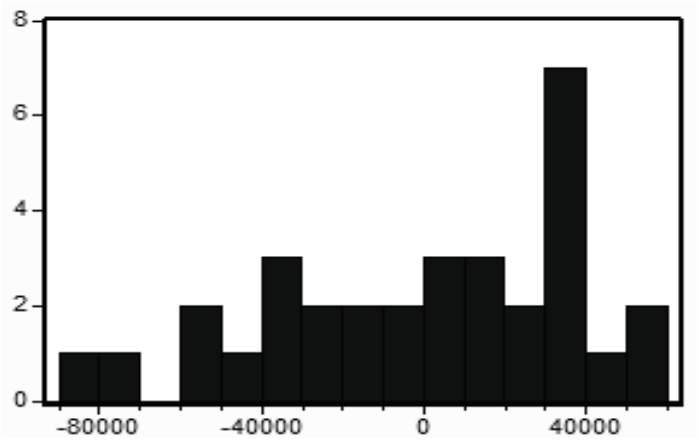
In the next step we want to test whether there are autocorrelation in the model. We used Breusch-Godfrey Serial Correlation LM Test and results are presented in the Table.

F-statistic	3.903574	Probability	0.007329
Obs*R-squared	15.80480	Probability	0.014841

In the Least Squares method there is RESID as a dependent variable. Resample missing value lagged residuals set to zero. There are six legs and we can see results in the Table.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	13083.50	9225.903	1.418127	0.1690
C(2)	-0.150237	0.092697	-1.620732	0.1181
RESID(-1)	0.519818	0.192805	2.696077	0.0126
RESID(-2)	-0.095959	0.208581	-0.460056	0.6496
RESID(-3)	-0.109249	0.180725	-0.604501	0.5512
RESID(-4)	0.764476	0.203896	3.749351	0.0010
RESID(-5)	-0.395573	0.217604	-1.817861	0.0816
RESID(-6)	-0.014033	0.222370	-0.063107	0.9502

R-squared	0.493900	Mean dependent var.	1.05E-11
Adjusted R-squared	0.346287	S.D. dependent var.	37148.24
S.E. of regression	30035.28	Akaike info criterion	23.67045
Sum squared resid.	2.17E+10	Schwarz criterion	24.03688
Log likelihood	-370.7272	Durbin-Watson stat	1.542101



Mean	1.05E-11
Median	7142.264
Maximum	52985.42
Minimum	-81548.87
Std. Dev.	37148.24
Skewness	-0.491920
Kurtosis	2.261873
Jarque-Bera	2.017028
Probability	0.364761

4. Conclusions – Whether FDI Play a Key Role in Economic Development in Serbia?

We can concluded that FDI have influence in level of GDP in Serbia, but not so much as we expected bearing in mind that an attraction of foreign investments is the main aim of Serbian government. As we see in our simplified regression model 26% of GDP changing can be explained by changing of FDI level in the observed period from 2004 to 2011. Values of Obs*R-squared, Skewness, Kurtosis, Jarque-Bera indicators suggest that there are not autocorrelation between observed variables. There may be a time leg between a moment when foreign investments were realised and a moment when they had impact on GDP level
According to Hildegard Gacek (EBRD Director for Serbia) FDI is very important for growth, both short-term – because it immediately leads to economic activity – and long-term – because investors can bring new skills and processes that promote long-term productivity in the country. When it comes to investment and the business environment in Serbia, we have witnessed significant improvements since 2001, when an office was first opened here. In principle, foreign investors have been successful in their operations and are generally satisfied with the quality of the business environment. Of course, there‘s always plenty of room for improvement in this regard. There are many attractive opportunities for investors in Serbia – a central location in the heart of Europe, a long-term European perspective, competitive tax rates and profits and also, in some ways, a skilled workforce. However, investors sometimes face difficulties like permits, administrative delays, etc. and those

regarding the inefficiency of public administration at both national and local levels. These are primary areas that require further improvement.

The transition model of economic growth in Serbia was largely based on attracting foreign direct investments through privatization in order to modernize and recover economy by acquiring new knowledge, technologies and techniques of management and sales. This process did not give visible results due also to the fact that, apart from well-known international companies, the so-called new owners of capital, often of unknown origin, also took part in privatization with dubious and short-term motives and without virtually any legal entrepreneurial experience.

The conclusion reached after several empirical studies on the relationship between FDI and economic development is that the effects of FDI are complex. From a macro perspective, they are often regarded as generators of employment, high productivity, competiveness, and technology spillovers. Especially for the least developed countries, FDI means higher exports, access to international markets and international currencies, being an important source of financing, substituting bank loans.

References

1. de Mello L R. Foreign Direct Investment in Developing Countries and Growth: A Selective Survey. Journal of Development Studies. 1997; 34 (1): 1-34.
2. De Gregorio J. Economic growth in Latin America. Journal of Development Economics, 1992; 39.
3. Borenztein E J, De Gregorio and Lee J W. How Does Foreign Direct Investment Affect Economic Growth Journal of International Economics, 1998; 45: 115-135.
4. Blomström M, Lipsey R E and Zejan M. What Explains Developing Country Growth NBER Working Paper No. 4132. Cambridge, MA: National Bureau of Economic Research. 1994.
5. Alfaro L A, Chanda S, Kalemli-Ozcan and Sayek S. FDI and Economic Growth: The Role of Local Financial Markets. Journal of International Economics, 2004; 64 (1): 89-112.
6. Balasubramanyam V N, Salisu M. and Sapsford D. Foreign Direct Investment and Growth in EP and IS Countries Economic Journal, 1996; 106 (434):92- 105.
7. Choe J I. Do Foreign Direct Investment and Gross Domestic Investment Promote Economic Growth? Review of Development Economics, 2003; 7: 44-57.
8. Basu P, Chakraborty C and Reagle D. Liberalization, FDI, and Growth in Developing Countries: A Panel Cointegration Approach. Economic Inquiry, 2003; 41 (3): 510-16.
9. Romer P. Idea gaps and objects gaps in economic development. Journal of Monetary Economics 1993; 32.
10. Rappaport, Jordan. How Does Openness to Capital Flows Affect Growth? Mimeo, Federal Reserve Bank of Kansas City. 2000.
11. Boyd J H and Smith B D. Intermediation and the Equilibrium Allocation of Investment Capital: Implications for Economic Development, Journal of Monetary Economics, 1992; 30: 409-432.
12. Carkovic M and Levine R. Does Foreign Direct Investment Accelerate Economic Growth? University of Minesota. 2002.
13. Hansen H, Rand J. On the causal links between FDI and growth in developing countries Research Paper, UNU-WIDER, United Nations University, 2005; 31
14. Grossman G M and Helpman E. Innovation and Growth in the Global Economy, The MIT Press, Cambridge, MA. 1991.
15. Luiz R. de Mello J. Foreign direct investment-led growth: evidence from time series and panel data Oxford Economic Papers, Oxford University Press. 1999.
16. Stepanović B. – editor. Foreign Direct Investments in Serbia 2001-2011, Business Info Group, Belgrade. April 2012.
17. Quartalni monitor No. 1-27, Fond za razvoj ekonomske nauke (FREN), Beograd

INFORMALITY AND PERCEPTIONS OF ENTREPRENEURSHIP IN SIERRA LEONE: NATION, NETWORKS AND DIAMONDS

Dr. Aaron C. van Klyton,

University of Greenwich, Maritime Greenwich Campus; QA359 Park Row, London, United Kingdom SE10 9LS, va21@gre.ac.uk

Abstract

Purpose: Sierra Leone is undergoing the process of state building, which includes increasing state capacity to provide services to its people and improve the business environment (1). Entrepreneurship should constitute a key part of national strategy to achieve growth (2). This study seeks to understand how entrepreneurship is understood and manifest from different perspectives of the diamond mining industry in Sierra Leone.
Design/Methodology/Approach: this is a qualitative study that applies narrative and interpretive analysis to interviews conducted with government officials, miners and brokers. The paper examines Kiznerian theories of entrepreneurship in the evidence collected from a developing West African nation.
Findings: the findings show that the miners and the State have different perceptions of entrepreneurship. The informal and unregistered status of many of these 'companies' marginalizes the miners; but also the State strategy of protecting foreign direct investors also diminishes the capabilities of lesser-established, registered companies.
Research limitations: The research is limited because of time and resource constraints; however, rather than a large sample size, the study sought to represent every level of the local diamond production.
Practical and/or social implications: In developing countries, informal sectors of the economy can embody much entrepreneurial activity that is often outside of government regulation and support. This study attempts to shed light on the linkage between informality and perceptions of entrepreneurship in the diamonds sector in Sierra Leone. In doing so, the study becomes more than a Schumpeter versus Kirzner comparison, rather it calls for an individual/brokerage view versus a systemic view of entrepreneurship. Hence, entrepreneurship in Sierra Leone needs to be understood more in terms of political and institutional embeddedness rather than individual traits or organizational features.
Originality: This study is a pilot study to explore entrepreneurship in a non-Western context. Although other studies have sought to reframe the concept in this way, this study examines a little research group of aspiring entrepreneurs in eastern and northern Sierra Leone. The study is uses primary data to empirically test tradition concepts of entrepreneurship.

Keywords: entrepreneurship, Sierra Leone, extractive industries, and informal sector

1. Introduction

Entrepreneurship has been defined in the literature in many ways; however, for this study, I am using the definition put forth by Shane and Venkataraman (5), who argue that examining entrepreneurship is to examine 'how, by whom, and with what effects opportunities to create future goods are discovered, evaluated, and exploited.' This framing of entrepreneurship allows us to look at the stakeholders involved in the Sierra Leone diamond mining industry. Their definition also ties into Kirzner's (6) formulation of an entrepreneurship based on arbitrage and alertness of market disequilibriums. Lastly, the definition highlights the tensions and challenges that exist due to the regulatory practices of the state and the imperatives of foreign mining companies operating in the country; both of which directly affect the trajectory and competitiveness of local Sierra Leoneans in the international market for diamonds. Academic literature struggles to clarify how perceptions of entrepreneurship are understood and manifested in West Africa neither does it sufficiently show how entrepreneurship benefits the lives of Sierra Leonean miners. Preliminary interviews conducted for this study revealed that some of these miners regularly engage with state regulatory bodies to develop their business and to resolve conflicts. But this engagement is not uniform, and the extent and nature of this interaction is absent from academic literature. Additionally, even less is known about the extent to which the local miners collaborate with each other.

Not all diamond miners are necessarily entrepreneurs; however, those who identify themselves as entrepreneurs face significant barriers in directly reaching the global market. This situation is the result of a clear divide between the behaviours of registered formal Sierra Leonean companies and the unregistered informal ones that constitute the core of this research. The economic actors in this study (independent miners, multinational mining companies, the State, and diamond agents) can be situated as interdependent, networked and culturally embedded. Preliminary interviews show that miners often experience much frustration in trying to access the global market. Some miners feel frustrated in trying to access the global market without having to go through the more powerful mid-sized Lebanese companies and indigenous agents who act as brokers. Other miners face direct competition from Western, South African and more recently, Chinese mining companies who are supported by the Sierra Leonean government. Even with such challenges, one Sierra Leonean miner also uses the fact that his mines are adjacent to the mines of MNEs as a means to raise the perceived value of his own product. Hence, this paper examines the nexus between the State, entrepreneurship in diamond mining, and the theoretical frameworks that shape the discourse of entrepreneurship. In doing so, the study will explore a relationship that is dialectic and contentious with unclear boundaries between competition and collaboration.

The next part of this article is devoted to defining the ideological framework of the discussion. The primarily framework is the work of Kirzner and the Austrian School. However, as I will show later, this West African case does not perfectly fit the Kirzner model, nor does it fit the work of the other major contributor to our understanding of entrepreneurship, Schumpeter. The next part will look at the experiences of the miners and how they perceive entrepreneurship. This will be followed by an analysis of the

State's perception of the activity of these miners. The last part will be discussion followed by the conclusion and recommendations.

2. Conceptual Framework

The formation of entrepreneurship can result from two main areas of recognition. One is the ability to innovate. Schumpeter (7) showed that innovation was a necessary component of entrepreneurship, which in turn drives the market. In his view, innovation could take the form of introducing new products to the market but also the act of entering new market and/or tapping into new sources of supply. For Schumpeter, the entrepreneur served to 'reform or revolutionize the pattern of production by exploiting an invention, or more generally, an untried technological pattern' (8). However, in the case of the local miners, fieldwork conducted in this study revealed very little innovation. However, innovation may be minimal due to the high labour mobility of the workers in moving between registered and unregistered companies. Additionally, any gains from innovation for any single mining group would be short lived because of the close networking among the groups Bradley et al (9) argue that necessity-based entrepreneurs, often found in developing countries such as Sierra Leone, are 'less likely to engage in a thorough search for innovative opportunities and are more likely to focus on imitative opportunities.' In like fashion, Aldrich and Martinez (10) describe these entities as 'reproducer organizations', whereby little innovation occurs because of the 'existence of socially created "truths"' about the market and the possibilities of innovation. By contrast, the second significant contribution to understanding entrepreneurship comes from the work of Israel Kirzner (6,11,12). For Kirzner, entrepreneurship centers on arbitrage opportunities and alertness that create entrepreneurship. This discovery is primarily achieved through disequilibrium in the market (11). Two main tenets of Kirzner's (13) approach is that market equilibration is a 'systematic process in which market participants acquire more and more accurate and complete mutual knowledge' and within the process of equilibration, entrepreneurial discovery occurs.

Aside from these two guiding theories, other aspects of entrepreneurship should be considered with respect to the Sierra Leonean miners. For example, Fogel et al (14) point out that entrepreneurship in developing economies takes a different pathway that relates to the existing formal and informal networks of institutions. The institutions themselves are constituted by and through socially and legally acceptable modes of behaviour of the geographic area where such institutions are based. Furthermore, the cultural embeddedness of entrepreneurship means that social and cultural values have a direct bearing on how entrepreneurship occurs (15) and, that is also defined by particular legal infrastructures (16). Although countries and regions in Africa share some cultural and legal similarities, the distinctness among them complicates the usage of a sole 'African' entrepreneurial model and how different actors within a given economy perceive the concept. Such distinctness is a consequence of a very localised negotiation between actors based on shared cultural values; all of which develop organically.

Most of the miners in this study tended to be small-scale miners, which means that they are allowed to mine more than six feet deep and use an array of (low-level) technology. These miners have organized themselves into organizations that become informal (unregistered) companies with an organizational structure that facilitates the mining to occur. However, Fogel et al (14) argue that entrepreneurs need 'information about technological innovations and new business practices, the foresight to see where these might lead and the judgment to get there.' The conditions and relationships that shape the local economy of diamond mining suggest that the values that characterize entrepreneurship in the West might not have transnational appeal. While it may be the case that some miners are managers or leaders (rather than entrepreneurs), it is increasingly apparent that at least some are seeking more entrepreneurial roles. As such, they face not only the usual obstacles of entrepreneurship, but also barriers that are geopolitical and perhaps cultural. As mentioned, neither Kirzner's nor Schumpeter's conceptual frameworks sufficiently capture the local economic activities related to this industry. The key point is that there is a lacuna about how these miners orientate themselves and respond to discourses about entrepreneurship.

While other models and conceptualizations of entrepreneurship abound (17–20), Kirzner's model is one of the most enduring foundations of the concept and is most related to this case. As a result, I am situating this research within the Austrian framework of entrepreneurship. Although, the use of this model offers some insights into this mining entrepreneurial activity, this analysis will need support from other scholars; namely, the work of Gartner et al (21) who argue that entrepreneurial behaviour of many individuals, as opposed to a single entrepreneur, creates and potentially sustains an organization. It is also worth noting that the focus of this paper is on entrepreneurship at a social and economic level rather than any specific manifestation or outcome of entrepreneurship.

3. Methodology

This paper is the product of a funded pilot study conducted in Sierra Leone from December 2012 to January 2013. The project examines how entrepreneurship occurs in a particular context to understand the extent to which culture and circumstance affect its meaning. The qualitative study used interviewees drawn from multiple levels of analysis (22) who engage in the domestic diamond network chain. However, the experiences of the Sierra Leonean mine operators received special emphasis because it is they who face the greatest challenges in this case. Although the sample size was relatively small (6 government officials, 10 local miners in two regions), the respondents were taken from every aspect of the local diamond mining activity in order to provide as complete a picture as possible given limited resources. The government agencies included representatives from the governmental agency, SLIEPA (the Sierra Leone Investment and Export Promotion Agency); an officer in the Ministry of Mines (Freetown); the deputy director of Department of Geology; an officer from the Office of Administration and Registry (Freetown), and a special assistant to the President of Sierra Leone. The mining companies vary in size but usually contain less than 25 'employees'. One of the companies was registered with the Sierra Leone government from July 2011. In total there were 10 Sierra Leonean heads of mining companies, one former head, and one

Lebanese businessman and former diamond trader. Narrative and interpretive analysis was then used on the interview data to analyze the experiences of the miners and to develop a discourse on how the State interprets the role of these miners in the economy. The interviews took place under a variety of conditions ranging from air-conditioned government offices to interviewing respondents with the entire village present. The questions were centered around the relationship between the miners and the State, collaboration and conflict among the miners and MNEs, access to capital, and the miners' perceptions of entrepreneurship.

4. The Miners as Entrepreneurs

One of the main differences between both the Schumpeter and Kirzner models and the reality of entrepreneurship in the Sierra Leone case is related to how these miners become entrepreneurs. According to the interviewees in this study, entrepreneurship in mining depends on an ability to coordinate activities and physical and mental strength rather than the alertness or opportunity that the Austrian view purports. Although entrepreneurial alertness particularly with regard to market disequilibrium significantly attributes to entrepreneurship (23), entrepreneurial activities in the Tongo and Kono areas seem to occur organically or through consensus based on some perceived innate abilities. Even a respondent whose company is registered acknowledges that he was 'chosen' to represent the company in Freetown because he had 'some schooling and could read.' The question then is, does being innately able-bodied and 'strong' equate to being alert in Kirznerian sense? Three of the miners interviewed said that they were 'born into diamond mining' and that they know no other work. This argument in itself does not make them entrepreneurs; however, they would have developed particular levels of human capital over their life that positions them for a leadership role at minimum and, if they succeed in steering the organization into new directions, as entrepreneurs. They saw themselves as entrepreneurs because they were appointed by the group of miners to organize the work and represent the interests of their fellow miners to outside parties. This suggests that entrepreneurship is also about being perceived as an entrepreneur by others. Note the comments of two different entrepreneurs:

> 1st respondent: The head of the company does not work, he is only there to supervise the workers, and he owns the company.
>
> Aaron: how do they determine who will be the head of the company?
>
> 1st respondent: it depends on their health; if he can do the work better then he will supervise the others.
>
> Aaron: So you look around and see who is the most able then you go to work with that person?
> 1st respondent: Yes, that's right.
>
> 2nd respondent: The head of the business has to be trustworthy and has to able to find managers whom he can trust. If you don't have somebody who is trustworthy then they can steal that diamond and go away and sell it. Honesty is a big problem in the mining industry.

> Aaron: How do you keep the trust?
> 2nd respondent: Well, that is the reason why I have my blood cousin as the operations manager, because I am in Freetown. But I also take care of his son in Freetown. And he takes care of the day-to-day mining in Kono. So we take care of each other.

The first point here is that a leader's trustworthiness and his or her ability to maintain trust among the group are key characteristics of a good leader, in their view. Coleman (24) points out that the higher the position of the member of an organization, the 'greater the trust that has been placed on him'. Second, when the 2nd respondent was asked whether he considers himself an entrepreneur, he said, 'yes, we are small-scale miners'. This group selection of a leader and the resulting creation of an organization is 'the principal outcome of entrepreneurship behaviour' (21); whether recognized by the State or not. In this case, the company itself is registered with the State and based in Freetown. However, his workers and the operations manager are not 'registered' in any systematized way. They are free to join and leave both registered and unregistered companies as they wish. According to respondents, this is a common practice throughout the local industry. The 2nd respondent clearly articulated the ability and the need to maintain trust among the group. The respondents at the Tongo and Kono mining sites displayed strong ties that are no doubt an important characteristic in maintaining social trust. Coleman (24) uses the term 'closure' to describe the dense ties that exist in guaranteeing a strict observance of norms and customs. In Tongo, interviews took place literally under the curious eyes of many villagers despite the fact only a small number of people were actually being interviewed. These relationships are overlain with marriages and extended family and most of the people were of the same Mende tribe. The close-knit relationships are no doubt a good deterrent for dishonesty. Licht and Siegel (15) suggest that strong ties would facilitate collaboration because the ties would attract resources that 'depend on non-legal enforcement of obligations.' However, notice the comments of a Lebanese businessman on the issue of trustworthiness:

> Trust is a major problem. Maybe the broker [the investor] pays to get the diamonds, but the investor may not see the diamonds. This has created an aversion to investment. I am a Sierra Leonean, but there are also outsiders who come to invest. Even Sierra Leonean investors often have to stand [on site] and just hire the miners by the day, otherwise [the investor] gets cut out once diamonds are found.

A striking observation about his comments is that he refers to himself a Sierra Leonean despite being Lebanese, born and raised. His self-description seems to suggest that a level of social embeddedness also acts to ensure trust from the workers. In this case, closure may not be enough to prevent dishonesty among the miners. The 1st and 2nd respondents above recounted stories of theft, one from her brother. On the other hand, strong ties may hinder entrepreneurs from accessing alternative 'managerial choices and/or thinking of new solutions to business problems not already solved with the existing network' (ibid 15). Hence, the overlapping relationships of the circle of miners could also serve as a limiting factor for these entrepreneurs in accessing the market, but also in fulfilling the purpose of creating the firm in the first place.

