THE ROLE OF EU IN THE IMPLEMENTATION OF THE CONCEPT FOR SMART CITIES DEVELOPMENT[1]

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Abstract

In the last two decades, the so-called concept of a smart city is one of the central axes surrounding the theoretical and empirical development of urban centers. As a result, in recent years parallel to the expansion of this concept in urban centers, there is a great consensus on the national and international level for the full further development of this concept. The goal of this paper is to analyze the international support for the development of the so-called. concept of a smart city or EU organized support for the development of this concept. In doing so, the emphasis will be on organized support through the network of EU funds to support the development of a smart city in various areas of human life. The research will use the content analysis method and the historical method. The results of the research provide a detailed picture of the EU support system for the concept of a

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[1] professional paper

smart city. The conclusions from the research point to certain statements regarding the further development of the EU support for the concept of a smart city.

INTRODUCTION

The concept of a smart city develops rapidly, both in terms of its characteristics and in terms of the areas on which its application is expected or expected changes. It is a fact that in the late 20th and early 21st centuries, humanity from all over the world faces numerous local and global risks for its health and well-being, ie its safe and secure future. Air, water and soil pollution pose a potential threat to human life, especially in large urban centers or urban areas where a large population lives in a smaller area whose daily needs require great resources for their satisfaction. Apart from environmental problems, there are almost everyday problems related to poverty and unemployment, social risks, educational challenges, etc. Basically, it is a huge influx of everyday problems and challenges that require efficient and effective resolution by the city authorities.

Hence, in the last two decades, in the scientific and professional public, certain approaches or ways of how to solve well-known problems in cities were imposed on a natural path. In parallel with the development of information and communication technology and the benefits it provides for efficient urban management, the modern concept of the so-called smart city started to emerge. The Smart City is a modern scientifically and expertly based methodological approach that exploits the benefits of information and communication technology in order to collect relevant data that are essential for the efficient and effective management of city resources.

This concept is multi-scientific and multi-disciplinary and for which there is no single definition, but a multitude of definitions, each of which starts from what is the subject of defining, or subject to scientific development and further implementation.

As a result, this paper will elaborate on the essential definitions and basic characteristics, that is, the models of a smart city that are found in literature, that is, the management of cities. In doing so, the emphasis will be placed on the role of the EU for the further development and successful implementation of this concept in the present.

DEFINING THE CONCEPT OF SMART CITY

There is no single definition in the literature of the concept of a smart city.[2] In a multitude of definitions, each definition starts from the subject and purpose of the research. In any case, each definition more or less starts from the application of modern advances in information and communication technology in different areas of social life.

According to the International Electrotechnical Commission, by the year 2050 it is expected that two-thirds or 66% of the world's population will live in cities or urban centers. Satisfying everyday needs will be an extremely difficult challenge in the future, with cities representing gigantic systems with countless sub-systems whose smart concepts can not be implemented if there is no energy and hardware or information technology solutions. The fact is that in the future the concept of a smart city will imply greater co-operation between cities in order to exchange knowledge and technical and technological solutions.[3] As our planet becomes more urban, it becomes increasingly important that cities become smarter. Its features must be inclusiveness, innovation, resource efficiency, dynamism, sustainability, and so on.[4]

In addition, according to Smart Cities Council, the smart city uses information and communication technology to advance its work efficiency and sustainability.[5] According to Greko and Cresta, smart cities include

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[2] Novotny, R., Kuchta, R. and Kadlec, J. Smart City Concept, Applications and Services, pp. 6-7, 2014.
available on https://www.omicsonline.org/open-access/smart-city-concept-applications-and-services-2167-0919-117.pdf
[3] International Elecrotechnical Commission. Smart Cities, 2018, available on https://www.iec.ch/smartcities/?ref=extfooter
[4] Eremia, M., Toma, L. and Sanduleae, M. The Smart City Concept in the 21st Century, pp. 12-14, 2017, available on
https://www.sciencedirect.com/science/article/pii/S1877705817309402
[5] Eremia, M., Toma, L. and Sanduleae, M. The Smart City Concept in the 21st Century, pp. 12-14, 2017, available on https://ac.els-cdn.com/S1877705817309402/1-s2.0-S1877705817309402-main.pdf?_tid=4a4b9ff8-b5e8-4c7b-bb7a-e68140854505&acdnat=1543700598_d2cc8e1729059f485e4cb265887e6249

technologically advanced cities that are capable of integrating competitiveness and sustainability by combining different dimensions of development (economy, mobility, environment, people, lifestyle and management). The term smart city was first used in the early 1990s to emphasize the process of urbanization and its growing dependence on technology, innovation and global phenomena, especially economic perspectives.[6]

Harisson and Donnelly emphasize that the concept of a smart city in recent years has been used by numerous technology companies to point out the integration of urban infrastructure operations and services such as transport, electricity distribution and water distribution, and public safety.[7] The smart city is a community that is characterized by average technological development, sustainability, comfort, attractiveness and security.[8]

According to the Department of Business, Innovation and Skills, "the concept is not static, there is no absolute definition for a smart city or an end". By contrast, it is a process or series of steps through which cities become more capable to adapt quickly in order to change in the environment ".[9] In addition, according to Frost and Sullivan, there are a total of 8 key aspects that define the smart city: smart management, smart energy, smart buildings, smart mobility, smart infrastructure, smart technology, smart health care and smart citizen.[10]

Since there is no single definition of the concept of a smart city, there is a broad consensus in the literature that the smart city actually relies on widespread use of ICT technology to improve the quality, performance and interactivity of urban services, to cut costs and use resources and

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[6] Cresta, A. A Smart Planning for Smart City: The Concept of Smart City as an Opportunity to Re-think the Planning Models of the Contemporary City, pp. 1-3, 2015, available on
file:///C:/Users/BRANKO/Downloads/Cresta_GrecoIccsa2015.pdf

[7] Harrison C, Donnelly IA, A Theory of Smart Cities. Proceedings of the 55th Annual Meeting of the ISSS. Hull: International Society for the Systems Sciences, 2011.