Entrepreneurship was not solely based on the alertness or opportunities for arbitrage in their responses; rather, entrepreneurship occurred as a process based on who was

perceived by the group to be the best leader. However, Bradley et al (9) argue that opportunity-based entrepreneurship occurs when an entrepreneur takes 'advantage of market opportunities'. When these miners began the process of 'selecting' the leader of the organization, they may not have prioritized yet Kirznerian undiscovered market opportunities per se; rather, they may have believed that having an organized group with a particular leader would be better prepared to compete in the market; a behaviour remiscient of the Coasian theory of the firm (25), seemingly a clear example of the difference between an entrepreneur and a leader. The formations of these companies are entirely informal and are held together not through legal recognition by the State as such but rather through kinship and tribal linkages. This organizational structure does not mean that the miners have no recourse to resolve problems. The mining groups have also appointed a Chairman who bears the responsibility to resolve problems that arise within the group or across groups. The respondents further noted that if the problem cannot be resolved at this level, then the village chief intervenes.

The formation of these companies does not necessary translate to market gains. In fact, the respondents did not appear to desire to gain 'riches' from mining diamonds; rather their focus was on day-to-day survival; and creating an organization with a leader seemed the best way for them to achieve that. Collaboration with multinationals operating in the area would provide some scope for growth. In a Freetown interview, the deputy directors commented that local small-scale and artisanal miners are 'financially handicapped' and that they sometimes work for or collaborate with multinational companies. However, if the miners do not have support from investors then their own operation faces hardships. Although a South African mining company has its regional headquarters in a prominent place in Tongo, the local entrepreneurs said that they have no relationship with the company. The deputy director further noted that it was unlikely that artisanal miners advanced to the level of small-scale miners, and even more rare that small-scale miners become large-scale miners. He also claimed that most large-scale companies are owned by MNEs.

However, this is not to downplay how the miners characterize entrepreneurship. Skarbek (26) argues that entrepreneurial alertness is 'both nonreplicable and nonrandom'; meaning that an intricate knowledge of at least the local market and the resource is essential to an entrepreneur. This depiction of alertness also implies that their knowledge is tacit in nature and cannot be systematically transferred. Given this notion, we would expect entrepreneurship to develop in a very particular way given the local context. In a pure Kirnerian (6) sense, alertness means that the entrepreneur is 'the "knowledge" of where to find market data'. Such data is based on an individual's 'subjective perceptions of real resources' but also the 'contextual local knowledge of time and place' (26). In this manner, there is opportunity for arbitrage because the market will have 'moments of disequilibrium' that allow for entrepreneurial profit.

Kirzner (12) shows that entrepreneurship is tied to discovery, as a result of alertness particularly in the form of price differences that create entrepreneurial opportunities. However, the diamond market activity in Tongo and Kono regions of a Sierra Leone suggests that price differences are not being sufficiently exploited by indigenous entrepreneurs. According to a Lebanese businessman, local miners determine the price

through interactions with the more than 50 diamond agents that line Hangma Road in center of town in Kenema, a major diamond city in the eastern part of the country. He claims that the miners go from shop to shop negotiating prices until they shape an 'understanding' of the market with respect to price. However, the small-scale miners in Tongo admitted that they have little if any knowledge of the true price of their product. Note their comments on the issue:

> Respondent: We have not got information.
>
> Aaron: So, how do you know if you are selling a diamond for the right price?
> Respondent: Well, we are just miners, those who buy and sell them in Kenema and they know that we are just miners. Those that buy and sell the diamonds [on Hangma Road], they are the ones who know…we are just miners.

Hence, the agents on Hangma Road are, in some senses, the only true Kiznerian entrepreneurs, because they are able to take advantage of price arbitrage. When pressed further, the miners chuckle in embarrassment. So I add: you don't know… you just trust the [agencies on Hangma Road]?

> Respondent: Yes, they will tell you the gold price but they will never tell you the true diamond price (on the world market).

Another entrepreneur then said that the gold price is listed on commodities exchange so the price tends to be more standardized (universal). Diamond prices are not listed; hence, in order for the miners to know what is the market price they would have to be networked in a more systematic way to the global market activity; which is not occurring. This lack of social capital for the Tongo entrepreneurs precludes them from taking advantage of any price arbitrage, a key component of successful entrepreneurship. The alertness that Kirzner discusses has a muted/diminished effect for this group of miners. Furthermore, in the Austrian framework of entrepreneurship, 'complete relevant information' is not assumed. The miners who accept a lower price do so because they are simply unaware that higher prices are available or what a 'better' price should be. According to Kirzner (11), those entrepreneurs 'unaware of prices' more favourable may remain so indefinitely without entrepreneurial alertness. Kirzner (13) further notes that, unlike the neoclassical price-taking behaviour, the entrepreneurial role when shortages occur 'the resulting price increases are driven by the entrepreneurs ability to recognize 'profit opportunities available through…arbitrage.' However, for the Tongo miners, such alertness and recognition could only be developed through the appearance of small differences in the pricing of the agencies on Hangma Road. This is in no small part due to their not having direct access to the global market, which is facilitated through the government agency, Sliepa.

Kirzner (12) argues that entrepreneurial alertness 'is not only pushing prices toward relevant equality, it is also moving resources from one line of production to another.' But for whom is this occurring? The miners themselves have admitted that they have very little knowledge regarding the actual market price that occurs on the global market. According to the deputy director of department of geology, the miners tend to sell diamonds at far less than the market value; whereas gold is sold at above market rates. The lack of knowledge about the market price for diamonds (because this commodity is

not traded on the commodities market) is a key factor for the undervaluation of diamonds at this early stage of the production chain. Kirzner (13) differentiates between imperfect knowledge of the neo-classical model and 'sheer (unknown) ignorance', whereby the latter is said to be 'gradually but systematically' reduced through entrepreneurial discovery. However, this discovery also serves to increase mutual awareness among market participants and further reduce the gap in prices, output and input quantities and qualities. In such manner, the level of ignorance gets reduced. This process would not be occurring in an effective manner if the entrepreneurs were relying exclusively on the business relationship developed on Hangma Road.

It would no doubt be difficult for these entrepreneurs even to judge the extent to which their 'business conjecture is potentially viable' (27) without knowledge of prices and quantities. Hence, the market plays a critical function in conveying information to the entrepreneurs in order to guide their decisions regarding production and other operating behaviour. According to the Tongo respondents, there is a great reliance on 'trust' in the Hangma Road agents to give them a reasonable price for the diamond produce. Hence, what this creates is a falsified 'market', in the sense that the entrepreneurs are essential cutoff from the global market (in part due to their unregistered status, which will be discussed in a later section).

Kirzner's (12) argument regarding capital and entrepreneurship reflects the need for access to capital as necessary condition for entrepreneurship to occur. However, Bradley et al (9) show that many (especially the poor) are 'precluded' from entrepreneurship because they do not access not only to financial capital but also to human and social capital. As a result, would-be entrepreneurs in developing countries such as Sierra Leone are often marginalized in their potential and in the State's discourse on entrepreneurship. When one government officer was asked if the State is attempting to enable or nurture local talent, he responded, 'the country is open, for everybody, if you have the capital then it is fine. But if locals do not have capital but someone from outside does, then we don't stop them.' Bradley et al (9) reassess the role of capital in the entrepreneurial process by arguing that without innovation, capital alone is insufficient to foster success. However, what is not clear is whether innovation is needed before capital or the other way around. The same government officer went on to say the following:

> The law is that if you are going to mine in a certain community, then you have to engage the community. You have to engage them. [MNEs] can bring their expats in with them but if we have experts in the local community then you should use them. You know, it will be cheaper because you don't have to pay them the international wage.

He went on to say that the MNEs have to provide some corporate social responsibility-type projects, such as building hospitals, roads, and bridges. However, the benefits that accrue from this type of activity do precious little to directly foster new entrepreneurial talent among locals. During the fieldwork, there was a pattern of responses that touched on a few related points. The miners felt that all they needed was 'an investor' to be successful in the industry; however, when pressed further about how the money would be used they could not provide a definitive path for development.

5. The State and the Miners

The political and market environment within which this activity is occurring shapes how entrepreneurship has developed, particularly in the informal sector of Sierra Leone's diamond industry. Metcalfe (27) argues that the 'nature and consequences of enterprise are embedded in the wider system of market and non-market economic institutions.' Hence, it is important to look at how the actions and attitudes of the State have an impact on the behaviour of the Tongo and Kono miners. As explained at the outset, the three key state actors are Sliepa (Sierra Leone Investment and Export Promotion Agency), the Ministry of Mines, and the Geology Department. These agencies contribute directly to the forward momentum of the mining sector as well as to the livelihoods of the miners. Metcalfe (27) argues that the entrepreneurial structure cannot be 'separated from the instituted structure of the economic system in which it is exercised.' Strong property rights are one of the five instituted features of modern capitalism that foster entrepreneurship. On this front, Kirzner and Schumpeter ignore the context of the State and its role in facilitating or deterring entrepreneurship. It is clear from this research that the Sierra Leonean government values the function and contributions of entrepreneurs. This is evidenced through the work of Sliepa. This government-sponsored agency works with a select group of (established, registered) Sierra Leonean diamond miners. Their function is to facilitate inward foreign direct investment and also showcase the local traders in a global context. The organization deals with all areas of economic activity separated into export development and investment promotion. This person, Sally Meyers, commented on the relationship between Sliepa and the miners:

> Aaron: so you have two parts, which of the agency deals more with diamond miners?
>
> Sally: Well, for now, we are more focused on the investment side. Really we do have exports but most of the people who are already in the business of diamond mining and who export are already entrenched into society, they already know their way around the government offices and, you know, they know how to wrangle. So, it is not much of a big deal to export for them. Most times, we have people coming in (from outside) the country.
>
> Aaron: How does information get transmitted to the miners? What types of interactions do you have with the miners?
>
> Sally: The people *who come to us are the ones we deal with*. Because this is a new agency, we have not 'spread our tentacles' to cater to the miners upcountry. So, we are focused on the foreign buyers who come in to invest. And we do the necessary linkages, if he wants to buy we know a *few people* who the institution can recommend. And we can also contact the Ministry of Mines… it's not like we have information that we send to the miners in the remote places.
>
> Aaron: The people who get recommended by your agency, who are these people?
>
> Sally: These are people who have been in the diamond business for a long while and we know that they are credible. That is with respect to (foreigners) who have to come in and buy raw stones. With the supervision and help of the Ministry of Mines, we select [Sierra Leoneans] who we know have been in the business a long time.

Hence, the miners being recommended to participate in the global diamond market are people who have already developed a relationship with the Ministry of Mines based on how the amount of diamonds that the miner exports per month or per year. She further commented that these entrepreneurs are based around the country in places such as Kenema and Kono. Regular mobile communication is maintained with these miners; however, new entrants find it quite difficult to enter this network with the Ministry of Mines, Sliepa and the global market. The Sliepa representative further comments:

> Well, to be honest, someone coming in for the first time as an institution (meaning a new Sierra Leonean company), we cannot say that we have 'everyone' dealing in minerals. Even if we have information about them, we would still need a second approval from the Ministry of Mines. They can verify that this person is in this kind of business. So it is very difficult for us to find new people because you want to safeguard the [foreign investor]. The investor has trusted [Sliepa] for information, so you do not want to try a new person; especially when money is involved, the miners might sell fake stones to them or something…

All of the recommended diamond miners are registered with the government as companies. The Sliepa representative could not estimate how many '419ers' were operating upcountry.[1] On the hand, the government agencies have a particular responsibility to encourage and protect foreign investors; however, the protection has served to reduce the participation of and the number of new entrepreneurial companies from within Sierra Leone. Hence, the role of State is debilitating the creation of entrepreneurship. The agency's position represented in Ms. Meyers' words treat the unregistered miners as something of a (negative) externality of the economic process rather than as a secondary form of economic activity. However, Mitchell (28) argues that 'informal, clandestine and unreported economic activity', such as the unregistered miners, may represent an imperfection in the market but they may also point to an 'inability of the principle of the market to account for complex effects whose value cannot be monetized.'

Sliepa, the Ministry of Mines, and the Department of Geology displayed a pragmatic, optimistic view of mining in the region. However, one thing was clear: Sierra Leone is open for business. The focus of Sliepa was clearly outward facing with most of their efforts geared toward investment rather than developing more local mining entrepreneurs to compete with foreign MNEs. As far as the miners-cum entrepreneurs who participated in this study, without their being registered with the State, it is unlikely that they will be able to compete, develop, and grow. They have essentially been excluded from participating in State efforts in improving the mining sectors and from benefitting from existing State-driven initiatives, such as SLIEPA. In fact, in a 2012 Act of Parliament, a new National Minerals Agency was formed with support from the World Bank and Department for International Development. The benefits of this new agency may also be out of the reach of many of these entrepreneurs because the agency will undoubtedly only serve registered mining companies.

[1] 419 is a term adapted from Nigerian law that criminalized acts of financial fraud. Similar to Ponzi schemes in the West.

6. Conclusion

This pilot study looked how entrepreneurship is perceived among Sierra Leonean miners in the informal sector and how the State perceives the role of these mining activities. What became clear from this study is that the State's attitude toward the unregistered diamond miners was one of marginalization. The miners in Tongo field were in fact forced to mine in the forests once the South African company came to town, a clear environmental disaster in the making. Although the increased competition resulted in greater collaboration among local mining groups it did not ignite a relationship between the indigenous 'companies' and the multinational; a pattern suggested by one government official. The increased competition from MNEs also reduced the output capacity of the locals. What's more, the Sliepa representative's use of the term 419 to describe the behaviour of these informal mining companies reclassifies them as a nuisance to the agency's efforts at best, or worse as criminals. Sliepa restricts its recommendations and advice to a limited number of registered companies who 'come to them'. On the one hand, the action safeguards much needed inward foreign direct investment. However, many less-established registered mining companies are essentially cut out of the opportunity for much needed global exposure and networking that Sliepa provides. They are also less able to take advantage of potential investment opportunities that accompany an extended network. Furthermore, the line is blurred between legal and illegal entrepreneurial activity in this industry because even the unregistered companies sell their output to one of the 50 or so *registered* agents on Hangma Road. Consequently, this transaction is then legitimized in the eyes of the State through the Kimberley Certification processing. Hence, the State sanctions the diamonds and the mining activity that produced them through a de facto acceptance. The Sliepa agency then offers up these agents, the diamonds and its associated mining activities for sale and partnerships with international buyers and investors.

Secondly, this research offers a way of looking at entrepreneurship outside of the standard approaches, namely that of Kirzner and the Austrian School. For many of the miners in this study, entrepreneurship did not develop as a result of alertness or price arbitrage in the market. The gap in knowledge of the market that Kirzner termed 'sheer ignorance' is not shrinking for these entrepreneurs; namely, because their exposure is limited with respect to the larger global activity of the diamond market beyond Hangma Road.

As a government official suggested, Sierra Leone is open for business; but for whom? According to the mining interviewees, their plight has gotten worse since the arrival of the new laws and new multinationals. Part of the function of the new National Minerals Agency is to enforce the laws that govern this sector; laws that both help and harm the efforts of independent, local miners. This is not a call for State protectionism of mining; rather an admonishment for both the State and academics to revisit the notion of entrepreneurship, particularly for this region, and how to find better ways to integrate the informal sectors of this activity into a national discussion on economic growth.

References

1. Casson M, Yeung B, Basu A, Wadeson N, editors. The Oxford Handbook of Entrepreneurship. OUP Oxford; 2008.

2. Acs Z, Virgill N. Entrepreneurship in Developing Countries. In: Acs Z, Audretsch DB, editors. Handbook of Entrepreneurship Research. 2nd ed. New York and London: Springer; 2010. p. 485–515.

3. Prahalad CK. The Fortune at the Bottom of the Pyramid: Eradicating Poverty Through Profits. 1st ed. Prentice Hall; 2009.

4. London T, Hart SL. Next Generation Business Strategies for the Base of the Pyramid: New Approaches for Building Mutual Value. 1st ed. Financial Times/ Prentice Hall; 2010.

5. Shane S, Venkataraman S. The Promise of Enterpreneurship as a Field of Research. The Academy of Management Review. 2000 Jan;25(1):217.

6. Kirzner IM. Competition and entrepreneurship /. Chicago, US: University of Chicago Press,; 1973.

7. Schumpeter JA. Theory of Economic Development. New edition. Brunswick, NJ: Transaction Publishers; 1934.

8. Schumpeter JA. Capitalism, Socialism and Democracy. 2nd ed. Pober Publishing Company; 1942.

9. Bradley SW, McMullen JS, Artz K, Simiyu EM. Capital Is Not Enough: Innovation in Developing Economies. Journal of Management Studies. 2012;49(4):684–717.

10. Aldrich HE, Martinez MA. Entrepreneurship as Social Construction: A Multilevel Evolutionary Approach. In: Acs Z, Audretsch DB, editors. Handbook of Entrepreneurship Research. 2nd ed. New York and London: Springer; 2010. p. 387–427.

11. Kirzner IM. How Markets Work: Disequilibrium, Entrepreneurship and Discovery. Institute of Economic Affairs; 1997.

12. Kirzner IM. Perception, Opportunity and Profit: Studies in the Theory of Entrepreneurship. Univ.Chicago P.; 1980.

13. Kirzner IM. Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach. Journal of Economic Literature. 1997 Mar 1;35(1):60–85.

14. Fogel K, Hawk A, Morck R, Young B. Institutional Obstacles to Entrepreneurship. In: Casson M, Yeung B, Basu A, Wadeson N, editors. The Oxford Handbook of Entrepreneurship. Oxford, UK: Oxford University Press; 2006. p. 540–79.

15. Licht A, Siegel J. The Social Dimensions of Entrepreneurs. In: Casson M, Yeung B, Basu A, Wadeson N, editors. The Oxford Handbook of Entrepreneurship. Oxford, UK: Oxford University Press; 2006. p. 511–39.

16. Webb JW, Kistruck GM, Ireland RD, Ketchen J. The Entrepreneurship Process in Base of the Pyramid Markets: The Case of Multinational Enterprise/Nongovernment Organization Alliances. Entrepreneurship Theory and Practice. 2010 May 1;34(3):555–81.

17. Hayek FA. The Use of Knowledge in Society. The American Economic Review. 1945 Sep 1;35(4):519–30.

18. Lachmann LM (Ludwig M. The market as an economic process /. Blackwell,; 1986.

19. Mokyr J. The Lever of Riches: Technological Creativity and Economic Progress. New Ed. Oxford Paperbacks; 1992.

20. Ricketts M. Theories of Entrepreneurship: Historical Development and Critical Assessment. The Oxford Handbook of Entrepreneurship. Oxford, UK: Oxford University Press; 2005. p. 33–58.

21. Gartner WB, Carter NM, Reynolds PD. Entrepreneurial Behavior: Firm Organizing Processes. In: Acs Z, Audretsch DB, editors. Handbook of Entrepreneurship Research. 2nd ed. New York and London: Springer; 2010. p. 99–127.

22. Lee N, Lings I. Doing Business Research: A Guide to Theory and Practice. Sage Publications Ltd; 2008.

23. Reekie WD. Markets, Entrepreneurs and Liberty: An Austrian View of Capitalism. Palgrave Macmillan; 1984.

24. Coleman JS. Foundations of Social Theory. New edition. Harvard University Press; 1994.

25. Coase R. The Nature of the Firm. Economica. 1937 Nov;4(16):386–405.

26. Skarbek EC. Experts and Entrepreneurs. In: Koppl R, Horwitz S, Dobuzinskis L, editors. Experts and Epistemic Monopolies. Bingley, UK: Emerald Group Publishing Limited; 2012. p. 99–110.

27. Metcalfe JS. Entrepreneurship: An Evolutionary Perspective. In: Casson M, Yeung B, Basu A, Wadeson N, editors. The Oxford Handbook of Entrepreneurship. Oxford, UK: Oxford Handbooks Online; 2006. p. 59–90.

28. Mitchell T. Rule of Experts: Egypt, Techno-Politics, Modernity. University of California Press; 2002.

DETERMINING THE CRITICAL FACTORS OF AN E-WASTE MANAGEMENT SYSTEM: THE CASE OF IT AND TELECOMMUNICATION PRODUCTS

Maria-Chrysovalantou Emmanouil[1], Emmanouil Stiakakis[2], Maria Vlachopoulou[3], Vasiliki Manthou[4]

[1]Department of Applied Informatics, University of Macedonia, 156 Egnatia Str., Thessaloniki, Greece, emmanouil.maria@gmail.com

[2]Department of Applied Informatics, University of Macedonia, 156 Egnatia Str., Thessaloniki, Greece, stiakakis@uom.gr

[3]Department of Applied Informatics, University of Macedonia, 156 Egnatia Str., Thessaloniki, Greece, mavla@uom.gr

[4]Department of Applied Informatics, University of Macedonia, 156 Egnatia Str., Thessaloniki, Greece, manthou@uom.gr

The Waste Electrical and Electronic Equipment (WEEE) is one of the fastest growing and complex waste streams. The effective and efficient management of this waste stream raises the interest of the global scientific and business community. The EU WEEE Directive (2002) encompasses 10 main categories, one of which is the waste of IT and telecommunications equipment. This paper has a twofold purpose: (i) to identify the critical factors which affect the design and operation of an electronic waste (e-waste) management system focusing on this category, and (ii) to classify a number of relevant studies from the literature according to those factors. Therefore, the methodology of the study is a two-stage approach, first a detailed literature review and second the identification of the critical factors based on the analysis of representative flow diagrams of an e-waste management system. Our findings indicate five critical factors of managerial concern: (a) estimating e-waste quantities as precisely as possible, (b) minimizing the total cost of the e-waste management system, (c) selecting the appropriate strategy for e-waste treatment, (d) redesigning the IT and telecommunication products in order to improve their recycling characteristics, and (e) defining the infrastructure, technology, and investments that are needed to optimize an e-waste management system. The results of the study will provide significant information to managers dealing with the design of e-waste management systems. Furthermore, the classification of distinctive studies from the literature, according to the five factors identified herein, demonstrates the extent to which the critical aspects of an e-waste management system are examined.

Keywords

E-waste, E-waste management system, ICT, WEEE

1. Introduction

Electronic waste is growing at a rate of 3–5% per annum or approximately three times faster than normal municipal solid waste [1]. The rapid technological development, consumer

habits, growing needs of the modern world, and the excessive use of electric and electronic products lead to a continuous replacement of products with new ones. It is remarkable to notice that the average lifespan of a new computer has decreased from 4.5 years in 1992 to less than 2 years nowadays [2]. The result of this trend is a yearly huge amount of obsolete electronic products that are disposed without proper treatment, constituting a major risk for the environment and human health.

The environmental, social, and financial impact of e-waste generation raise a need to adopt a more sustainable and effective approach in managing WEEE. One of the current initiatives that attempt to manage issues of e-waste is STEP (solving the e-waste problem) which assists countries to exchange knowledge on WEEE systems and launch efforts about reverse supply chain [2]. Moreover, the European Parliament made efforts to develop appropriate legislation to prevent e-waste generation and promote recycling and reuse. This legislation has evolved in two directions: a) The WEEE Directive, which has been specifically developed to establish measures for the collection, treatment, recovery, and recycling of electronic products. b) The Restriction of Hazardous Substances (RoHS), which promotes the replacement of harmful substances in products [2]. According to the EU WEEE Directive (EU, 2002) the categories of WEEE are presented in Table 1:

Table 1 Categories of e-waste

Category	**Label**
Large household appliances	Large HH
Small household appliances	Small HH
IT and telecommunications equipment	ICT
Consumer equipment	CE
Lighting equipment	Lighting
Electrical and electronic tools (with the exception of large-scale stationary industrial tools	E & E tools
Toys, leisure and sports equipment	Toys
Medical devices (with the exception of all implanted and infected products)	Medical equipment
Monitoring and control instruments	M & C
Automatic dispensers	Dispensers

The paper presents a literature review of electronic waste focusing on ICT waste. The literature sources that are studied are dated from the year 2005 till today. Depending on the relative literature and the material flow of obsolete ICT products, it is attempted to identify and present the most important factors that are involved in the WEEE reverse logistic network and affect the treatment processes. In the first section of this paper a sample of the literature review is presented in chronological order starting from the most recent article referring to e-waste management and continuing to the oldest. The second section proposes a material flow diagram including the fundamental affecting factors. Furthermore, based on the proposed diagram, the extant literature, and the influential factors, a paper classification is attempted.

2. Literature Review

The main objective of Kuo's [3] article is to provide solutions for disassembly and recycling of WEEE problems. A Petri Net (PN) graph is developed to represent the components of a product, the structure, and the attachment relationships between them. The benefits and costs between manual and shredding process are compared. A case of a company that produces routers in Taiwan is examined. Considering that the financial cost and the environmental effects are fundamental criterions for dismantling, it is shown that if the shredding cost is 1.2 times the cost of manual disassembly, it is preferable to follow the manual process.

Araijo et al [4] aim to estimate quantities using theoretical analysis and literature review. The e-waste management system in Brazil is presented while a model for estimation of future quantities of electronic waste is proposed, considering two market types (mature and non-mature). Different calculation methods were developed accordingly.

The study of Queiruga et al. [5] is a chronological analysis that presents how systems for the management of e-waste in Spain were developed and evolved after the implementation of WEEE Directive 2002/96/EC. The stages obtained from the analysis are "Observation", "Development" (in which pilot programs start and recycling facilities are being built), "Consolidation" (in which the facilities are completed), and finally "Assessment and Control".

In Ji's article [6] the main objective is to maximize social welfare by analyzing the economic behavior of the main stakeholders involved in the return process of e-waste. In China there are two basic models of WEEE take-back: outsourcing, separated in single take-back and the collective take-back model, while the second model is manufacturer internalization take-back. Profit of the manufacturer and processor, consumer surplus, and total profit of the system are estimated. By comparing the results for each model, it is assumed that the manufacturer's individual take-back model is the best solution.

In the study by Zhang et al. [7], a model for prediction of future quantities of obsolete electronic and electrical appliances for the years 2009 - 2050 in Nanjing, China, is proposed. For this purpose, the distribution of the product lifespan is modeled and data from stock in use are obtained from the Statistical Yearbook. Short-term predictions of quantities can be made, while for future estimations a linear regression is applied for urban and rural areas.

Gamberini et al. [8] intend to minimize the e-waste management cost by estimating the optimum transportation solution from the collection points to the recycling plant. For the purpose of the study, which was performed at Reggio Emilia in Northern Italy, the quantities of e-waste were calculated and the performance criteria were determined, separated in two categories: technical and environmental. Alternative scenarios are proposed relying on alternative routes that vehicles can follow and the availability of resources. Finally, a simulation model is applied in order to conclude to the solution with the best performance.

In the approach of Achillas et al [9], the reduction of the total e-waste management cost is attempted by finding the best location for the installation of an e-waste treatment facility. To achieve this goal, a multicriteria model is constructed and performed with the method ELECTRE III [10]. The existing facilities of WEEE management, the quantities that end up in them, and the values of the criteria are taken into account and finally a ranking of installation sites is proposed.

In the article of Steubing et al. [11] obsolete computer quantities are calculated developing a mathematical model based on material flow analysis. Data from imports and sales were collected and a survey with questionnaires was conducted in order to examine consumer behavior about storage, reuse, and disposal of computer equipment. Tanking into account the assumption that there are three scenarios of quantity generation (average, minimum, and

maximum generation), the residence times and transfer coefficients are calculated, and then the quantities of obsolete computer equipment can be predicted.

A paper presented by Kuo [12] refers to a platform that assists the selection of a treatment strategy of electronic equipment at the end of its life. Suppliers have the opportunity to exchange online information with customers about the electronic devices and via the platform are able to review and incorporate this information. The product designers using the information received about the dismantling and recycling are able to make changes and improve the product characteristics. The cost of recycling could also be calculated taking into account the revenue from the resale of materials and the cost of dismantling, treatment, transport and disposal, while determining when the dismantling of the product is more profitable to be terminated.

The main goal of Giudice and Kassem [13] is to develop a methodology that will estimate the level of difficulty in dismantling an obsolete product, while attempting the reduction of it by proper redesign of the product. The method Eco-Indicator 99 and appropriate software are used to meet the basic criterion of the method which is the reduction of the environmental impact of product life cycle. Then, the results of disassembly analysis are used to improve product characteristics by interfering in the system architecture, the number and geometry of components, the allocation, and the number and types of connections that exist.

In the research of Iakovou et al. [14], it is attempted to ascertain the materials and components of electronic equipment that create environmental and economic profit when are recycled. The study is focused on network netMod ISDN terminal manufactured by a company in Greece. For the survey purposes a multicriteria table of the device components is created. To assess the importance of each criterion four alternative scenarios are assumed. The importance of each criterion and each scenario can be determined by Analytic Hierarchic Process Methodology. Finally a table shows the result of multicriteria calculation and the classification of parts. Taking into account the final table it is concluded which components should be reused, recycled or discarded.

Robinson [15] presents the tendencies in generation and amount of e-waste, underlining that the contribution of an item in the annual production of e-waste, E (kg / year) depends on the mass of the object, M (kg), the number of units in operation, N, and its average lifetime, L (years), $E = MN / L$.

The goal of Yang and Williams's [16] study is to estimate future trends in generation of scrap computers in the U.S. The current penetration rate of computers is estimated and the average lifespan is assumed by analyzing the flow of materials. Combining the above estimations with historical sales data, the obsolete computer quantities are calculated.

The research of Liu et al. [17] presents an economic evaluation of three recycling processes for five obsolete electronic home appliances (TVs, refrigerators, dishwashers, air conditioners, and personal computers) in Beijing. The recycling processes that are examined are manual disassembly of parts, manual disassembly following separation of metals with magnetic separator and shred the remaining mixtures, while the third process is the most advanced including the separation of plastic mixtures in the steps of the second process. Data, such as prices, labor costs, utility, dismantled components, and materials recovered, were collected using literature, related websites, and interviews with recycling specialists. The average time needed, electricity, and manpower were calculated. After the estimation of the income and cost of recycling the study presents the estimation of marginal profit for each strategy.

Kahhat et al. [18] attempt to find an accepted by the public way to organize the e-waste management system. For this purpose an e-waste management model is proposed called: e-Market for Returned Deposit system. The system starts with a deposit paid by consumers to sellers when they buy an electronic product and then data, products, and deposits are

electronically recorded and monitored via a radio frequency identification (RFID) affixed to the product. The flow of products, information, money, cost, and cost management is presented.

The cost of the recycling process of electronic devices constitutes main objective in the study of Shanshan and Kejing [19]. An optimization model is developed in order to find a suitable facility site for dismantling and recycling of e-waste considering transportation, fixed and operating costs, subsidies, and revenue from sales. Furthermore, the optimum material flow between the stakeholders involved in the recycling process is examined. A reverse logistics network is developed, which includes collection sites, dismantling facilities, recycling facilities, and disposal/ incineration sites. The model is solved with the use of an optimization modeling software.

Alternative systems for managing WEEE in order to find the optimal scenario in the case of Cyprus are studied by Rousis et al [20]. A Multi-Criteria Decision Making (MCDM) method, PROMETHEE, is used to evaluate the systems. During the application of this method, 12 alternative management systems are compared and ranked according to performance and efficiency. The results indicate that a treatment based on partial disassembly is most suitable for the e-waste management system in Cyprus.

Mathieux et al. [21] introduce a new method that helps the manufacture of products easier to recover and is called Recovery Systems modeling and Indicator Calculation Leading to End-of-life-conscious Design, or ReSICLED. To evaluate a product recovery method, ReSICLED defines three criteria: a) the weight criterion in order to meet the legislative requirements b) the financial criterion and c) environmental criterion. In the survey eight basic types of recovery procedures are considered: manual disassembly, shredding, sorting, recycling, incineration with energy recovery, selling of recycled materials and recovered energy, burying in controlled landfill, and logistics (transportation of the products from one recovery location to another).

Shih et al. [22] present an evaluation model in order to determine the best management strategy for obsolete electronic appliances. A library with 22 cases of obsolete products in Taiwan is used as a pattern. Similarity function is developed and used to determine which product from the library is more similar to the product tested. The proposed strategy is similar to the one followed for the product in the library and how appropriate is, depends on how "similar" are the cases. Finally, the costs and benefits of both the recycling and dismantling processes are estimated.

The method presented by Kuo [23] concerns product design and analyzes the process of dismantling at the end-of-life of a product. A tree graphical representation of the product components and their interconnection is used. The results constitute a useful tool for designers to evaluate and improve the dismantling and recycling characteristics of products.

The conditions of e-waste management in China, the related legislation, impacts on health, work, and society are the object of Hicks et al. [24] study. Two pilot projects for the installation of e-waste recycling plants are presented, while referring to the investments needed, the necessary capacity, and the operation problems. It is stressed that both pilot programs have experienced difficulties in collecting e-waste because of the unequal and costly competition with informal collectors.

Finally in the study of Streicher-Porte et al. [25] is attempted to estimate the quantities of obsolete computer equipment. For this purpose the supply market method is applied and data of computer market for the period 1996-2004 are used, taking into account two scenarios for lifespan, 5 and 7 years. Semi-structured interviews and field observations are performed to determine the flow of materials and the recycling processes.

3. Critical Factors in WEEE Management

Through our extensive literature review, we came across several diagrams and material flow models presenting the life cycle of e-waste. Examples of such diagrams can be found in the above literature sources and in addition in the studies of Achillas et al [26], Kang and Shoenung [27], and Koh et al [28]. Depending on these models, the main processes and flows that the obsolete electronic products follow can be determined. The model proposed in this study, it is shown in Figure 1 and presents all the basic steps of a WEEE reverse logistic network and at the same time stresses and includes the fundamental effecting factors in the e-waste management system.

According to the analysis of the above models and diagrams, the management of IT waste starts from the moment the product becomes obsolete and it's no more useful to the original owner, which could be either a business or a household. The obsolete electronic product is disposed and enters the collection process. Based on literature and case studies of various countries e-waste management systems, the most common collection ways of IT and telecommunication waste products are curb side, where the e-waste is picked up from the owner's place, special drop off events at certain specifically designed sites or permanent drop off events, which include the returning of the obsolete product at the point of purchase. The effectiveness and proper function of the collection is usually responsibility of the seller, producer, user, and/or state.

During the collection stage, the total generated amount of e-waste, which affects the whole management system and the e-waste material flow should be taken into account and needs to be estimated. It is assumed that the design and the efficiency of the WEEE management system, the optimal treatment, the required facilities, the average capacity, the available sources of transportation and storage, all depends on the generation and the average amount of e-waste. The volume of IT waste could be estimated using data from the collection sites. Moreover, the efficiency and convenience of the collection procedure impacts in the total amount of e-waste collected. The quantity factor is necessary at this point since it affects the next process, storage and transportation.

After the collection process the obsolete products are temporarily stored or transported to special facilities in order to be subjected under functionality and mechanical characteristics tests. During this process, sorting and utility tests, which depend on the age and the mechanical condition of the product, take place. There are three possible flows for the e-waste after the sorting. The product is functional or can be repaired and ends up in reuse and second hand markets. The product can not be reused, but it contains valuable components / materials and can be disassembled. The product ends up in landfill/ incineration. The route that the obsolete product will follow depends on the selection of the most appropriate treatment strategy for it.

The selection of the most efficient, economically, and environmentally sound treatment strategy is a determinant factor in the management of e-waste, since not all treatments are suitable for every obsolete product and result in the optimal and desirable outcome. From the literature review it is easy to conclude in four general categories of treatment strategy: reuse/resale (where the product or parts of the product can be reused by another user), remanufacture (where the components of the product are send to factories in order to be used in new product manufacture), recycling (where the valuable materials of the product and energy can be extracted), and disposal (where the obsolete product cannot be treated in any other way and end ups in incineration or landfill). The selection of strategy depends on product characteristics, the value of its materials, its recyclability, and the environmental burden that can cause. The proper treatment strategy should be decided at the sorting stage and will affect the flow of the e-waste product after this point.

An amount of IT waste products, after the sorting process is led to resale and reuse, a percentage is led directly to incineration or landfill, and the rest is led to disassembly. During disassembly process, the obsolete product is dismantled in its components. The valuable and functional components can be sold for reuse or can be sent to manufacture in order to be reused in new products. Moreover, it is necessary to take into account that the equipment which contains valuable materials (e.g. gold, silver) or harmful materials (e.g. toxic, plastic) needs to be recycled in order to extract raw and rare materials that can be reused, promoting at the same time environmental sound treatment. The rest of the components are disposed in landfill or are incinerated for energy extraction.

A general concern of major stakeholders is finding solutions and improvements of the e-waste treatment, limiting simultaneously the environmental and financial consequences. An approach that is followed under this perspective, is designing products with improved characteristics that are easier to treat, recycle, and disassemble. The management of e-waste can be facilitated by making changes at the early stage of product life cycle, its design. In order to manufacture more “green” products, feedback from the final steps of the e-waste treatment process, like the harmful materials that can be replaced, the easiness of disassembly, and product recyclability are used. The redesign of an improved IT product can contribute to the reduction of total e-waste quantity, to the reduction of the total management costs, and to the remanufacture of more environmentally friendly products.

Before a WEEE management system is developed and put in operation the investment, the available financial resources, and technology systems should be taken into account. The first approach when designing the e-waste management model is to estimate the average financial investment in facilities, labour, infrastructure. Furthermore, the technological and information systems that are needed and can improve the treatment should be extensively researched. A very common approach, which is met in a lot of studies, is the use of other countries’ expertise as an example.

Moreover, an e-waste management system should be viable, cost effective, and advantageous compared to other alternative ways (e.g. disposal with the rest municipal solid waste, transfer to third world countries) so that the main stakeholders benefit from the participation in the e-waste treatment. This is the reason that cost benefit analysis should be performed while designing the management system and while the system is in operation. The main goal of the analysis is the estimation of the total cost and also the cost of every process and the minimization of it. In literature, we find many studies aiming to investigate ways of cost reduction and profit increase. The cost benefit analysis can be applied in order to decide the optimal and the most efficient way of collection, the optimal and most suitable treatment strategy, the optimal facility location, storage and transportation of every obsolete IT product.

It is also important to mention that, the legislation that is applied in local and broader level is an important factor in the designing of the e-waste management system. However, since it is not studied as a separate parameter in literature and since the nature of the legislation aspect is not purely managerial, we excluded it from the fundamental affecting factors.

According to the above analysis, we assume that in the e-waste management system there are five influential factors that need to be taken into account, (i) the estimation of e-waste quantities, (ii) the minimization of total cost of the e-waste management system, (iii) the selection of the appropriate strategy for IT waste treatment, (iv) the redesign of IT and telecommunication products in order to improve their recycling characteristics, and (v) the identification of the infrastructure, technology, and investments that are needed to optimize an e-waste management system.

Depending on the main steps of the management process and the main factors that affect it we conclude in the model shown in Figure 1. It is worth noting that in the diagram oval denotes the beginning of the WEEE reverse network where the product reaches its end of

life and enters the e-waste management system, rectangular stands for a process of treatment, parallelogram represents the affecting factor which interrelates with at least one process, and rounded rectangle stands for a terminate situation/process of treatment. Lines show the material flow and dashed lines the information flow.

4. Classification of Presented Studies

According to our findings there are five significant factors which influence the design and the management of the IT waste treatment. These factors constitute an important object of research in a lot of studies, which have as a main goal to add knowledge about them and to

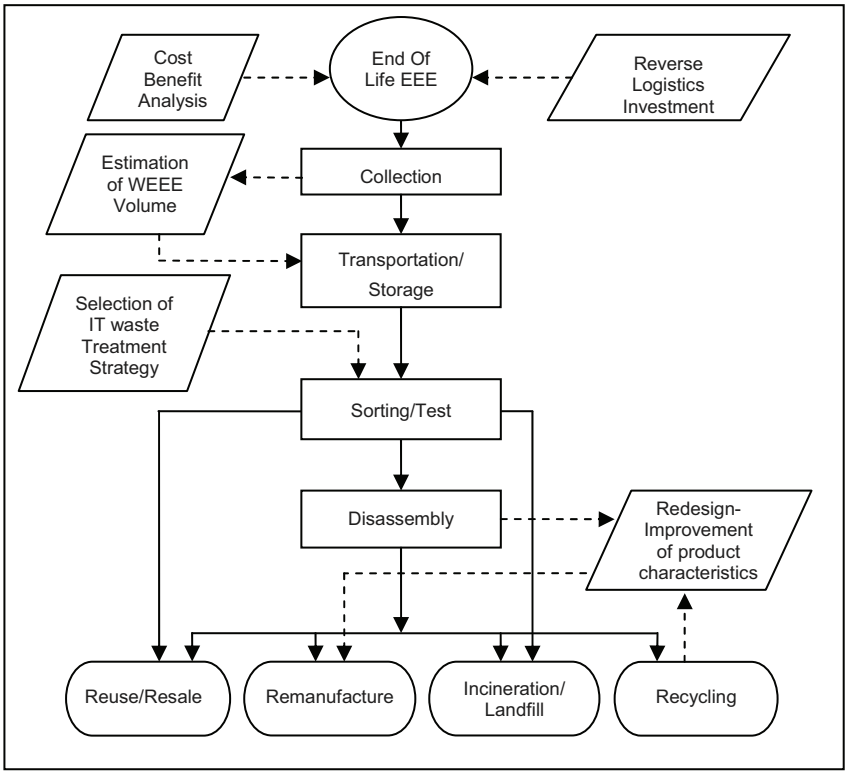


Figure 1 The material flow diagram

optimize the way they impact in the e-waste management system. Given that the estimation of e-waste volume, the cost benefit analysis, the selection of treatment strategy, the improvement and redesign of products, and the investment and infrastructure are the influential factors, we are able to classify the relevant studies, which were analysed in this paper, according to the object of their research and the factor they refer to. Table 2 is a classification of the literature review that was prior studied and used herein.

It became clear from the analysis that the factors are interconnected and interact during the management process. For example, the selection of a treatment strategy is often associated with the cost benefit analysis, since the most suitable strategy has also to be cost effective. Furthermore, in order to conduct cost benefit analysis of the treatment process, the total volume of e-waste should be taken into account. Most of the studies deal with more than one factor, as it is realized from the classification in Table 2.

Table 2 Classification of studies presented

Studies analysed here	WEEE volume	Cost Benefit Analysis	Treatment Strategy	Redesign, Characteristics Improvement	Investment/Infrastructure
Kuo [3]		X	X		
Araijo et al [4]	X				
Queiruga et al. [5]					X
Ji [6]		X	X		
Zhang et al. [7]	X				
Gamberini et al. [8]	X	X			
Achillas et al. [9]		X			
Steubing et al. [11]	X				
Kuo [12]				X	X
Giudice and Kassem [13]				X	
Iakovou et al. [14]		X	X		
Robinson [15]	X				
Yang and Williams [16]	X				
Liu et al. [17]		X	X		
Kahhat et al. [18]					X
Shanshan and Kejing [19]		X			
Rousis et al [20]			X		
Mathieux et al. [21]	X			X	
Shih et al. [22]		X	X		
Kuo [23]				X	
Hicks et al. [24]					X
Streicher-Porte et al. [25]	X				

5. Conclusion

In this study, we addressed the issue of IT waste management system and we attempted to add knowledge on the involved processes, material and information flow, and the main factors influencing and interacting with the system. The significance of these factors is highlighted by the number of the relevant studies and the fact that their critical effects are object of research in the large body of literature. We presented recent and related researches on e-waste management system, through which we assumed the material flow of obsolete IT products, the treatment processes, and the important factors that affect in the processes. These factors from managerial view include the estimation of the WEEE volume, the cost benefit analysis, the selection of treatment strategy, the improvement of product characteristics, and the overall investment and the necessary infrastructure. Finally, depending on the affecting factors, which are often interconnected, we proceeded in a classification of the studies presented.

References

1 Schwarzer S, Bono AD, Peduzzi P, Giuliani G, Kluser S. Geneva: E-waste, the hidden side of IT equipment's manufacturing and use. Environmental Alert Bulletin UNEP. http://www.grid.unep.ch/product/publication/download/ew ewaste.en.pdf. 2005.

2 Widmer R, Oswald-Krapf H, Sinha-Khetriwal D, Schnellmann M, Boni H. Global perspectives on e-waste. Environ Impact Assess Rev. 2005 Apr; 25: 436-58. doi:10.1016/j.eiar.2005.04.001.
3 Kuo TC. Waste electronics and electrical equipment disassembly and recycling using Petri net analysis: Considering the economic value and environmental impacts. Comput Ind Eng. 2012; doi:10.1016/j.cie.2011.12.029.
4 Ara□jo MG, Magrini A, Mahler CF, Bilitewski B. A model for estimation of potential generation of waste electrical and electronic equipment in Brazil. Waste Manag. 2012 Feb; 32(2): 335-42. doi:10.1016/j.wasman.2011.09.020.
5 Queiruga D, Gonzalez-Benito J, Lannelongue G. Evolution of the electronic waste management system in Spain. J Clean Prod. 2011 Nov; 24: 56-65. doi:10.1016/j.jclepro.2011.11.043.
6 Ji G. Effective Implementation of WEEE Take-back Directive: What Types of Take-back Network Patterns in China. Procedia Syst Eng. 2011; 2: 366-81. doi:10.1016/j.sepro.2011.10.051.
7 Zhang L, Yuan Z, Bi J. Predicting future quantities of obsolete household appliances in Nanjing by a stock-based model. Resour, Conserv Recycl. 2011 Sep; 55: 1087-94. doi:10.1016/j.resconrec.2011.06.003.
8 Gamberini R, Gebennini E, Manzini R, Ziveri A. On the integration of planning and environmental impact assessment for a WEEE transportation network—A case study. Resour Conserv Recycl. 2010 Feb; 54(11): 937-51. doi:10.1016/j.resconrec.2010.02.001.
9 Achillas Ch, Vlachokostas Ch, Moussiopoulos N, Banias G. Decision support system for the optimal location of electrical and electronic waste treatment plants: A case study in Greece. Waste Manag. 2010 May; 30(5): 870-9. doi:10.1016/j.wasman.2009.11.029.
10 Roy B. Electre III: algorithme de classement base sur une representation floue des preferences en presence de criteres multiples. Cahiers de CERO. 1978; 20(1): 3-24.
11 Steubing B, Boni H, Schluep M, Silva U, Ludwig C. Assessing computer waste generation in Chile using material flow analysis. Waste Manag. 2009 Sep; 30: 473-82. doi:10.1016/j.wasman.2009.09.007.
12 Kuo T C. The construction of a collaborative-design platform to support waste electrical and electronic equipment recycling. Robot Comput Integr Manuf. 2009 May; 26: 100-8. doi:10.1016/j.rcim.2009.05.004.
13 Giudice F, Kassem M. End-of-life impact reduction through analysis and redistribution of disassembly depth: A case study in electronic device redesign. Comput Ind Eng. 2009 Oct; 57(3): 677-90. doi:10.1016/j.cie.2009.01.007
14 Iakovou E, Moussiopoulos N, Xanthopoulos A, Achillas C, Michailidis N, Chatzipanagioti M, et al. A methodological framework for end-of-life management of electronic products. Resour Conserv Recycl. 2009 Apr; 53(6): 329-39. doi:10.1016/j.resconrec.2009.02.001.
15 Robinson B H. E-waste: An assessment of global production and environmental impacts. Sci Total Environ. 2009 Sep; 408: 183-91. doi:10.1016/j.scitotenv.2009.09.044.
16 Yang Y, Williams E. Logistic model-based forecast of sales and generation of obsolete computers in the U.S. Technol Forecast Soc Change. 2009 Mar; 76: 1105-14. doi:10.1016/j.techfore.2009.03.004.
17 Liu X, Tanaka M, Matsui Y. Economic evaluation of optional recycling processes for waste electronic home appliances. J Clean Prod. 2008 Mar; 17: 53-60. doi:10.1016/j.jclepro.2008.03.005.
18 Kahhat R, Kim J, Xu M, Allenby B, Williams E, Zhang P. Exploring e-waste management systems in the United States. Resour Conserv Recycl. 2008 Mar; 52: 955-64. doi:10.1016/j.resconrec.2008.03.002.
19 Shanshan W, Kejing Z, editors. Optimization Model of E-waste Reverse Logistics and Recycling Network1. Proceedings of 2008 3rd International Conference on Intelligent System and Knowledge Engineering. 2008 Nov: 1436-42
20 Rousis K, Moustakas K, Malamis S, Papadopoulos A, Loizidou M. Multi-criteria analysis for the determination of the best WEEE management scenario in Cyprus. Waste Manag. 2007 Dec; 28(10): 1941-54. doi:10.1016/j.wasman.2007.12.001.
21 Mathieux F, Froelich D, Moszkowicz P. ReSICLED: a new recovery-conscious design method for complex products based on a multicriteria assessment of the recoverability. J Clean Prod. 2006 Jul; 16: 277-98. doi:10.1016/j.jclepro.2006.07.026.
22 Shih L H, Chang □ S, Lin Y T. Intelligent evaluation approach for electronic product recycling via case-based reasoning, Adv Eng Inform. 2006 Apr; 20(2): 137-45. doi:10.1016/j.aei.2005.11.003.

23 Kuo T C. Enhancing disassembly and recycling planning using life-cycle analysis. Robot Comput Integr Manuf. 2005 Nov; 22: 420-8. doi:10.1016/j.rcim.2005.11.014.
24 Hicks C, Dietmar R, Eugster M. The recycling and disposal of electrical and electronic waste in China—legislative and market responses. Environ Impact Assess Rev. 2005 Jul; 25(5): 459-71. doi:10.1016/j.eiar.2005.04.007.
25 Streicher-Porte M, Widmer R, Jain A, Bader H P, Scheidegger R, Kytzia S. Key drivers of the e-waste recycling system: Assessing and modelling e-waste processing in the informal sector in Delhi. Environ Impact Assess. 2005 Jul; 25(5): 472-91. doi:10.1016/j.eiar.2005.04.004.
26 Achillas C, Vlachokostas C, Aidonis D, Moussiopoulos N, Iakovou E, Banias G. Optimising reverse logistics network to support policy-making in the case of Electrical and Electronic Equipment. Waste Manag. 2010 Dec; 30(12): 2592-600. doi:10.1016/j.wasman.2010.06.022.
27 Kang H Y, Schoenung J M. Electronic waste recycling: A review of U.S. infrastructure and technology options. Resour Conserv and Recycl. 2005 Jun; 45: 368-400. doi:10.1016/j.resconrec.2005.06.001.
28 Koh S C L, Gunasekaran A, Tseng C S. Cross-tier ripple and indirect effects of directives WEEE and RoHS on greening a supply chain. Int J Prod Econ. 2012 Nov; 140(1): 305-17. doi:10.1016/j.ijpe.2011.05.008

THE IMPACT OF COMPANY'S HUMAN CAPITAL ON INNOVATION ACTIVITIES
Firm-level Evidence from South-East Europe

Hyrije Abazi-Alili[1], *Remzije Rakipi*[2]

[1]*South East European University, Ilindenska b.b., Tetovo, 1200 Macedonia,*
h.abazi@seeu.edu.mk

[2]*South East European University, Ilindenska b.b., Tetovo, 1200 Macedonia,*

r.rakipi@seeu.edu.mk

This paper investigates the effect of company's human capital, generally seen as individuals' set of knowledge and skills, on the innovation activities in firm-level. Bearing in mind that the abilities and skills of the individuals can be improved and thus change their impact, human capital is considered to be relevant source of individuals' competitive advantage, comprising capacity of bringing on innovation activities. Following the stylized fact that the increase in the degree of skilled workers would provide conditions for creative reaction by firms i.e. engenders firms to undertake innovation activities, TEs have embarked different programmes for increasing the abilities and skills of human capital. We use firm level panel data Business Environment and Enterprise Performance Survey (BEEPS) 2002, 2005 and 2009 on transition economies. We apply a common application of two-step maximum likelihood estimation. We estimate whether the change in the share of skilled workers has led to more innovative activities and whether the predicted values of innovation affect firm performance measured by labour productivity. Our econometric results suggest that overall the variables influencing the probability to innovate are similar with the ones that influence productivity. The findings show that skilled workers, R&D intensity, foreign ownership, domestic ownership (base category state ownership), age, export activities and pressure from foreign competitors are significant and positively related to firm innovation activities. When the predicted values of this regression are incorporated at the productivity model, the results show positive and significant impact of innovation on performance. Furthermore, apart from the positive impact on innovation, skilled workers and foreign ownership have supplementary positive and statistically significant impact on labour productivity.

Keywords
Entrepreneurial Businesses, ICT, Innovation Activities, IV technique

1. Introduction

The role of human capital on the decision of the firms to innovate has gained importance in the most recent literature. The literature considers the human capital (HC) and technology as the principal factors driving innovation capacity (Smith et al. 2011)[1]. According to Smith et al. (2011)[1] "Human capital development is stimulated by appropriate human resource management practices and two ancillary services: the learning and development system, which must go beyond training and create learning cultures in enterprises; and the tertiary

education system, which is playing an increasingly important role in the new learning and development systems of enterprises." Thus, we employ a measurement of human capital as the level of education of the employees, measures as the share of employees with university degree.

We now continue with the discussion of the effect of different determinants on innovation and productivity in parallel. There is a vast literature investigating the impact of ownership structure on innovation activities. The Transition Report 2005 reviews the literature on this issue and confirms that ownership and management decisions have a significant influence on the innovation activities, performance of firms and their competitiveness in international markets in TEs. Foreign-owned firms, which can draw on the technical and management know-how of their parent companies, tend to be more efficient than their domestically owned rivals. Using BEEPS data, Gorodnichenko and Schnitzer (2010)[2] find that domestically owned firms are 10 to 20 percent less productive than companies under foreign ownership. On the other hand, other studies that investigating the influence of foreign ownership on firms' innovative behaviour and performance, and find neutral relationship (Stoevsky, 2005[3]; and Dachs and Ebersberger, 2009[4]). Domadenik et al.(2008)[5], using a sample of Slovenian firms, indicate that domestically owned firms have significantly higher R&D investment than other types of owners. One can conclude that while in general it is expected that foreign owned firms invest more in R&D and thus perform better, the findings of the empirical evidence on innovation output and firm performance are mixed and thus complex for drawing general conclusion.

The firms export intensity is another frequently employed determinant that may affect innovation behaviour. The reasons to expect that exports stimulate innovation activities of firms are: (i) exporting firms can benefit more from the knowledge abroad (learning-by-exporting) for their innovation activities than non-exporting firms; (ii) they are exposed to more intense foreign competition which requires continuous upgrading of their products and processes; and (iii) they will gain more profit by introducing the innovative product to foreign markets. The empirical evidence reports a positive relationship between export intensity and the incentive to innovate (Lööf and Heshmati, 2006[6]; Alvarez and Robertson, 2004[7]; Damijan et al., 2008[8]).

According to growth theory, R&D activities are expected to lead to product and process innovation, thus a majority of studies employ R&D intensity in their models (Crepon et al., 1998[9]; Damijan et al., 2008[8]; Falk, 2008[10]). Becheikh et al. (2006)[11], reviewing the empirical studies published between 1993 and 2003, bring together a set of variables related to the innovation process which also affect performance and suggest that R&D expenditure does not necessarily lead to product and/or process innovation.

According to new growth theory, R&D activities are expected to lead to product and process innovation. Becheikh et al. (2006)[11] on a review of empirical studies published between 1993 and 2003 bring together a set of variables related to the innovation process, and find that R&D expenditure do not necessarily lead to new product and/or process. For the TEs, we mentioned in the previous section that not all firms that undertake innovation activities have indicated to invest in R&D. However, both specifications of the R&D variables in the regression, the R&D intensity and dummy invested in R&D, appear to have positive and significant relationship with innovation activities.

For the purpose of this paper we empirically investigate the impact of individual factors such as human capital (measure as the share of employees with university degree), size of firm, share of R&D expenditure in total sales (or the dummy for investment in R&D variable), dummy for foreign and domestic ownership, direct exports, pressure from foreign competitors, and age on the probability of firm engaging in innovation activities. The following section discusses the issues arising when trying to measure human capital and innovation activities. Section three provides empirical evidence on the relationship between innovation

activities, human capital and other firm characteristics. The methodology and the estimated regressions are provided in section four. Finally, in section five findings and conclusions are presented.

2. Evidence on Human Capital and Innovation Activities Measures

The ability of enterprises' to innovate is affected by a number of factors such as the technical skills required for introducing new product and/or process, ownership structure, export activity, R&D intensity, availability of financial resources, and others that may affect innovation activities. Human capital factors have been specifically identified in terms of management to induce innovation since 1980s (Kanter, 1983[12]). Studies investigating the relationship between human factors and innovation conclude that HC are critical to innovation (Kanter 1983[12]; Gupta & Singhal 1993[13]). Thus, the ability of enterprises to innovate depends on the effective management of human resources and the level of education of employees. It should be noted that the education system (from primary to secondary and then on to tertiary education) emphasizes any enterprise learning and development system (Smith et al., 2011)[1]. Human capital includes not only the education workers bring to the job, but also skills learned while working and adapting to new technologies.

The empirical literature on investigating the relationship between human capital and innovation behaviour face the methodological challenge of how to measure human capital and innovation. This challenge is accompanied by the difficulty of getting appropriate data which correspond to their definition. Consequently the empirical studies have mainly adjusted their analysis of the determinants of innovation depending on the measures of innovation available to them, using proxies which reflect only some aspects of the innovation process.

2.1 Human Capital Measures

The notion of human capital can be described as the conceptual mixture of human and capital. The concept of human capital refers to knowledge, abilities and skills of the individuals, used in the activities that stimulate economic growth and development (Coleman, 1988)[14]. Wehereas, firm-specific human capital refers to skills and knowledge that are valuable only within a certain firm. They are directly correlated with tradition, culture and its practice and they can be applied only within that company (Popescu and Diaconu, 2008[15]). In the economic perspective, the capital refers to 'factors of production used to create goods or services that are not themselves significantly consumed in the production process' (Boldizzoni, 2008)[16]. According to Kwon (2009)[17] the human is the subject to take charge of all economic activities such as production, consumption, and transaction. On the establishment of these concepts, it can be recognized that human capital means one of production elements which can generate added-values through inputting it. Frank & Bemanke (2007)[18] define that human capital is "an amalgam of factors such as education, experience, training, intelligence, energy, work habits, trustworthiness, and initiative that affect the value of a worker's marginal product".

In the 1950's, some economists discovered that the investment of human capital was the primary element to raise individuals' wages compared to the quantitative input of other components such as land, financial capital, and labor force (Salamon, 1991)[19]. In practice, private and public investment in human capital, in the form of expenditure in education and training, accounts for over 10 percent of national income in most OECD countries (Healy, 1998)[20]. Because of the importance of human capital, numerous countries measure their

human capital in order to "diagnose their state position". Therefore, it can be recognized that human capital measurement is an important source in terms of suggesting various policies regarding human resources (Kwon, 2009)[17]. Our estimation employs the share of employees with university degree as a proxy of human capital.

2.2 Innovation Measures

In defining innovation activities undertaken by companies most of the empirical evidence follows Joseph Schumpeter, who defined innovation in a broad sense, as: "carrying out of new combinations" that include "the introduction of new goods …, new methods of production …, the opening of new markets …, the conquest of new sources of supply … and the carrying out of a new organization of any industry" (1934, p.66). He was the first to develop a three-stage classification: invention, innovation and diffusion, known as Schumpeterian trichotomy (Jaffe et al., 2004; pp. 63). Figure 5.1 presents a scheme having for basis the Schumpeterian trichotomy expanded with stages developed further.

Following Schumpeter's definition of innovation activities, most of the empirical literature defines innovation as the development of new products and/or new processes introduced to the market. The OECD (2005) Oslo manual guiding the collection of data on innovation reflects this perspective by defining innovation as: "... the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations (p. 46). An alternative definition of innovation adopted more recently by policymakers in the UK and also applied in the literature (Stoneman, 2010[22]; Battisti et al., 2011[23]) regards innovation as the 'successful exploitation of new ideas'. If this is scrutinised further, this definition combines (i) new ideas – involve new product/process or service, (ii) exploitation – presents the applicability of the idea, and (iii) successful – implies that the innovation is adapted by the market (from firm's viewpoint the target is increased profitability).

Based on these definitions, the most common measures used in the literature analysing the innovation process are as follows: i) a measure of the inputs into the innovation process, such as R&D expenditure or the number of scientists and engineers, ii) a measure of output, such as the number of inventions which have been patented and iii) a direct measure of innovation output, such as new product or new process. These proxy measures for the innovation process have their limitations. Not all R&D expenditures result in innovation output since this measure reflects only the resources committed to producing innovation output, but not the innovation process. The number of patents does not indicate whether this output has a positive economic value or whether it has successfully been introduced in the market. Whereas the new product and/or process is acknowledged as a proxy that directly quantifies the effect of innovation and its success in the market. Thus in our empirical estimations we use introduction of new product and/or process.

3. The Methodology and Findings

For the empirical analysis of this paper we use firm-level data from the World Bank/EBRD's Business Environment Enterprise Performance Surveys (BEEPS)[24] conducted in 2002, 2005 and 2009. The BEEPS questionnaire consists of questions which allow us to specify the variables which are used in the theoretical framework followed here. The pooled data for 2002, 2005 and 2009 is used in order to utilise the advantage of a larger number of

observations, with the final sample consisting of 9,354 firms. Table 1 provides the description of the variables employed in the model and their expected signs.

Table 1 Description of the variables and expected signs

Dependant variable	Description of the variables
Labour productivity	Labour Productivity = Sales / number of employees (log)
Innovation Activities	Dummy for innovative firms (new product and/or process)

Independent variables	Description of the variables	Expected signs
Skilled_workers	Share of employees with university degree	+
Size	Number of employees	- / +
R&D intensity	Amount spent on R&D / Sales	+
dInvestR&D	Invested in R&D (dummy variable = 1 if the firm has invested in R&D)	+
dInternetCONN	dummy = 1 if the firm have a high-speed, broadband Internet connection on its premises	+
Direct_exports	% of establishment sales as direct exports	+
dFRGNinv	Foreign Ownership– (=1 if the % share of foreign capital in the company> 10%)	-/+
dDOMprivate	Domestic Ownership– (=1 if the % share of domestic capital in the company>10%)	-/+
dSTATE	State Ownership	-
FRGNcomppress	Pressure from foreign competitors - Effect on decisions to develop new products	- / +
Age	Firm's experience–year since establishment	+
Agesq	Firm's experience–year since establishment squared	+
EU_members	dummy = 1 if EU member country	+
Sector	The industry in which the firm operates	

According to the statistics for the pooled data, the average labour productivity has increased by 25 percent from 2002 to 2005, and doubled from 2005 to 2009. For companies surveyed in 2002, on average 33 percent of the employees have university degree, and this percentage drops to 14 percent in 2009. The size of the companies in the sample is varying on average from 90 to 140 employees. On average the firms' R&D investments are approximately 4% (R&D expenditure to sales ratio). The average exporting experience of firms that have exported directly is 10 years (12 percent of firms). Firms are established mainly 16 to 20 years ago (in the 1980s and 1990s). Considering innovation activities, 62 percent of the companies have indicated that they have introduced new products and/or processes in 2002, the number increases to 79% by 2009.

3.1 The Methodology

In order to explore the nature of the innovation process in transition countries, we develop a model to empirically investigate the relationship between firm's innovation activities, human

capital and productivity. Two advanced techniques are applied in this investigation: (i) two-step maximum likelihood estimation which involves inserting prediction of one variable into a function that describes the behaviour of another; and (ii) the instrumental variable (IV) technique (Green, 2012)[25]. Furthermore, panel data techniques and IV estimations will be employed to account for the impact of both innovation activities and human capital on firm performance.

$$Innov\_activity_{it} = \phi_0 + \phi_1 Size_{it} + \phi_2 R\&D\_intensity_{it} + \phi_3 Direct\_export_{it} + \phi_4 dFRGN\_inv_{it} + \phi_5 dDOM\_private_{it} + \phi_6 FRGN\_comppress_{it} + \phi_7 Skilled\_workers_{it} + \phi_8 T1 + \phi_9 T2 + \varepsilon_{it} \quad (1)$$

$$LNproductivity_{it} = \vartheta_0 + \vartheta_1 PrInnov\_activity_{it} + \vartheta_2 dFRGN\_inv_{it} + \vartheta_3 dDOM\_private_{it} + \vartheta_4 Skilled\_workers_{it} + \vartheta_5 Age_{it} + \vartheta_6 Agesq_{it} + \vartheta_7 EU\_members + \vartheta_8 Sector + \vartheta_9 T1 + \vartheta_{10} T2 + \mu_{it} \quad (2)$$

The regression coefficients and corresponding p-values of two specifications of the probit model are used as residuals and incorporated as independent innovation variable on the productivity model. It is worth noting that we employ the level of education of the employees as the share of employees with university degree and the coefficient of this variable is significant and positively related to the decision to innovate.

3.2 Empirical Findings

Following the methodological approach applied in the literature, we continue with the empirical implementation of the treatment model. The predicted values of the innovation regressions are inserted as innovation activities variable into the labour productivity model. The inserted model, apart from the determinant of productivity, allows for human capital, R&D and export intensity, and other source of knowledge input such ownership effects on labour productivity. Furthermore, because of the suspected endogenous relationship between innovation activities and firm performance the IV technique is applied. Table 2 displays the regression coefficients and corresponding p-values of the productivity model.

Table 2 The productivity models: (i) the predicted values of innovation activities incorporated and (ii) IV regression results (see Appendix I)

Dependant Variable	***LNproductivity***							
	Predicted values of innovation (R&D intensity)		Predicted values of innovation II (dummy invested in R&D)		IV regression		IV regression II	
Independent Variables	*Coeff.*	*ρ-values*	*Coeff.*	*ρ-values*	*1st stage Coeff.*	*IV Coeff.*	*1st stage Coeff.*	*IV Coeff.*
Skilled_workers	0.01***	(0.001)	0.00	(0.001)	.01**	0.00	.01**	0.00
PrInnov*	**0.27***	**(0.141)**						
PrInnov2*			**1.26*****	**(0.108)**				
Innov_act (instrumented)						**0.13**		**1.50*****

Size	-0.01**	(0.000)	-0.01***	(0.000)	.00	0.00	.00	-0.00
dFRGNinv	0.34***	(0.055)	0.28***	(0.051)	.11***	0.13	.11***	-0.01
dDOMprivate	0.19***	(0.046)	0.14***	(0.047)	.13**	0.01	.13**	-0.29**
Age	-0.00	(0.002)	-0.01***	(0.002)	.00	-0.01**	.00	-0.01**
Agesq	0.00	(0.000)	0.01***	(0.000)	5.62	0.01**	4.32	0.01*
EU_members	-0.10**	(0.042)	0.04	(0.035)	-.05	0.02	-.06**	0.24***
Sector	0.00***	(0.001)	0.01***	(0.001)	-.01**	0.00	-.01**	0.01***
Constant	9.72***	(0.138)	8.97***	(0.113)		10.13***	0.7***	9.04***
Instruments:								
RnD2Sales					√	√		
Inv_RnD							√	√
Direct_export					√	√	√	√
Observations	3,004		4,834			681		1,220
R-squared	0.038		0.071			0.039		-0.144
F-statistics	13.18		40.67			2.954		9.019
df_r	2994		4824			.		.
Log Likelihood	-3812		-6828			-872.8		-1916
Sargan statistics	.		.			0.276		0.333
Cragg-Donald Wald F statistic	.		.		3.139	3.139	20.20	20.20

Note: Standard errors in parentheses, and *** p<0.01, ** p<0.05, * p<0.1
*The model reflects results with R&D intensity as determinant of innovation
** The model reflects results with dummy invest in R&D as determinant of innovation

4. Conclusions

Two different estimation techniques are applied to measure the productivity model: (i) semi-logarithmic OLS regression, with the predicted values of innovation activities model incorporated (for comparison we also provide results using dummy innovation variable equal to 1 if the firm has introduced new product and/or process); and (ii) the instrumental variable model (instruments used for innovation activities are R&D intensity and direct export).

The incorporation of the predicted values of innovation into the productivity model raises an issue related to the inconsistent standard errors. By employing separately the innovation dummy we are able to compare the standard errors. Since we find not much difference between the standard errors of the two specifications, there is no need to adjust the standard errors (by applying bootstrap methods).

The results of the two productivity models, where the predicted values of innovation (*PrInnov*and *PrInnov2*) are included, show positive and significant impact of the innovation activities model on firm performance. This methodological specification indicates the impact of the determinants of innovation on labour productivity. Thus, the variables employed in the productivity model, which are previously incorporated as determinants of innovation, can be interpreted as having additional (to the predicted values) positive or negative effect on the labour productivity.

Human capital, measured as the share of employees with university degree, appear positive and significant for the first model where the R&D intensity is employed, indicating that it contributes additionally to labour productivity. But, this variable is insignificant for the model

with dummy invest in R&D employed. The positive and significant sign of human capital on both specifications indicates that human capital additional to the indirect impact from the predicted values of innovation, positively contributes to the improvements of labour productivity.

The private foreign ownership variable is engaged first as determinant of innovation activities, and then as determinant of firms' productivity. The positive and significant sign of foreign investment on both specifications indicates that foreign ownership additional to the indirect impact from the predicted values of innovation, positively contributes to the improvements of labour productivity. The private, domestically owned firms' is also positive and significant for innovation activities, and appears additionally positive and significant for the productivity model.

The firms' age appears negative and significant on the productivity regression (the second model), implying that the new firms are more productive than the older ones. The positive significant sign of *age squared* indicates a U shape relationship. The negative effect of the firms' age is up to a point, where it turns to be positive.

When investigating the relationship between innovation activities and firm performance the issue of endogeneity is raised in the empirical literature. Considering that the innovation variable employed questioned 'the innovation activities undertaken for the last three years' whereas the labour productivity is measured only for the current year, one can say that the problem of endogeneity maybe lessen because of the implied timing.

On the instrumental variable (IV) model, the innovation activity variable is instrumented with the R&D expenditure or dummy invested in R&D and direct export. The validity of the instruments is tested for both models, but only invest in R&D and direct export showed be valid instruments. The results show positive and statistically significant impact of instrumented variable, undertaken innovation activities, on firm performance. This impact confirms our hypothesis that more innovative firms' tend to perform better.

The IV model for the domestic ownership appears to have negative significant coefficient, indicating that private domestic firms are not performing better than state owned firms. The firms' age also has negative significant coefficient indicating that new firms outperform older ones. The EU membership dummy variable is positive and significant, showing that EU member state firms' perform better than the ones that operate in non-EU countries.

Generally, one can notice that different estimation techniques bring us to slightly different results. By controlling for the endogeneity through IV we provide more reliable and robust econometric results for the labour productivity model.

References

1 Smith A, Courvisanos J and Tuck J Q. Building innovation capacity: the role of human capital formation in enterprises – A review of the literature. University of Ballarat. 2011.

2 Gorodnichenko Y and Schnitzer M. Financial Constraints and Innovation: Why Poor Countries Don't Catch Up. The Institute for the Study of Labour (IZA). Discussion Paper No. 4786. 2010.

3 Stoevsky G. Innovation and Business Performance of Bulgarian Companies (structural econometric analysis at firm level). Economic Research and Projections Directorate Working Paper. Bulgarian National Bank. 2005.

4 Dachs B and Ebersberger B. Does Foreign Ownership Matter for the Innovative Activities or Enterprises?.International Economics and Economic Policy, 6(1), 41-57. 2009.

5 Domadenik P, Prasnikar J and Svejnar J. How to Increase R&D in Transition Economies? Evidence from Slovenia. Review of Development Economics, 12(1), 193-208. 2008.

6 Lööf H and Heshmati A. On The Relationship Between Innovation and Performance: A Sensitivity Analysis. Economics of Innovation and New Technology,5(4/5): 317-344. 2006.

7 Alvarez R and Robertson R. Exposure to foreign markets and plant level innovation: evidence from Chile and Mexico. Journal of International Trade and Economic Development, 13(1): 57-87. 2004.
8 Damijan J P, Kostevc C and Polanec S. From innovation to exporting or vice versa? Causal link between innovation activity and exporting in Slovenian microdata. Discussion Paper Series No 204. 2008.
9 Crepon B, Duguet E and Mairesse J. Research, Innovation, and Productivity: An Econometric Analysis at the Firm Level. NBER Working Paper Series No 6696. 1998.
10 Falk M. Effects of Foreign Ownership on Innovation Activities: Empirical Evidence for Twelve European Countries. National Institute Economic Review, 85-97. 2008.
11 Becheikh N, Landry R and Amara N. Lessons from Innovation Empirical Studies in the Manufacturing Sector: A Systematic review of the Literature from 1993 - 2003. Technovation (26), 644-664. 2006.
12 Kanter R M. The change masters: Innovations for productivity in the American corporation. Simon and Schuster:New York. 1983.
13 Gupta A K and Singhal A. Managing Human Resources for Innovation and Creativity. Research Technology Management, May-June, 1993.
14 Coleman J S. Social capital in the creation of human capital. American Journal of Sociology, nr.94, p. S95-S120, 1988
15 Popescu C and Diaconu L. Human Capital And Innovation, 2008.
16 Boldizzoni M. Means and ends: The idea of capital in the West; 1500-1970, New York: Palgrave Macmillan, 2008
17 Kwon D-B. Human capital and its measurement, The 3rd OECD World Forum on "Statistics, Knowledge and Policy" Charting Progress, Building Visions, Improving Life Busan, Korea 27-30 Oct. 2009
18 Frank R H and Bernanke B S. Principles of Microeconomics (3rd ed.), New York, McGrawHill/Irwin. 2007
19 Salamon L M. Human Capital and America's Future. Baltimore: Johns Hopkins University, 1991
20 Healy T. Human Capital Investment: An International Comparison, Centre for Educational Research and Innovation, Organization for Economic Cooperation and Development, Paris. 1998.
21 Jaffe B A, Newell R G and Stavins R. Technology Policy for Energy and the Environment, in Innovation Policy and the Economy, Volume 4, (eds.) Jaffe, A.B., Lerner, J. and Stern, S. Cambridge, Massachusetts: MIT Press for NBER. 2004.
22 Stoneman P. Soft Innovation: Economics, Product Aesthetics, and the Creative Industries. 2010
23 Battisti C A, Fisher J and Duffi n J.J Physiol 589, 3039–3048. 2011.
24 Business Environment and Enterprise Performance Survey (BEEPS) II-IV
25 Green W H. Econometric Analysis. 7ed. New Jersey: Prentice-Hall. 2012.

Appendix I- Productivity model regressions for pooled data

Semi-logarithmic Productivity regressions

```
. reg   LNproductivity    Size prInnov dFRGNinv   dDOMprivate   Skilled_workers Age
Agesq   EU_members Sector

      Source |       SS       df       MS              Number of obs =    3004
-------------+------------------------------           F(  9,  2994) =   13.18
       Model |     88.1238     9  9.79153334           Prob > F      =  0.0000
    Residual |   2224.9965  2994  .743151803           R-squared     =  0.0381
-------------+------------------------------           Adj R-squared =  0.0352
       Total |   2313.1203  3003   .77026983           Root MSE      =  .86206

------------------------------------------------------------------------------
```

```
LNproducti~y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        Size |  -.0001009   .0000425    -2.38   0.018    -.0001841   -.0000176
prInnov |   .2735569   .1412967     1.94   0.053    -.0034916    .5506054
dFRGNinv |   .3445916   .0547318     6.30   0.000     .2372759    .4519072
dDOMprivate |   .1856887   .0460436     4.03   0.000     .0954084    .2759689
Skilled_wo~s |   .0020511   .0007029     2.92   0.004     .0006729    .0034294
         Age |  -.0028968   .0023031    -1.26   0.209    -.0074126    .0016191
       Agesq |   .0000211   .0000202     1.04   0.296    -.0000185    .0000607
  EU_members |  -.1004592   .0416971    -2.41   0.016    -.1822171   -.0187014
      Sector |   .0036515    .001184     3.08   0.002       .00133    .0059731
       _cons |   9.721788   .1384631    70.21   0.000     9.450295     9.99328
------------------------------------------------------------------------------

Instrumental Variable Regressions

ivreg2   LNproductivity    Size   dFRGNinv   dDOMprivate   Skilled_workers  Age  Agesq
EU_members Sector ( Innov_act= EurRnD2Sales Export_experience), first

First-stage regressions
-----------------------

First-stage regression of Innov_act:

OLS estimation
--------------

Estimates efficient for homoskedasticity only
Statistics consistent for homoskedasticity only

                                                      Number of obs =      681
F( 10,   670) =     4.90
                                                      Prob > F      =   0.0000
Total (centered) SS     =  115.2687225                Centered R2   =   0.0681
Total (uncentered) SS   =          534                Uncentered R2 =   0.7988
Residual SS             =  107.4181092                Root MSE      =    .4004

------------------------------------------------------------------------------
Innov_act |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        Size |   .0000945   .0000568     1.66   0.097     -.000017     .000206
dFRGNinv |   .1157263   .0478885     2.42   0.016     .0216968    .2097559
dDOMprivate |   .1280055   .0490743     2.61   0.009     .0316475    .2243635
Skilled_wo~s |   .0016397   .0006797     2.41   0.016     .0003051    .0029742
         Age |   .0005401   .0023815     0.23   0.821     -.004136    .0052162
       Agesq |   5.62e-07   .0000192     0.03   0.977    -.0000372    .0000383
  EU_members |  -.0582915   .0362198    -1.61   0.108    -.1294095    .0128266
      Sector |  -.0041988   .0009575    -4.39   0.000    -.0060789   -.0023188
EurRnD2Sales |   .9469971   .3976811     2.38   0.018     .1661459    1.727848
Export_exp~e |  -.0013277   .0017344    -0.77   0.444    -.0047332    .0020778
       _cons |   .7639913   .0733915    10.41   0.000     .6198863    .9080962
------------------------------------------------------------------------------
Included instruments: Size dFRGNinv dDOMprivate Skilled_workers Age Agesq
                      EU_members Sector EurRnD2Sales Export_experience
------------------------------------------------------------------------------
Partial R-squared of excluded instruments:   0.0093
Test of excluded instruments:
F(  2,   670) =     3.14
  Prob > F      =   0.0440


Summary results for first-stage regressions
-------------------------------------------
```

```
Variable     | Shea Partial R2 |   Partial R2    |  F(  2,   670)    P-value
Innov_act    |     0.0093      |     0.0093      |        3.14       0.0440

Underidentification tests
Ho: matrix of reduced form coefficients has rank=K1-1 (underidentified)
Ha: matrix has rank=K1 (identified)
Anderson canon.corr. N*CCEV LM statistic   Chi-sq(2)=6.32     P-val=0.0424
Cragg-Donald N*CDEV Wald statistic          Chi-sq(2)=6.38     P-val=0.0412

Weak identification test
Ho: equation is weakly identified
Cragg-Donald Wald F-statistic                        3.14
See main output for Cragg-Donald weak id test critical values

Weak-instrument-robust inference
Tests of joint significance of endogenous regressors B1 in main equation
Ho: B1=0 and overidentifying restrictions are valid
Anderson-Rubin Wald test     F(2,670)= 0.60      P-val=0.5512
Anderson-Rubin Wald test     Chi-sq(2)=1.21      P-val=0.5456
Stock-Wright LM S statistic  Chi-sq(2)=1.21      P-val=0.5461

Number of observations              N  =        681
Number of regressors                K  =         10
Number of instruments               L  =         11
Number of excluded instruments      L1 =          2

IV (2SLS) estimation
--------------------

Estimates efficient for homoskedasticity only
Statistics consistent for homoskedasticity only

                                                      Number of obs =      681
F(  9,   671) =     2.95
                                                      Prob > F      =   0.0019
Total (centered) SS     =  538.4424408                Centered R2   =   0.0388
Total (uncentered) SS   =  73639.95389                Uncentered R2 =   0.9930
Residual SS             =  517.5559586                Root MSE      =    .8718

------------------------------------------------------------------------------
LNproducti~y |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   Innov_act |   .1286852   .8690009     0.15   0.882    -1.574525    1.831896
        Size |   .0000733   .0001447     0.51   0.613    -.0002103    .0003568
dFRGNinv |   .1325305   .1403831     0.94   0.345    -.1426154    .4076764
dDOMprivate |   .0115828   .1555575     0.07   0.941    -.2933043    .3164699
Skilled_wo~s |   .0033189   .0021153     1.57   0.117     -.000827    .0074649
         Age |  -.0105843   .0046341    -2.28   0.022    -.0196669   -.0015016
       Agesq |   .0000954   .0000396     2.41   0.016     .0000178    .0001729
  EU_members |   .0237395    .096539     0.25   0.806    -.1654734    .2129524
      Sector |    .004599   .0045254     1.02   0.309    -.0042705    .0134685
       _cons |   10.12675   .6970742    14.53   0.000     8.760511    11.49299
------------------------------------------------------------------------------
Underidentification test (Anderson canon. corr. LM statistic):           6.321
                                                      Chi-sq(2) P-val =    0.0424
------------------------------------------------------------------------------
Weak identification test (Cragg-Donald Wald F statistic):                3.139
Stock-Yogo weak ID test critical values: 10% maximal IV size             19.93
                                         15% maximal IV size             11.59
                                         20% maximal IV size              8.75
                                         25% maximal IV size              7.25
Source: Stock-Yogo (2005).  Reproduced by permission.
------------------------------------------------------------------------------
```

```
Sargan statistic (overidentification test of all instruments):           1.189
                                                  Chi-sq(1) P-val =    0.2756
------------------------------------------------------------------------------
Instrumented:         Innov_act
Included instruments: Size dFRGNinv dDOMprivate Skilled_workers Age Agesq
                      EU_members Sector
Excluded instruments: EurRnD2Sales Export_experience
```

THE RELATIONSHIPS BETWEEN ORGANIZATIONAL CULTURE AND INNOVATION PERFORMANCE

Ercan Ergün[1], Yunus Emre Tasgıt[2]

[1]*Gebze High Technology Institute, Faculty of Business, Kocaeli, Turkey, eergun@gyte.edu.tr*
[2]*Düzce University, Akçakoca Vocational School, Düzce, Turkey, yunusemretasgit@duzce.edu.tr*

The purpose of the study

The aim of this study was to examine the relationship between organizational culture types and innovation performance.

1. Introduction

Innovativeness has drawn interdisciplinary attentions for decades, because of the impact of innovation on firm performance and on economic growth[1].

In the literature, there is a consensus that culture is an important determinant of organizational innovativeness and plays important role in making an innovation successful[3]. İnnovation is discussed as a critical element to the success of an organization[4;5], but if an organization's culture does not support innovation it is unlikely to occur[6].

Although the relationship between culture and effectiveness-performance is relatively well established in the literature, relatively fewer articles have been contributed towards the relationship between culture and innovation performance. Thus, this study aims to investigate the possible relationships between organizational culture and innovation performance.

2. Literature Review

Almost all organizations develop a dominant type of organizational culture over time, and the types of cultures form as certain values, assumptions, and priorities become dominant when organization address challenges and adjust to changes.

There are many definitions of culture in the literature (over 150 definitions)[14]. Schein[12] defines culture as the shared values, beliefs, and practices of the people in the organization.

Organizational sciences views organizational culture as a principal aspect of an organization's functioning and a critical driver of effectiveness[15]. The importance of organizational culture is embedded in the fact that it serves as the critical element which management might utilize in shaping the direction of their firms[16]. Corporate culture is a strategic-level variable that has an influence on overall organizational performance and influences a firm's strategy as well as its processes and, consequently, the outcome of new product development projects[6].

There are many culture classifications in the literature. But we have adopted the competing values framework as it is perhaps the most popular approach to assessing culture where the interest is on relating culture to organizational performance[20].

2.1. Measuring Organizational Culture through Competing Values

The Competing Values Framework has proven to be a helpful framework for assessing and profiling the dominant cultures of organizations because it helps individuals identify the underlying cultural dynamics that exist in their organizations. This framework was developed in the early 1980s as a result of studies of organizational effectiveness (Quinn and Rohrbaugh, 1981).

The ınstrument has now been used in many organizations worldwide in most sectors (e.g., private sector, public sector, education, health care). The framework consists of four quadrants, each representing a distinct set of organizational effectiveness indicators. Each of the four quadrants has a label that characterizes its most notable characteristics -clan, adhocracy, market, and hierarchy[14].

The market culture

The market culture is a results-oriented workplace. Leaders are hard driving producers, directors, and competitors. They are tough and demanding. The glue that holds the organization together is an emphasis on winning. The long-term concern is on competitive actions and achieving stretch goals and targets. Success is defined in terms of market share and penetration. Outpacing the competition, escalating share price, and market leadership dominate the success criteria[14]. The market culture, which is based on differentiation, competitive advantage, and market superiority, is expected to exhibit a high level of market orientation[21].

The clan culture

The clan culture is typified as a friendly place to work where people share a lot of themselves. It is like an extended family with best friends at work. Leaders are thought of as mentors, coaches, and, perhaps, even as parent figures. The organization is held together by loyalty, tradition, and collaboration. Commitment is high. The organization emphasizes the long-term benefits of individual development with high cohesion and morale being important. Success is defined in terms of internal climate and concern for people. The organization places a premium on teamwork, participation, and consensus[14].

The hierarchy culture

The hierarchy culture is characterized as a formalized and structured place to work. Procedures and well-defined processes govern what people do. Effective leaders are good coordinators, organizers, and efficiency experts. Maintaining a smooth-running organization is important. The long-term concerns of the organization are stability, predictability, and efficiency. Formal rules and policies hold the organization together[14].

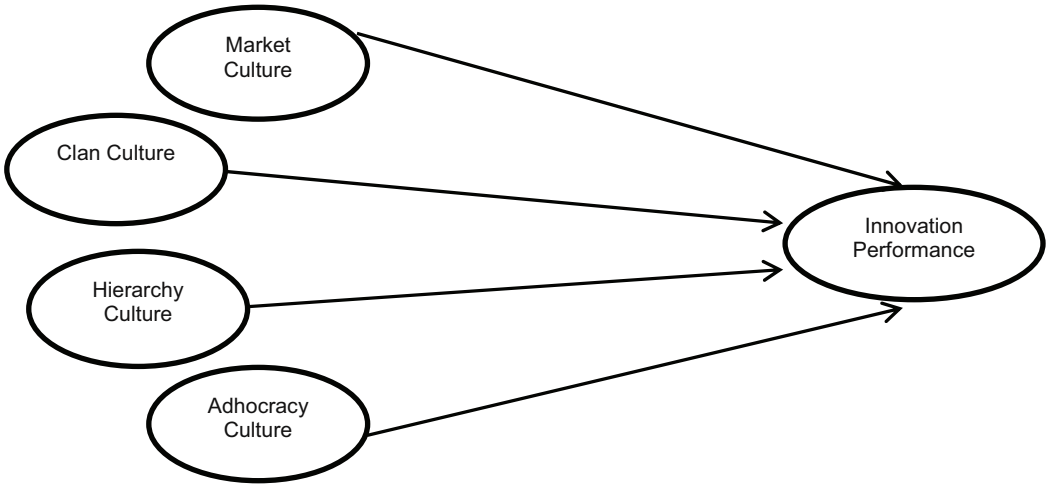
The adhocracy culture

The adhocracy culture is characterized as a dynamic, entrepreneurial, and creative workplace. People stick their necks out and take risks. Effective leadership is visionary, innovative, and risk-oriented. The glue that holds the organization together is commitment to experimentation and innovation. The emphasis is on being at the leading edge of new knowledge, products, and/or services. Readiness for change and meeting new challenges are important. The organization's long term emphasis is on rapid growth and acquiring new resources. Success means producing unique and original products and services[14].

3. Research Methodology

A face-to-face questionnaire method was used to collect data from hotel senior managers on the two constructs: Culture types (Adhocracy, Market, Clan, Hierarchy) and Innovation performance. In order to examine the relationships between culture types and innovation performance, a theoretical research model is developed (see Figure 1) and 4 hypothesizes are established to test this model.

Figure 1: Hypothesized Research Model



H1. *There is a positive relationship between Market Culture (MC) and innovation performance (IP).*
H2. *There is a negative relationship between Clan Culture (CC) and innovation performance (IP).*
H3. *There is a negative relationship between Hierarchy Culture (HC) and innovation performance (IP).*
H4. *There is a positive relationship between Adhocracy Culture (AC) and innovation performance (IP).*

3.1. Survey procedure and sample

Quantitative research method was used in the study. The data were acquired using a questionnaire form. The population of this study includes 1572 hotel managers working in 3-

4-5 star hotels in Turkey. All 1572 hotels listed in Turkey Ministry of Culture And Tourism web pages. For the research sampling, according to random sampling method, 310 senior managers (experimental group) were selected and questionnaire was applied to this target group.

3.2. Instrument

Survey items were adapted from existing instruments used in past research. Cameron and Quinn's (1999) Competing Values Framework (CVF)-based culture instrument was used in this study. The instrument was modified according to the characteristics of hotel business. The modified scale consist of 18-item and four CVF culture domains (Adhocracy Culture: 6, Market Culture: 4, Clan Culture: 4, Hierarchy Culture: 4). Each of the 18 items is scored on a 5-point Likert response format ranging from not valued (1) to highly valued (5).

On the other hand, it is not reached a comprehensive, valid and reliable scale developed on innovation performance in the literature. Therefore, the innovation performance scale is formed by examining the similar studies (e.g. Innovation capacity, innovativeness, innovation strategies) in the field. The main studies utilized; Khan and Manopichetwattana[23], Meeus and Oerlemans[24], Lawson and Samson[25], Ritter and Gemünden[26], Verbees and Meulenberg[27], Akman and Yılmaz[28]. The developed scale consists of 6-item and one dimension. Each of the 6 items is scored on a 5-point Likert response format ranging from very low (1) to very high (5).

In order to assess the reliability of the respondents on the variables, the internal reliability test was conducted. The average Cronbach's alpha was 0.60, indicating that there is a generally acceptable internal consistency among the respondents (see table 2).

3.3. Data analysis

Following Jöreskog and Sörbom (1989), structural equation modeling (SEM) was conducted with the LISREL program, assessing confirmatory measurement models (factor analysis) and confirmatory structural models (path analysis).

4. Findings

4.1. Measurement models

Results from the confirmatory factor analysis demonstrated that all of the scales (Culture Types – Innovation Performance) used in the study formed adequate measurement models and thus provided evidences for the construct validity of the measures. Table 1 shows the fit indices of the measurement models. Table 2 shows the descriptives of the constructs.

Table 1: Evaluation of measurement models for the constructs used in the study.

Constructs	□2	df	p	NNFI	CFI	GFI	AGFI	RMSEA	RMR
Market Culture	5,62	2	0.06	0.97	0.99	0.99	0.96	0.07	0.009
Clan Culture	2,08	2	0.35	1.00	1.00	1.00	0.98	0.01	0.005
Hierarchy Culture	14,11	2	0.00	0.87	0.96	0.98	0.88	0.08	0.018
Adhocracy Culture	47,52	9	0.00	0.94	0.96	0.95	0.87	0.09	0.029
Innovation performance	39,15	9	0.00	0.97	0.98	0.96	0.91	0.07	0.032

Table 2: Descriptive statistics for the constructs used in the study (N=138).

Constructs	M	SD	1	2	3	4	5
1.Market Culture	14,5782	1,56162	(0.74)				
2.Clan Culture	14,3145	1,55881	,452**	(0.71)			
3.Hierarchy Culture	14,7613	1,40915	,271**	,316**	(0.67)		
4.Adhocracy Culture	22,2747	3,10532	,440**	,351**	,320**	(0.83)	
5.Innovation performance	20,6247	4,09616	,203**	,139*	-,014	,199**	(0.89)

Reliability coefficient alphas are presented in diagonal in parentheses.
*Correlation is significant at the *P<0.05 - **P<0.01*

4.2. Structural models

The hypothesized model was tested with a confirmatory modeling strategy approach. The model tests the relationship between culture types (Adhocracy, Market, Clan, and Hierarchy) and innovation performance. The results of the Standardized Solution of the Basic Model and The tested model and the T- values of the Structural Model are shown in Figs. 2-3

The model generally demonstrates a good model fit indices, but some paths in the models are not significant (three insignificant paths between MC – IP, CC –IP and HC –IP, the path values < critical t- value 1.96).

Other goodness of fit values in the model are analyzed; it is showed that the model produces quite good values in terms of all goodness of fit criteria, hence, as such, can be easily accepted by. For example, the chi-square value (721.80) degrees of freedom (242) ratio is between 2-5. Likewise, RMSEA (0.073), CFI (0.91) and GFI (0.84) values indicate a good connection.

In addition, AIC (837.80) and CAIC (1112.52) values of the model are lower than the independence model (respectively 5897.63 and 6011.31) and the saturated model (respectively 600.00 and 2020.97) values .

Figure 2: The tested model and the Standardized Solution of the Basic Model

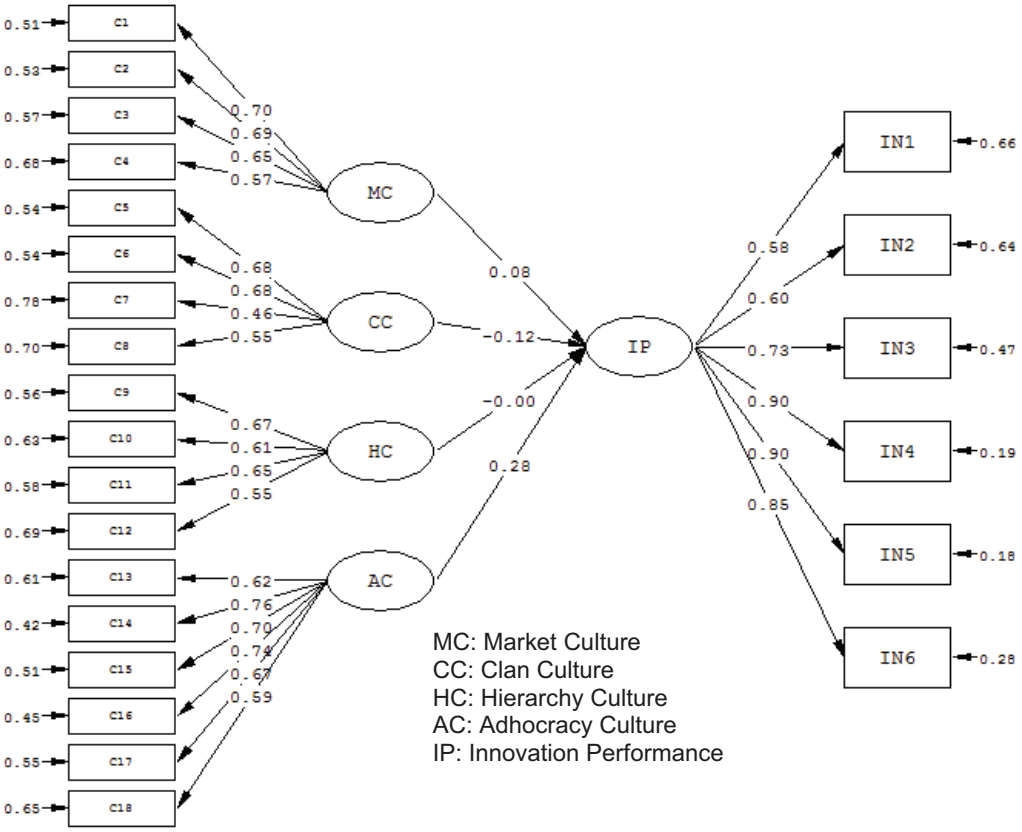
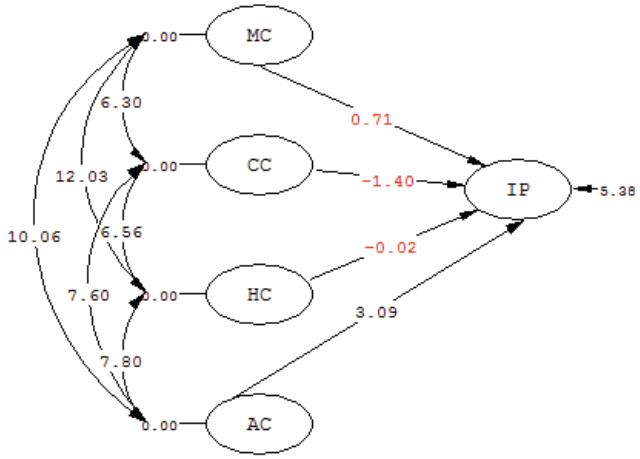


Figure 3: The tested model and the T- values of the Structural Model



4.3. Hypothesis testing

Figure 3 is examined, it is seen that there is a positive but non-significant relationship between Market Culture (MC) and innovation performance (IP), so H1 not supported by the findings. Clan culture (CC) demonstrated a negative and non-significant relationship with innovation performance, so H2 not supported. Also Hierarchy culture (HC) has a negative relationship with innovation performance, but not significantly, so H3 not supported by the findings. On the other hand, it is seen that adhocracy culture (AC) has a significant and positive direct impact on innovation performance, so H4 is supported.

5. Conclusion

According to the results of research, there is generally a significant relationship between the cultural types of hotel companies and their innovation performance.

In particularly, hotel businesses, with adhocracy culture, have certain features such as entrepreneurship, innovation, and risk taking, so their innovation performance is higher than the other culture types (market, clan, hierarchy).

The hotels, dominated by the hierarchy culture, have such as order, rules and regulations, uniformity dominant attributes, so innovation performance is low and negative in these hotels.

In the same way, because the hotel companies, with clan culture, have some dominant features such as cohesiveness, participation, team work, sense of family, their innovation performance is affected negatively.

Innovation performance is positive and high in the hotel businesses with market culture. In these hotels have some dominant attributes such as competitiveness and goal achievement.

On the other hand, adhocracy culture is the most dominant culture type in hotel companies. This was followed by hierarchy culture, market culture and clan culture.

Hotel enterprises are generally in good condition in terms of innovation performance.

The study contains the results of an initial investigation, conducted to fill the gap in the literature (relationship between organizational culture and innovation performance). In this respect, the research is original and contributes to the literature.

BUSINESS PROCESS MANAGEMENT AND ITS IMPLEMENTATION IN SLOVAK ENTERPRISES

Andrea Oborilová[1], Zuzana Papulová[2]

[1] *Department of Strategy and Entrepreneurship. Comenius University in Bratislava, Faculty of Management, Odbojárov 10, 820 05 Bratislava, e-mail: andrea.oborilova@fm.uniba.sk*

[2] *Department of Management. Comenius University in Bratislava, Faculty of Management, Odbojárov 10, 820 05 Bratislava, e-mail: zuzana.papulova@fm.uniba.sk*

Processes and Business Process Management (BPM) have recently become very frequent topic of many experts from the theoretical and practical fields. BPM can be classified as a new trend of management of the organization; but on the other hand it is not only perceived as a novelty, but as a necessity for organizations. By allowing companies to enforce their innovation capabilities with greater transparency, agility, compliance, quality, efficiency, BPM therefore plays a central role in shaping of high performance. The paper deals with the area of Business Process Management and its theoretical background. Evolution, importance, implementation and benefits of BPM are discussed and its impact on innovation growth in the companies. The practical part deals with research of current state of BPM implementation in Slovakia. The research was carried out on selected Slovak enterprises in the years 2011 and 2012. The research is focused on several aspects related to Business Process Management such as examination of the reasons why managers decide to implement BPM in their businesses, the level of process mapping in enterprises, as well as the detection of limitations of process management.

Keywords
Business Process Management, BPM Implementation, BPM in Slovak Enterprises, Processes.

1. Introduction

Under influences of environment development, the previously established and successful methods and approaches in the management are losing their effectiveness. The most important characteristics of the contemporary world are significant changes in the environment. Sudden and dramatic changes are forcing management of organization to seek, adapt and develop new approaches. Making changes in management approach is becoming a prerequisite for achieving the competitiveness and very often even a survival in a competitive environment. One of the approaches that greatly influenced the development of the theory and practice of management at the end of the twentieth century was the business process management approach (BPM). Effective BPM improves the organization's ability to anticipate, manage and respond to changing market conditions and to maximize exploitation

of market opportunities. Proper implementation of BPM can also reduce inefficiencies and errors arising from the redundancies. Maintaining business flexibility through effective process management is currently crucial to maintaining competitive advantage.

In the article we would like to discuss the development of approaches in management towards BPM approach, the advantages and benefits organizations can gain from BPM, outline its implementation and presents and discuss the results of the research of BPM implantation in Slovak enterprises.

2. Evolution of Business Process Management

Early stages in evolution of management were characteristic with great simplicity and low-level changes. These stages of management could be named as an *intuitive management.* They were based on the sharing of experience and knowledge of "generations" without creation of comprehensive management theory. Later, the industrial revolution had significant influence on management. The new approaches to production emerged as development of division of labour, production line and intensification of production caused the need for "an organized approach to management". As a respond the scientific and administrative management principles were created. [1] These classical principles of Taylor and Fayol were used for the long time and they are known as a *„functional approach to management"*. Fayol, as a founder of functional management, named the basic management functions as a planning, organizing, commanding, coordinating and controlling and also divided activities of the company into business functions such as accounting, finance, production, distribution and others. [2] Although in the theory of management other definitions of the basic functions and activities of management can be found, in general, they are applications of the same principle that aim to break down the complex management functions to a number of sub-functions. Functional approach in the management became the basis for the determination of manager activities, for the enforcement division of labour and specialization and reflected also in organizational design. In this approach organizational structure is based and followed the configuration of functions and hierarchies in organization.

Functional approach dominated in management for most of the past century. Later, also these principles started to show their limitations and forced companies to search for new approaches. Among new approaches we can find "*process approach to management"* as a contrast to traditional functional approach.

The process principles were firstly outlined by M. Hammer in USA [4]. His approach to management is known as re-engineering and it began to be applied progressively in the U.S. companies from the early 80's of 20th century. Later in the 90's it began to appear in the U.S. under the name of BPM - Business Process Management. U.S. companies previously established and managed on the classical Taylor and Fayol principles (functional approach) had slowly begun to realize the benefits of the BPM implementation.

When comparing these two approaches to management it should be noted that the basis of the functional approach is division of labour and specialization and more focus on functional departments and activities divided into these individual units. However, this functional arrangement and division ceases to be effective in accelerating competitive environment, it causes many problems - from slowing communication, duplication of unnecessary costs and activities to the overall organization inflexibility. Process approach, by contrast, focuses more on adjusting of weaknesses caused by functional approach and on process efficiency - especially faster decision-making processes and communication. Transition to process approach can identify and eliminate many problems that were caused by functional approach. [3]

Regarding Germany or Western Europe there is BPM initially conceived more pragmatically, as a guide to improve the operational activities of the company. [5] Gradually a trend can be noticed in these markets – BPM as a part of strategic management of the organization. It is not just about one or two more efficient processes, but understanding that processes streamline and change the functioning of the whole company.

When we look at Central and Eastern Europe, not excluding Slovakia, most companies that are slightly larger and have a majority of the owners from Western European countries or any partnerships with Western Europe have to automatically adapt to their management style to obtain competitive advantage. This is particularly typical for banks and financial institutions industry and energy companies and gradually the trend of BPM extends to the whole market. [3]

Nowadays in Slovakia there exist many firms offering consulting services in the area of BPM, many professionals who are interested in this subject and try to develop and refine approaches, standards and tools to effective modelling and managing processes in organizations.

3. BPM and its implementation

In the literature we can find a lot of definitions of Business Process Management. According to Šmida [6] BPM represents control schemes, methods and instruments for ensuring maximum performance and continuous improvement of inter-enterprise processes, based on clearly defined organizational strategy.

The objective of BPM is to develop and optimize the operation and functioning of the organization so that it can efficiently and effectively respond to customer requests. The purpose of proper process functioning is the determination of personal responsibility for the processes and for each activity and system of process performance measurement with the purpose of monitoring and evaluation of each process. [7]

When deciding why to implement business process management it is important to understand what are the main benefits of BPM. Benefits can be found in all areas of organization: reducing in exposure time of orders, orders increase without any errors, shortening the total purchasing time, reducing the time to develop new products and the reaction time to customer requests, clearly defined competencies of employees, simplifying and clarifying workflows, streamlining the organizational structure, outsourcing of support processes, orientation on key processes, effective use of modern methods and process management tools.

Of course there are much more benefits, but their importance, amount and character are influenced by the characteristics of each organization.

The transition from functional to process management is considered as the most laborious manager's step. In addition to technical and organizational changes, changing attitudes and skills of human resources should be particularly taken into account. The principle of business process management system cannot be understood only in the arrangement of basic processes in the organizational and management structure, but primarily as a change in behaviour of the action's and activities' owners. [8]

For the above mentioned reasons some barriers of the transition to process management are defined as: [8]

- unwillingness to adopt changes at all levels of management, disagreement to change,
- unpreparedness / unwillingness of employees to assume the competency and responsibilities,
- threat of degradation of employees' jobs, threat of losing power,

- too much operative problems, not too much time and willingness to support changes,

- lack of communication of reasons and the expected effects of transition to BPM,
- lack of commitment of senior management to process management,
- unclear, respectively incorrectly defined objectives of the process management transformation,
- lack of knowledge on methods and tools of process management,
- concerns of staff redundancies.

From these defined risks/barriers it is clear that their elimination is possible only under conditions of systematic communication of strategic plans with employees and their continuous professional development. It is important to convince employees that change is needed and why, that the change will bring positive results for the organization and how and what behaviour is expected from each employee. [8]

Implementing BPM not only requires a basic understanding of the risks and limitations, but also a deeper understanding of the possibilities of using different tools and approaches. Selection of procedural methods should be connected with the organization's requirements and conceptions, but also with the skills and abilities to use the tool. The research followed the application of these instruments and the extent to which managers use software support.

Apart from the implementation of process management there are other tools and methods that are related and linked to business process management: [3]

- ABC (Activity Based Costing)
- ABM (Activity Based Management)
- BPM (BPI - Business Process Improvement)
- BSC (Balanced Scorecard)
- SCM (Supply Chain Management)
- Quality Management Systems (ISO, EFQM, Six Sigma)
- CRM (Customer Relationship Management)
- and others...

On today's market (in Slovakia) we can choose among multiple software tools which can model, analyze and simulate processes. These tools usually use a graphical visualization and process description.

Some instruments are easy to manage, others offer comprehensive solutions. We could divide these into three groups: [9]

- Mapping Tools (Process Wizard, Visio, ...)
- Modelling Tools (ARIS Toolset, System Architect, ...)
- Modelling and Simulation Tools (ProVision, QPR Process Guide, ...)

4. The level of BPM implementation in Slovak enterprises

As mentioned in the theoretical part, process management may be on the one hand very useful, but on the other hand, its implementation is not easy. Current status of Slovak companies on this issue was determined through research (2011-2012) regarding the level of

implementation of BPM, manager's attitudes to its benefits and the use of tools and methods of quality management.

4.1 Nature of the survey

A pilot survey was conducted in 2011 as well in 2012 by questionnaire and by structured interviews in companies operating in Slovakia in various sectors in order to obtain an overview of manager's attitudes to BPM.

The number of surveyed companies in research was: 218

Companies were divided into several sectors:

- *Industrial production:* companies in the engineering, food processing, electronics and other industrial sectors. This was the largest group of total surveyed companies: 33%
- *Services:* companies providing logistics and marketing services: 30%
- *Information and communication technologies (ICT)*: 14%
- *Financial institutions*
- *Consulting*
- *Trade*
- *Tourism*

Concerning the size of companies, a significant percentage (approximately 36% and 32%) consisted of large and medium-sized enterprises, micro and small companies built a small interviewed group.

4.2 Structure of questions

Questions were divided into two areas. The first area consisted of four questions to determine the current status of process management and its perspective on the importance perceived by managers in selected companies. Each question offered several types of responses. Second series of questions was designed with the intention of ascertaining the state use of systems of quality management or planning the implementation of these systems, among which were the ISO (9001, 14001, other), TQM – Total Quality Management, EFQM - Excellence Model and the CAF – Common Assessment Framework. The same question was laid for the implementation and for implementation planning of the following methods: ABC - Activity Based Costing, BSC - Balanced Scorecard, BPI - Business Process Improvement, SCM - Supply Chain Management, CPM - Corporate Performance Management, Lean Manufacturing, Six Sigma.

Example of questions in questionnaire and structural interviews:

- In what areas does the manager/company see the importance of BPM implementation?
- How would you describe the level of BPM in your company?
- How are the processes described/captured in your company?
- Does the company use software to support BPM?
- Does the company have implemented any of the quality management systems? Which one do you plan to implement?
- Which of the following methods does the organization have already implemented? Which is / are (not) planning to be implemented?
- From the perspective of process performance measurement indicate a favourable / unfavourable opinion:

- Is there a defined performance indicator for every process?
- Is there a defined periodicity of recording value of performance indicator?
- It there an IT support for measurement and evaluation of performance indicator?
- Are there settled correction actions in case of overload (violation) of defined value of performance indicator?
- Are there records of process costs in last period?
- Is measurement of business process base for their improvements?

4.3 The survey results

The survey results were recorded individually and based on structured interviews, supplemented by observations of managers. Managers reported several issues, ideas and multiple answers to each individual question. As the greatest importance of the implementation of BPM respondents (50%) reported satisfaction of improvement of external customers in 2011 and reducing of overall costs by optimizing processes in 2012 (almost 59%).

4.3.1 BPM implementation

When surveying the level of BPM in 2011 we met a combination of guidelines and manuals of described processes in companies and also their measurement and evaluation. Over 14% of companies confirmed that they do not have process management implemented and they do not describe and measure processes at all. Within this category we include mainly micro and small enterprises. The use of process normalization models (ABC, BSC...) and the strategic realignment process management has been the domain of medium and large enterprises. In comparison to 2012 only 9% of companies stated that they do not need process description or process measurement. More than 36% of mostly large companies measure and control their processes. In Table 1 we can see the level of BPM implementation in both years. We can see the positive trends in BPM level implementation when comparing the situation in 2012 with 2011.

Table 1 Level of BPM implementation

Level of BPM implementation	2011	2012
No processes determination	14%	9%
Process descriptions	36%	36%
Process descriptions, graphical process maps	17%	33%
Process measurement and management	32%	36%
Process management with help of BPM methods	15%	12%
BPM implemented, process innovations and strategic goals optimalizations	21%	26%

4.3.2 Level of BPM implementation

For those businesses which reported describing internal processes or measuring them we tried to capture the way of describing and mapping these processes. The most common response (67% in 2011, 61% in 2012) was describing and depicting processes with help of

their own systems and standards - Word, Excel, Pohoda nadstandard, … Others (35% in 2012) reported capturing processes by describing in the quality manual (ISO standards). Very few businesses (2-8%) are on the other hand using specialized methods to map processes, such as IDEF (Intergrated Definition) - IDEF1X, IDEF14, IDEF12, BPMN (Business Process Modeling Notation) and EPC (Event-driven Process Chains). To conclude we can say that company mostly developed and used own systems and standards rather than standard or available methods.

4.3.3 BPM support

When asking managers if they use any software to support process management, 69% of managers reported negatively. By contrast the year 2012 showed that 66% of respondents use software tools to support the process management in the company. Regarding the company size, micro and small enterprises indicated little or no use of software supporting BPM. The second year was more represented by large and middle sized companies. Maximum use and benefit of such support was recorded in industry, financial and IT sector. In contrast, the less utilization was in counselling and tourism. The most frequently mentioned software tools were ARIS, ARIS Business Architect, QPR, Compass, Process Wizard, Nimbus, Arriba, SAP Wave and many others. Table 2 shows the comparison of both selected years regarding the software support.

Table 2 Software support for BPM

Software support for BPM	2011	2012
YES	31%	66%
NO	69%	34%

4.3.4 Management systems

In the second question area we focused on the use and status of implementation of quality management systems. ISO standards were the most frequent answer to this question; about 58% in 2011 and 56% in 2012 of these companies have ISO standards already implemented. 9%-13% of companies plan to implement them. The in the questionnaire offered systems - ISO, TQM, EFQM Excellence Model and CAF - companies reported Total Quality Management as the second most popular, as well as in order to implement similar systems in the near future. The remaining number of respondents gave a negative response with regard to implementation of planning systems in the future. In terms of company size, which stated ISO standards as implemented, it was the domain of medium-sized and large enterprises. Quarter of respondents, mainly small businesses, recorded that they are planning to implement ISO standards. The absolute lack of interest in the implementation of specific methods was the one of the CAF model - a common system of quality assessment (Common Assessment Framework) as showed in Table 3. In terms of industry and sectors, implemented ISO standards were prevailing in the area of IT and other industries and the planning implementation for the foreseeable future was dominated by consulting companies and tourism.

Table 3 Quality management systems implementation

Quality management systems	2011	2012	
ISO	58%	56%	IT, industry, trade sector
TQM	21%	16%	IT, industry, tourism sector
EFQM	4%	2%	Financial sector
CAF	2%	2%	Financial sector

4.3.5 Methods of process improvement

The situation of the established methods of continuous process improvement (ABC, BSC, BPI, SCM ...) was answered in other set of questions directed to the implementation and the planning implementation of these methods. Up to 55% of companies stated that the methods are not implemented. BPI with 21%, ABC with 17%, BSC and SCM both 15% were the most commonly used methods in 2011. Six Sigma, Lean manufacturing and CPM ended up with less percentage. Interest in the implementation of Balanced Scorecard showed 8% of companies questioned. Again, as shown in the previous question, large companies accounted for the highest percentage in the use of these methods and in their planned implementation. Financial institutions and trade led the chart on the use of ABC, BSC and BPI methods. IT and other industries dominated the SCM, CPM, Lean Manufacturing and Six Sigma. The comparison of methods used by companies in 2011 and 2012 is showed in Table 4, as well as the sectors most represented.

Table 4 Business process improvement methods

Business (process) improvement methods	2011	2012	
ABC	17%	16%	IT, industry, finance sector
BSC	15%	15%	IT, consulting sector
BPI	21%	13%	IT, consulting sector
SCM	15%	12%	IT, trade sector
CPM	11%	12%	IT, trade sector
Lean Manufacturing	11%	13%	IT, industry sector
Six Sigma	13%	25%	IT, industry sector

The last question was about expressing the manager's views on process performance measurement. Most managers agreed and expressed the answers to individual questions in the affirmative way, what indicates the interest and putting the importance on the necessity of BPM and its tools.

5. Conclusions

The pressure of globalization, new economy, accelerating scientific and technological progress creates a need for changes that will enable to make better use of natural, financial and human resources. Limited resources in terms of long-standing sustainability of growth lead to economical and efficient use. "Doing the right things in the right way" (P. Drucker) is famous thought applied in the process approach. Principles of BPM build the basis to increase competitiveness, which many Slovak companies have not realized yet. The survey

showed the manager's awareness of major importance in the BPM implementation to maximize the benefits for the customer, as well as minimize unnecessary, redundant processes.

On the other hand, processes in enterprises are described according to own company's standards or with the aim to include them into the quality manual for the implementation of ISO standards. In the transition process only large companies usually invest considerable money in process modelling tools. The survey confirmed this statement. As expected, ISO standards are and will be the quality management system that is mostly implemented by Slovak companies. Other systems and methods are less significant for small enterprises, for large they mean the next steps of process improvement, mainly in the industrial sphere. From mentioned statements and survey's results we doubt whether managers do not confuse process management with managing processes that is required by implementing of quality management systems.

From the above described reasons of BPM implementing, managers agreed on advantages - increasing benefits for the customers while reducing overall costs by optimizing processes. The interviews did not reveal other meanings, which are more essential, especially supporting strategic business objectives and clearly defined competencies and responsibilities in the processes. This confirms that managing of processes is more than familiar to managers, but BPM is not applied.

Small hope for the BPM implementation and its growing importance was revealed in manager's attitudes to process performance measurement. The opinions and answers showed a positive approach to process measuring leading to their improvement, hence the use of various tools to optimize processes and IT support.

References

1 PAPULA, J, LAUKO, L.: Projektový manažment ako evolučný predchodca procesného manažmentu. In:Zborník vedeckej konferencie doktorandov, Trendy v manažmente očami mladých vedeckých pracovníkov. Bratislava FM UK, 2009. S 102-107. ISBN 978-80-88870-84-5

2 ROBBINS, S.P., COUTLER,M.: Management. Praha: Grada 2004. 600 s. ISBN 80-247-0495-1

3 PAPULOVÁ, Z.: Process Approach and its Application in Strategic Performance Management. In: Comenius Management Review – Scientific Journal, Comenius University in Bratislava. Faculty of Management. Bratislava: KARTPRINT, 2008, s. 59 – 67. ISSN 1337-6721

4 HAMMER, M., CHAMPY, J.: Reengineering – manifest revoluce v podnikání, Praha: Management Press 2000. 212 s. ISBN 80-7261-028-7

5 ŠUPŠÁK, J.: *BPM - alfa a omega efektívnosti*. [on-line] 29.07.2006 [cit.16.10.2011] Dostupné z <http://www.efocus.sk/archiv/kategoria/riadenie-procesov/clanok/bpm-alfa-a-omega-efektivnosti/>

6 ŠMÍDA, F.: *Zavádění a rozvoj procesního řízení ve firmě.* Praha: Grada Publishing, 2007. 293 s. ISBN 978-80-247-1679-4

7 GRASSEOVÁ, M. – DUBEC, R. – HORÁK, R.: *Procesní řízení ve veřejném sektoru: Teoretická východiska a praktické příklady.* 1. vyd. Brno: Computer Press, 2008. 266 s. ISBN 978-80-251-1987-7

8 BOROVSKÝ, J.: Manažment zmien – cesta k rastu konkurencieschopnosti. 1. vyd. Bratislava: Eurounion, 2005. 142 s. ISBN 80-88984-66-1

9 OBORILOVÁ, A.– MEŠKO, M.: *Súčasné prístupy a nástroje procesného manažmentu a procesného modelovania* In *Súčasné trendy a smery v manažmente organizácií. Zborník z konferencie doktorandov.* KARTPRINT: Bratislava, 2010. 246 s. ISBN 978-80-88870-93-7

AN EMPIRICAL STUDY OF CUSTOMER-ORIENTED NEW SERVICE DEVELOPMENT IN THE MENTAL HEALTH SECTOR. PRELIMINARY FINDINGS OF THREE MENTAL HEALTH HOSPITALS

Stavros Sindakis[1], Professor Paul Trott[2]

1. *Institute for Knowledge & Innovation, Bangkok University, Rama 4 Road, Klong-Toey, Bangkok, 10110, Thailand, Stavros.s@bu.ac.th*
2. *Business School, University of Portsmouth, Portland Street, Portsmouth, PO1 3DE, UK, Paul.Trott@port.ac.uk*

In the highly competitive health care market, corporations need to develop successful new services that meet the needs of customers. However, little has been written about how new health services are developed and to what extent should patients be involved in the development process. Furthermore, little in-depth research has been conducted into how entrepreneurial opportunities can be developed by health care organisations from patient-oriented services.

The paper reviews relevant literature and develops a model that investigates and explores the level of patient involvement required for successful new service development and how these new services could aid the cases organisations with establishment and growth in the sector of mental health hospitals.

Qualitative research techniques were applied to address the research questions. The preliminary findings show that health care organisations should adopt service innovation processes, involving users in the design and development of new offerings. This will also give them the ability to identify further entrepreneurial opportunities in the wider sector of health services.

Keywords

Service Innovation; Corporate Entrepreneurship; New Service Development; Customer Orientation; Health Care Services

1. Introduction

It is widely accepted that innovation has assumed great importance for organisations in sustaining their competitiveness (e.g. Tidd *et al*, 2005; Bernstein & Singh, 2006; Ussman *et al*, 2001; De Propris, 2002). Blumentritt *et al* (2005), whose study concentrates on how entrepreneurs develop internal cultures that may inspire and impel innovation, argue that continuous innovation requires organisational systems and procedures that are embedded, so as to ensure growth. From an entrepreneurial point of view, Simmons *et al* (2009) state that entrepreneurship creates value through innovation, seizing business opportunities. But little research has been conducted about new service development in the health service industry, with only a select number of notable works available: Duncan and Breslin, 2009; Windrum and Garcia-Goni, 2008. This paper focuses on the mental health sector, investigating the opportunities for development of mental health care in Greece.

It becomes apparent that there is a noteworthy improvement in the areas of decentralisation of mental health services in Greece (Madianos *et al*, 1999). Yet there is much

still to be done in terms of quality and delivery of mental health care services. What is more, the mental health service sector is not very highly exploited. There are few private independent hospitals of this kind across Greece, even though the public sector appears not to satisfy the needs of the patients. The organisation that is the focus of this study is a leading player in the area of diagnosis, prevention, and hospital care in Greece. Euromedica Group is mainly involved in the foundation, organisation, and operation of clinical and scientific centres. In 2008, Euromedica recognised an unfilled niche in the market for health care, that of mental health services. Following extensive market research into this area of the health care market, including the limited availability of such treatments geographically, the organisation decided to invest in and develop their own services in this area.

This article responds to calls for the further development and investigation of the concepts of customer participation in the new service development process as well as of the link between innovation and entrepreneurship (e.g. Jones & Rowley, 2011; Melton & Hartline, 2010). It also attempts to bring a promising entrepreneurship lens to the still emerging field of service innovation in mental health care. On one hand, the aim of this study is to advance previous service innovation theory by associating with the entrepreneurship theory, while on the other, seeks to extend previous knowledge regarding the benefits of customer participation in new health service development.

This study adopts qualitative research techniques, following the advice of Rohrbeck and Gemünden (2011, p. 234), who state, “for research fields that are relatively new and about which the knowledge is limited, a qualitative research design is recommended.” The preliminary findings are based on in-depth élite interviews with higher executives of the Euromedica Group, as well as with the administrator of each psychiatric hospital. The aim was to investigate issues relating to innovation, entrepreneurship, and customer orientation from the standpoint of management. The next sections of the paper include the evaluation of main findings with detailed discussion and implications for the literature. Finally, managerial implications and ideas for future research can be found at the end of this paper.

2. Innovation and service development in health services: The development of a conceptual framework

The health care industry is one characterised by innovation (Bowers, 1987), with hospitals often acting as leaders in innovation as new treatments and technologies in this arena emerge daily. However, this rapid rate of change can often stifle organisations who may not have the resources to keep up and will end up suffering from business inertia (Rohrbeck & Gemünden, 2011). Other potential problems regarding innovation in the health care can lie in the bureaucracy and other such problems often associated with the industry (Duncan & Breslin, 2009; Bellou, 2010). Efforts to ameliorate problems and issues such as these have been illustrated in research by various authors (e.g. Nijssen *et al*, 2006; Menor & Roth, 2007) who suggest a rigid, systematic approach to new service development as being able to provide a more effective approach to successful innovation.

In addition, corporate entrepreneurship may be defined as an organisational capability, which promotes entrepreneurial behaviour within organisations in order to overcome internal barriers, challenge bureaucracy, and encourage innovation through novel business schemes (Salvato *et al*, 2009; Echols & Neck, 1998; McFadzean *et al*, 2005). It is a concept that is often associated with competitive success and is said to be achieved through various methods. Similarly, Kraus and Rigtering (2010), who see corporate entrepreneurship as a company philosophy, cite that corporate entrepreneurship is a strategy that improves firms' innovative capability and raises employee satisfaction.

Furthermore, new service development activities are of vital importance, as they strengthen current business and create the potential for new business ventures (Frambach *et al*, 2003; Igel & Islam, 2001). The necessity to develop new services is of particular importance in the health care industry due to the nature of the services provided. Smith *et al* (2007), who implemented five different models on the design and development of new health care services, found that in order for a development process for health services to be successful the service

design should harmonise with the organisation's objectives and strategies and with the interests and expectations of the key stakeholders (government, health board, etc.). Moreover, service design should focus on users' needs and involve both customers and a range of other stakeholders, such as front-line staff, managers, and so on, in the development process. In addition, the process must be well-structured, flexible, and fast.

It is also widely recognised that customer-oriented businesses improve customer satisfaction and deliver better service quality (e.g. Hartline *et al*, 2000). This point is particularly relevant to the health care industry as health services need to be modified for individual patients, balancing their medical needs so as to increase efficiency (Berry & Mirabito, 2010). Furthermore, increased customer orientation seems positively to influence medical scientists' working practices and their sense of professional expertise (Cohen *et al*, 2004). Another important point is the increased access to information regarding health care now available to customers. This has led the current health care experience to move from simple procedures and services, towards a holistic process that starts before admission and is completed after discharge (Ford & Fottler, 2000). All this implies that executives must always consider effective ways to provide health care services. Wood *et al*'s (2000) study, suggests that health care organisations should focus on new approaches, such as customer orientation, to achieve patient satisfaction. Similarly, Lord (1989) concluded that the aims of involving patients are generally to advance health outcomes, raise satisfaction, and/or reduce cost.

In recent years, users of psychiatric services have taken a more active role in their treatment and hospitalisation. Research by Barnes & Wistow (1994) and Campbell (2001) found that until the early 1980s, patients used to be passive recipients of their treatment, having no participation in and little influence over the services they used. Indeed, the World Health Organization (1990) advised that patients should be involved in the decision-making process with regard to their treatment, yet it has been reported in the literature that mental health patients have not been treated with equal consideration as other types of patients (Lammers & Happell, 2003).

Nevertheless, many changes have occurred since the 1980s that have led to mental health patients gaining increased influence over the services they receive, including users having increased control of their care and the decisions involved, and better availability of knowledge of the types of treatments delivered. Based on these findings, a conceptual framework (Fig. 1) has been developed in order to address the following research questions:

- What is the role of customer (and of the market) in the development of health services in Euromedica Group?
- How does Euromedica Group exploit innovation in services so as to engage in corporate venturing?

The framework conceptualises new service development and entrepreneurship in the health care industry. It offers a holistic approach to strengthening an organisation's position in the health care market by developing new service offerings and identifying business prospects, whilst satisfying and gaining loyal customers. From a theoretical perspective, this framework highlights the interactions between the research concepts within an organisation, as well as the entrepreneurial and new service development opportunities within the mental health and rehabilitation sector. The framework is developed to guide research efforts and to provide insights for managerial practice. The proceeding section of this paper explains the elements of the framework.

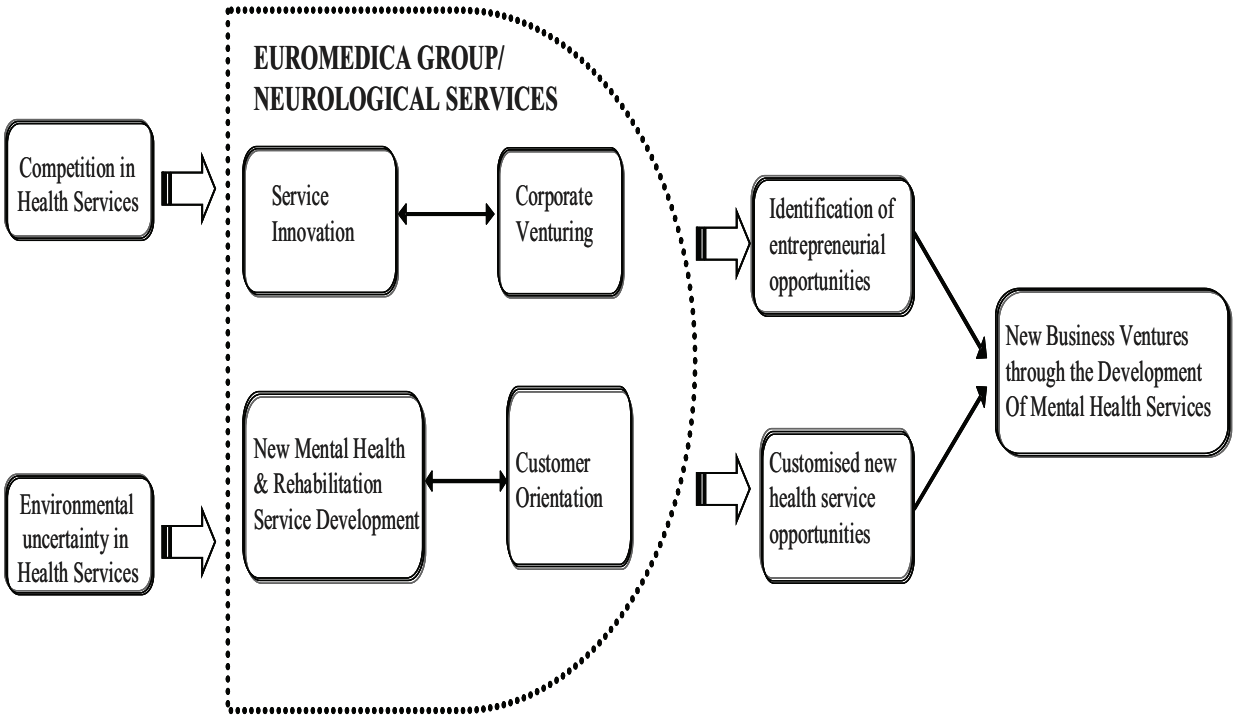


Figure 1 Conceptual framework for New Service Development through Corporate Venturing in the Health Care industry

2.1 Driving Forces

Figure 1 recognises that competition in the health care industry and environmental uncertainty are the key external driving forces that require the organisation to pursue strategies for growth. As will be been shown in the research context section, the health service industry is now characterised by increased competition and the growth of large enterprises offering a wide-ranging selection of services. Consequently, this has led to a decrease in the number of smaller specialised firms.

The second driving force is the instability of the Greek health care industry. This is the result of a number of factors: Firstly, as Greek political power is frenetic in its longevity (with leading political parties, only possessing power for what is often a very short time); policy regarding health care is continually changing. Secondly, the many problems regarding cash flow and payment delays of insurance funds, and in turn hospital funding and revenues. Lastly, the great concern felt by many Greek citizens regarding hospital fees. It is important to mention that considering the conditions of competition in the Greek private health care market and the political, business, and social climate in the Greek society, these are major forces pushing health care organisations to seek innovation and exploit business prospects.

Identification of entrepreneurial and new service development opportunities

Figure 1 also portrays two driving forces that urge firms to undertake several initiatives and approaches related to their growth. These are classified into four research efforts: service innovation, corporate venturing, new service development, and customer orientation. The combination between the first two seems to play an important role in the identification and exploitation of entrepreneurial opportunities, while the interplay of the latter two contributes to the creation of satisfied customers.

Many authors believe innovation and entrepreneurial activities to be intrinsically linked (e.g. Zahra, 1996; Thornberry, 2001). We may conclude that entrepreneurship and innovation are complementary activities, with innovation as the source of entrepreneurship and entrepreneurship enabling innovation to prosper, create value for the organisation, and improve business performance (Zhao, 2005a). Likewise, many researchers conceptualise corporate venturing as the actions of individuals or teams within organisations that lead to innovation of processes or products (e.g. Antoncic & Hisrich, 2003; Walton, 2003). Conversely, some authors

support the view that service organisations should focus on the needs and preferences of their customers and turn their innovation efforts in this direction (e.g. Fuchs & Schreier, 2011; Kandampully, 2002).

Successful service innovation is likely to involve existing and potential customers in the new service development process, in so doing the customers' needs are better understood (Morden, 1989). It is clear in the literature that inputs of information about actual and potential customers guide successful and customised offerings (e.g. Zirger & Maidique, 1990; Cooper & Kleinschmidt, 1988). Gronroos's study (2007) suggests that the development of a new service offering should be implemented by people who fully understand the requirements and the preferences of the customers. This is particularly valid in mental health services, as user participation improves the psychological situation of the patient and enhances the quality of the offering. This leads to a more active user, who can contribute to his/her treatment.

3. Research context: Euromedica Neurological Services

In recent years, the Greek health care industry has become characterised by significant changes involving mergers and acquisitions between companies in the three broad areas of activity (general clinics, obstetric and gynaecological clinics, and diagnostic centres). A result of this trend is the prevalence of multi-purpose business groups for medical services, which offer a full range of services for diagnosis and treatment. The competition between private health units is particularly intense with several factors affecting the increase of demand for private health services (e.g. gradual aging of the population, emergence of new diseases, evolution of medical science and technology, etc). However, mental health care sector is not very much exploited by the Greek healthcare groups. There are few independent hospitals of that kind across Greece and it becomes apparent that public sector cannot satisfy the needs of patients. This leads to the conclusion that this underdeveloped area of healthcare has much room for growth in both new quality service development and, business expansion.

Euromedica Neurological Services is the leading provider of private mental health treatment and associated care services in Greece, with a network of 3 acute hospitals and care homes (Thermaikos, Castalia and Galini), which employ more than 350 people. The organisation offers a range of inpatient, outpatient, day patient and residential treatment programmes, as well as therapy services that include condition management programmes as well as psychological and psychiatric services, such as secure and step-down services, complex care and rehabilitation services. It also provides autism services and care of the elderly. It continues to establish new services each year in partnership with government bodies.

4. Corporate and hospital-related research

This study aims to investigate issues regarding innovation, entrepreneurship and customer orientation from the management perspective. All things considered, "the role and responsibility of top management is to deliberately create processes (regarding innovation and corporate entrepreneurship) that are carefully cultivated and maintained through cultural and structural design" (Kemelgor, 2002, p. 70). The corporation and hospital-related side of the research reveals the viewpoints of the executives and higher-level managers of the Euromedica Group as regards the innovative and entrepreneurial activity of its mental health hospitals and how they take in the participation of patients in the new service development process.

4.1 Data collection method

In-depth élite interviewing was adopted as the primary data collection method, because of the nature of the research purpose. This technique provides a deep and rich investigation of executive viewpoints regarding entrepreneurial activities and the development of customer-oriented services. Elite interviewing is not a common research technique and has not been broadly mentioned in the business literature on in-depth interviews (Ozdemir, 2007; Welch *et al*, 2002). Elite interviews, though, offer valid and reliable data on the central questions of this research project. Richards's study (1996) reports that the élite interview process assists the researcher in appreciating the perceptions and values of the interviewee; essentials that cannot

be found in documents or records, but which influence decision-making. Another study by Goldstein (2002) suggests that researchers should adopt élite interviewing to seek information from a specific sample of officials (élites) to generalise the outcome in connection with their characteristics or to search for particular information.

The researchers had initial discussions with key informants, who were very interested in the study and helped considerably in its execution. Apart from those discussions, they prepared a letter providing information about the research and its objectives as well as the type and number of sample required. This letter also mentioned privacy (personal confidentiality) and potential benefits for the hospitals. After confirmatory feedback was received, further discussions took place to arrange the date and time of the interviews. The interviews were carried out at the headquarters of the Euromedica Group as well as at the chosen hospitals. Interviews were tape-recorded for future analysis and assessment and lasted 50 to 80 minutes.

4.2 Survey Instrument

Interview questions were derived from the innovation-management, entrepreneurship, and customer-orientation reviews of the literature and were prepared for the analysis of both the new patient-oriented services development and the ways these new services might aid the Euromedica Group with establishment and growth in the sector of mental health hospitals. It was also essential to conclude whether the organisation and its hospitals have their own procedures and tools to support such projects. The questions covered topics related to: the role of administrative and medical staff in innovation activity, the level, and type of market research undertaken on user- oriented service development, and the management practices engaged when developing new services.

4.3 Sample

Data collection was based on in-depth élite interviews with, on the one hand, members of the Board of Directors and other top executives, while, on the other, with executive managers from mental health hospitals. The former group consisted of the: Chairman, Vice-Chairman and CEO, Business Development Director, Quality Director, Medical Services Director, Nursing Director, Patient Services and Admissions Director, as well as the CEO of Euromedica Neurological Services, who is responsible for the Group's mental health care activity. They were chosen to provide information about the overall innovation strategy and new service development methods, activities and initiatives of the hospital chain, whereas the latter group (hospital managers) was expected to provide the same kind of information as regards the hospital unit they operate in. A study by McDermott and O'Connor (2002) emphasises that this approach offers a thorough understanding and a richer portrayal of the case being studied. Participants were selected because they have deep knowledge of Euromedica's innovation and entrepreneurial activity, so the information acquired could be compared and treated as being highly credible.

4.4 Data Analysis

Studies argue that qualitative research is of increased interest in health services (e.g. Shortell, 1999; Sofaer, 1999); however, no considerable attention has been paid to the approach and methods of data analysis (Bradley *et al*, 2007). Studies by Fossey *et al* (2002) and Thorne (2000) report that qualitative research techniques establish guides and associations between elements of data and therefore, data analysis is a compound and mysterious process in qualitative studies.

Data analysis was performed throughout by a broad and thorough procedure as set out by Creswell (2007). At the early stage of the qualitative analysis of Research Section I, interviews were transcribed to produce manuscript that could be used to generate coding categories and test theories. Before transcriptions were coded, each transcript was examined carefully to enable a thorough understanding of its value. A guide to themes then emerged, using a category system for data reduction and coding in line with both the initial theoretical framework and the conceptions that had been developed by the interviewees. The next step followed the process employed by Lindgren and O'Connor (2011), who classified interview data and organised them thematically to compare organisation, operation and strategy among case study sites as well as participants' viewpoints. This systematic process concerns the description of managerial practices, the interpretation of decisions and actions, as well as the search for

patterns and correlations among data (Lindgren and O'Connor, 2011). Likewise, the study by Pope *et al* (2002, p. 149) reports, “when conducting this coding analysis the researcher gives consideration to the actual words used, the context, the internal consistency, the specificity of responses that is more based on one's own experiences of respondents, and the big ideas beneath all detailed information”.

As regards conclusion drawing and data verification, one would apply the notion of Rohrbeck and Gemünden (2011), who recommend that a researcher should follow the theoretical framework, identify and assess rival explanations and make a case description.

5. Research findings

5.1 Innovation activity within Euromedica and its mental health hospitals

It is clear that senior executives of the Euromedica Group recognise the importance both of the development of innovation and of entrepreneurial activity. Indeed, higher executives identified many internal factors that stimulate innovation activity, such as: the evolution of technology; the attitude of managerial and scientific staff towards innovation; the evolving needs of patients; the quality of the service offerings; the need to remain competitive and to have additional revenue from different sources in a time of crisis. As an external factor that discourages firms from innovation, they identified legislation, both financial and social. The management also claimed that tools are used to identify customer needs and assess the health market, such as adequate information systems, questionnaires, and so on, despite the fact that these have not yet been established in their psychiatric clinics. Informal, rather than formal, processes of developing new services have been adopted.

It has also been found that the company is not rigorous in condemning efforts that fail, but prefers to acquire knowledge from experience. In any case, few people claimed that the company has created a system where innovation thrives without restrictions; most respondents stated that further measures should be implemented to enhance the organisation's structure and achieve better results. Participants argued that the stimulus of development encourages innovative activity and Euromedica has shown that its business goal is to expand its activities in all sectors of the health sector, and beyond national borders, as well as developing new services that meet the growing needs of customers.

This last is particularly important, as management observed that customers together with other stakeholders lead innovation efforts. Therefore, they have developed services that meet the needs of patients and take into account their demands. However, the management team claimed that patients are able to play a role in enhancing residential services in hospitals and stressed that only some users of psychiatric services are able to contribute to the development process. However, there were respondents who stressed that in psychiatric settings, there is no culture and organisation such as to cater for the desires of customers and their integration into the process of service development.

5.2 Venturing objectives and entrepreneurial activities of the Euromedica Group

It becomes clear that Euromedica seeks to establish a well-organised network of hospitals and health centres throughout the Balkans area, providing all kinds of health care services and meeting customer needs for high quality health care. As regards mental health, Euromedica Group plans to establish an association of ten units and develop new structures for primary care. This has great value as the market for primary care of mental health is quite underdeveloped and there is ample scope for action. It also shows that Euromedica promotes business ideas that seem to take into account both patient care and economic efficiency, encouraging investors/physicians to own more than half of the shares in the new investment, increasing the financial contribution where appropriate, and organising the new partnership, utilising their knowledge and experience in the health sector.

5.3 New service development in Euromedica Neurological Services

Data show that Euromedica has developed in the last two years, inputting new services, creating new departments and, collaborating with scientists to develop the Group. In the field of mental health, it seems that two of the three psychiatric hospitals have taken significant measures, through the upgrading of infrastructure and enhancement of services or by

developing new ones, in order better to meet needs and improve their competitiveness. Furthermore, it appears that the company wishes to expand its activities in the field of mental health by adopting new practices; establishing new structures that will contribute to the treatment of patients and enhance deinstitutionalisation, and utilising the knowledge and expertise of scientists to benefit both society and its position in the market place. As regards the operation of the hospitals, the plan is the expansion of services, aiming to gain more customers.

Overall, it appears that ideas for development mainly come from staff, the competition, and the evolution of science; fewer are drawn from from customers and market research. It also appears that the coordination between departments in developing new services is in need of improvement.

5.4 Customer orientation and health services within Euromedica and its mental health hospitals

Generally, it appears that Euromedica assesses the market, utilising a variety of tools, such as statistics, reports, market research, observation of the competition, cooperation with doctors, etc. Particularly in mental health, the company wishes to collect information about: the demographic and social characteristics and the quantity of potential customers; the socio-economic background; the status of the competition; the cost of potential investments; economic benefits; and adequacy of the scientific staff. Furthermore, Euromedica aims to establish solid relationships with doctors rather than with customers. However, the customer viewpoint on services is taken seriously, as special teams were formed within hospitals to improve services and increase customer satisfaction. Moreover, despite all the shortcomings, the company is trying to adopt techniques to monitor queries and complaints and to create mechanisms that would integrate patients into the design of new services and lead to initiatives for development.

Nevertheless, it is worth noting that although there is no great flexibility in adapting the services already provided, many people support the involvement of patients in the development of new services. Specifically, in mental health services it is evident that hospitals make efforts to build a trusting relationship with customers by providing high quality health care, arranging repeated sessions with psychiatrists and other doctors, and maintaining constant communication with both patients and relatives. Still, it is obvious that none of the hospitals uses specific tools to assess customer satisfaction or respond to customer questions.

6. Discussion

This research is pioneering, insofar as it has developed a conceptual framework, which introduces a new perspective to the literature of both innovation and entrepreneurship. The paper contributes to the literature, combining concepts that were previously little explored, particularly in conjunction. Generally, both the promotion of innovations through the creation of new business ventures and the development of new customer-oriented health services are underexplored areas of research (e.g. Svendsen et al, 2011; Rehme & Svensson, 2011; Zhao, 2005a; Johnson, 2001). The review of the literature has shown that those issues have not been investigated at the same time, and, as was highlighted earlier, customers can contribute significantly to the development of new services, which may boost business activity. As regards the Greek health market, it appears that no similar research has been conducted. Putting all these together, the conceptual framework incorporates these concepts and show their combination and evolution from a different perspective.

As regards Euromedica, it appears that it does not regard patients or mental health service users in particular, as capable of contributing to the service development process. It is argued that they can only be a factor in improving the hospitals' residential services. This illustrates their role in the process, giving an answer to the first research question. What is more, it becomes apparent that there is no culture and organisation that pays attention to their needs and integrates these into the service development process. There is neither flexibility for customisation nor adequate tools, processes and methods to track and respond to customer complaints that would trigger growth initiatives. For that reason, many noted that an organised effort on the part of the company would have superior results for patients. This is supported by

the literature as a number of studies note that firms should make efforts and plans to appreciate customers' needs and accomplish those needs by developing specific services (e.g. Berthon *et al*, 2004). Other studies also recognise that customer-oriented businesses enhance customer satisfaction and deliver better service quality (e.g. Hartline *et al*, 2000). Therefore, health care organisations should focus on new approaches to achieving patient satisfaction, as these have increasing influence on the performance of the firm (Wood *et al*, 2000; Ford & Fottler, 2000).

Evidence also shows that Euromedica does not employ an official or formalised, but rather a simple and informal process for the development of new services. Successful new services, however, need a well-designed, carefully-coordinated process for their development (Edgett, 1994; Edvardsson *et al*, 1995). A service innovation process establishes a pathway for developing new services and refers to the parallel and sequential activities that must be adopted for the service to be produced (Smith *et al*, 2007; Edgett, 1994). It is clear in the literature that this enhances the likelihood of success and leads to high quality service innovation for organisations that adopt formal processes (Edgett, 1996).

Companies usually adopt formal development processes because they lead to new product success. Such processes consist of stages, pre-specified activities, and evaluation points that allow screening and analysis of ideas that may become profitable offerings (Cowell, 1988). A study by Slevin and Covin (1990) argue that firms need to attain an entrepreneurial behaviour that will be supported by the appropriate culture and organisational structure. Another study by Johnson (2001) adds that companies should build the appropriate structure and develop the culture across the organisation that will promote entrepreneurship and innovation and encourage employees to undertake the new business. However, findings revealed that Euromedica has not promoted such actions.

Many respondents highlighted that there are gaps regarding the participation of staff in the decision-making process and their cooperation with administration. Indeed, few were those who advocated that the firm has built a system where innovation flourishes without constraints. Most respondents believe that further actions should come about to upgrade the organisation's structure and attain better outcomes. It becomes apparent that Euromedica lacks a particular plan and a proper procedure to run its innovation activities and this might well hinder or obstruct the execution of its growth plans. Therefore, it should develop a strategic plan for the implementation of service innovation. It is evident that innovation strategy provides a clear direction for dealing with strategic issues - such as selecting the markets to enter and the skills to develop - and focuses the effort of the entire organisation on a common innovation goal (van der Panne *et al*, 2003; Oke, 2007). Euromedica should also focus on internal and external resources to expand its operations into new markets/sectors and explore business opportunities in order to improve its competitive positioning. All this evidence answers the second research question, highlighting that Euromedica does not do much to exploit service innovation in corporate venturing activities.

7. Implications for future research

The conceptual framework suggested in this study is not without limitations. The first criticism relates to the adoption of customer orientation. Although the benefits of such a viewpoint have been discussed, this may also neglect the vital importance of maintaining a market orientation during the service development process. This is particularly true for the health care industry, where policy makers and suppliers, as well as internal customer service employees, often play a critical role in service delivery. Another area of criticism is that of the relationship between corporate venturing and customer orientation. Although both topics are discussed within this research, little is suggested concerning the relationship between them, and this is therefore an area requiring further research. Additional areas in need of more extensive research include the ways stakeholders (patients, medical staff, etc) are able to influence the development of new health services, and how and to what extent customers benefit from the corporate venturing process.

References

1. Alam, I. and Perry, C. (2002), 'A customer-oriented new service development process', *Journal of Services Marketing*, Vol 16, No 6.
2. Antoncic, B. and Hisrich, R. (2003), 'Clarifying the intrapreneurship concept', *Journal of Small Business and Enterprise Development*, Vol 10, No 1.
3. Barnes, M. and Wistow, G. (1994), 'Learning to hear voices: Listening to users of mental health', *Journal of Mental Health,* Vol 3, pp. 525-540.
4. Barringer, B. and Bluedorn, A. (1999), 'The relationship between corporate entrepreneurship and strategic management', *Strategic Management Journal*, Vol 20, No 5.
5. Bellou, V. (2010), 'The role of learning and customer orientation for delivering service quality to patients', *Journal of Health Organization and Management*, Vol 24, No 4.
6. Bernstein B. and Singh, P. (2006), 'An integrated innovation process model based on practices of Australian biotechnology firms', *Technovation*, Vol 26, No 5-6.
7. Berry, L. and Mirabito, A. (2010), 'Innovative healthcare delivery', *Business Horizons*, Vol 53, pp. 157 – 169.
8. Blumentritt, T., Kickul, J. and Gundry, L. (2005), 'Building an inclusive entrepreneurial culture: Effects of employee involvement on venture performance and innovation', *The International Journal of Entrepreneurship and Innovation*, Vol 6, No 2.

AUTHOR INDEX

6TH JUNE 20-21, 2013
ISTANBUL, TURKEY
INTERNATIONAL CONFERENCE FOR ENTREPRENEURSHIP
INNOVATION AND REGIONAL DEVELOPMENT 2013

REGIONAL ECONOMIC RESILIENCE THROUGH INNOVATION AND ENTERPRISE

Author Index

Aaron C.van Klyton	764
Abdullah Ökcesiz	536
Abetare Domi	353
Abubakar S. Garba	231
Adem Bölükbaşı	711
Ahmet Özçelik	142
Ahu Coşkun Özer	673
Aida Abduzaimovic	45
Akinleye Afolabi Ogungbemi	568
Aleksandar Vujovic	598
Aleksander Aristovnik	131
Alibekova Gulnaz	471
Alper Altan	379
Ana S. Trbovich	342,385
Anastasios G. Karamanos	14
Andrea Oborilová	808
Angelina Taneva Veshoska	742
Anja Orcik	36
Athanasios Geligiannis	293
Avraam Papastathopoulos	85
Ayla Esen	683
Bala Mulloth	450
Besim Verdi Abdullai	280
Betim Çiço	749
Bojan Jovanovski	461
Bojan Lekovic	369
Branislav Fodora	757
Branko Trajkovski	749
Bratislav Stankovic	172
Bünyamin Zile	142
Candan Umut Özden	693
Cem Bayrak	693
Christian Lüthje	510
Christos Georgiou	250
Chrysostomos Stylios	718
Danijela Lalic	342, 385, 412
Dashmir Istrefi	749
Dejan Zivkov	757
Deniz Ökcesiz	536
Diana Antonova	541, 552
Dimitar Nikoloski	426
Dina Williams	479
Dunja Vujičić	342
Dusko Lukac	109
Eleni Tsipouri	117
Elpida Samara	718
Emine Arslan Pauli	152, 562
Emmanouil Stiakakis	778
Engin Yüksel	494
Ercan Ergün	801
Evangelos Ergen	436
Evis Kushi	426
Fatma Avşar	693
Fatmir Stublla	419
Gabriela Ivanus	664
Gadaf Rexhepi	617
Garifallia Daroglou	293
Gjorgji Mancheski	426, 705
Gokcen Arkali Olcay	636
Grzegorz Leszczyński	25
Gündüz Ulusoy	98
Gürhan Günday	98
Hale Gülbaz	693
Hüseyin Özgür Ünsal	693
Hyrije Abazi Alili	653, 789
Ildiko Zedi	369
Ingrida Geciene	333
Ioannis Bakouros	164, 718
Ivan Radojicic	598
Jadranka Svarc	221
Jan Janać	587
Jan Kratzer	396
Jana Subotich	385
Jasminka Laznjak	221
Jelena Stankovic	412
Jihene Chebbi Ghannay	75
João Ferreira	193
Judith Terstriep	510
Jülide Alan	152
Jülide Alan	562
Kadir Yasin Eryiğit	152
Karen Anderton	311
Katarína Rentková	587
Katharina Simbeck	396

Author Index

Kemal Kılıç	98
Lefteris Antonopoulos	718
Ljiljana Bozovic	598
Ljubomir Drakulevski	742
Luis Farinha	193
Lütfihak Alpkan	98
Magdalena Sapała	25
Marek Zieliński	25
Maria Chrysovalantou Emmanouil	778
Maria Mikela Chatzimichailidou	109, 607
Maria Vlachopoulou	778
Marina Dabic	221
Marjan Angeleski	426
Marjan Angeleski	705
Marko Backovic	598
Marko Makipaa	607
Mehmet Sait Cülfik	152, 379, 494, 562, 711
Melih Bulu	240, 636
Metin Gürler	240
Milena Todorova	552
Mirjana Stankovic	172
Miroljub Hadzic	260
Mohammad S Khorsheed	184
Nicos Komninos	250, 729
Nihan Akyelken	311
Nikolay Kolev	525
Nikos Zaharis	625
Norbert Buzás	203
Oleg Golichenko	499
Olivera Kostoska	705
Osim Mamatkulov	587
Ozen Asık Dizdar	683
Panayiotis H. Ketikidis	353
Paraskevi Giourka	164
Paul Trott	817
Petar Pavlovic	260
Peter Kiryushin	450
Piotr Chwastyk	64
Radmil Polenakovik	461
Radu Jecu	301
Remzije Rakipi	789
Rene Wintjes	324
Sabri Er	142
Sadudin Ibraimi	617
Sasa Vujic	45
Shenaj Hadzimustafa	617
Shqipe Gerguri-Rashiti	653
Sladjana Gajic	412
Slavica Rocheska	705
Slobodan Vujic	45
Sophia Athanassopoulou	117
Soren Jensen	643
Sorin Mircea Axinte	664
Stavros Sindakis	817
Stefanos Katsavounis	109, 607
Stoyan Tanev	643
Stylianos Kechagias	270
Suzana Kolar	757
Svilen Kunev	541
Szabolcs Prónay	203
Tamer Değirmenci	379
Tan Yigitcanlar	575
Tatiana Iakovleva	450
Teodora Stojanova	36
Tiit Elenurm	213
Trajce Velkovski	461
Tunç D. Medeni	471
Valentina Gecevska	36
Vasiliki Manthou	778
Vassilis Barkoukis	293
Veland Ramadani	653
Vintileanu Cristina Monica	270
Vladimir Solodov	450
Yannis Bassiakos	117
Yasin Dalgıç	152, 562
Yulia Balycheva	499
Yunus Emre Taşgit	801
Zeineb Ben Ammar Mamlouk	75
Zivile Gedminaite Raudone	56
Zoran Anisic	36
Zuzana Papulová	808

The 7th International Conference for Entrepreneurship, Innovation and Regional Development

5-6 June 2014, Hilton Hotel and Resort, Nicosia, Cyprus

www.iceird.org 2014

In the face of fragile economic recovery following the economic and financial crisis of 2008, many firms all around the world continue to invest in growth-enhancing activities to achieve a sustainable development.

While the crisis has heavily hit all aspects of business vested interests, investments in innovation, entrepreneurship and regional partnership have been the key priority to ensuring a strong and stable economic growth.

The objective of the conference is to gather decision makers (government, ministries and state agencies), innovation experts (universities, research and development centres, technology transfer centres, start-up centres) and practitioners (smes, business incubators and business support organisations) to generate discussion and exchange on the potential of entrepreneurship promotion and innovation to national and regional competitiveness.

UCY