[8] Lazaroiu, C.G. and Roscia, M., Definition methodology for the smart cities model, Vol. 47 (1), pp. 326-332, 2012, available on
https://www.sciencedirect.com/science/article/abs/pii/S0360544212007062?via%3Dihub

[9] UK Department for Business Innovation and Skills, Smart cities background paper, available on https://en.wikipedia.org/wiki/Smart_city

[10] Sarwant S. Smart Cities- A $1.5 Trillion Market Opportunity. Forbes, 2014, available on https://en.wikipedia.org/wiki/Smart_city

increase cooperation, ie contact between citizens and city authorities.[11] Literature and practice use a multitude of similar concepts or similar terminology to the term smart city, such as: digital city, electronic communities, information city, intelligent city, etc.

CHARACTERISTICS OF THE SMART CITY MODEL

The smart city model is a general framework for further planning and action in those areas of social life that are necessary for the improvement or improvement of the general well-being of the inhabitants of the city. Theoretically, there are many models in the literature, but only some of them have played a significant role in the theory and practice of the concept of a smart city. In general, these are: the model entitled "Europeansmartcities", the so-called "Intelligent City" and the Eco-system framework for a smart city.

According to one of the crucial international projects entitled "Europeansmartcities" implemented on a total of 70 major cities in Europe by the Center for Regional Studies at the Vienna Institute of Technology in cooperation with the OTB Research Institute for Housing and Mobile Studies at Delft University of Technology and the Department of Geography at the University of Ljubljana, the model of a smart city consists of a total of 6 characteristic components. Those are:

а) smart economy;
б) smart mobility;
в) smart environment;
г) smart people;
д) smart management; and
ѓ) smart living.[12]

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[11] Yovanof, Gregory S.; Hazapis, George N. An Architectural Framework and Enabling Wireless Technologies for Digital Cities & Intelligent Urban Environments. Wireless Personal Communications. 49 (3): 445–463, 2018, doi:10.1007/s11277-009-9693-4. ISSN 0929-6212

[12] European Commission, Europeansmartcities, The smart city model, Vienna University of Technology, SRF- Centre of Regional Science, Vienna, 2018, available on http://www.smart-cities.eu/model.html.

Each of the above components consists of indicators grouped by factors to achieve the idea of the so-called smart city. The concept of the so-called "intelligent city" can be present in many areas of social life that can be grouped into three categories: innovative economy, urban infrastructure and management. (See Table 1 below)

. Table 1. Categories and areas of the so-called "Intelligent City"

Inovative economy	Urban infrastructure	Management
- Innovations in industries, clusters, parts of the city; - Scientific workforce: Education and employment; - Creation of high-tech Organizations.	-Transport; - Energy / Services; -Environmental protection.	Administrative services to citizens; -Participatory and direct democracy; - Services to citizens: Quality of life.

Source: European Commission, Smart City, 2018, available on https://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLwHCnL72vedxjQkDDP 1mXWo6uco/wiki/Smart_city.html, accessed on 19.11.2018.

In the last decade, one of the most modern models for a smart city is the so-called "A framework for the Eco-System for a smart city" based on the assumptions that the concept of a smart city is based on modern technology development but is highly focused on ultimate effects.

Generally, according to this framework or model, there are 7 types of universal results or effects that need to be achieved from the smart city and which are shown in Table 2 below.

Table 2. Effects to be achieved by the "smart" city: Model of the so-called "smart" city Eco-system framework

Gov. Efficiency	Sustain ability	Health and wellbeing	Mobility	Econ. Develop ment	Public Security	Quality of life
government performanc es	resource manage ment	mental	transport	business	protection of criminal	standard of living
running a	space	physical	transit	employ	protection	satisfact

business				ment	against accidents	ion
	energy	social care	traffic	producti vity		personal happine ss
	water	welfare				
	life environ ment					

Source: European Commission, The Smart City Ecosystem Framework- A Model for Planning Smart Cities, 2018, available on https:StrategyofThings.io, accessed on 12.12.2018

EU AND SMART CITY CONCEPT

According to the EU definitions, "the smart city is a place where traditional networks and services become more efficient through the use of digital and telecommunication technologies for the overall benefit of city dwellers and local businesses". Also, the smart city goes a step forward by just passive use of information and communication technologies. It is a symbol of smart urban transport networks, modernized drinking water and wastewater distribution systems and modernized ways of public lighting and heating of buildings. Also, according to the EU, the smart city refers to more interactive and responsible city management and administration, secure public space and successful interception of the needs of people at an older age.[13]

The concept of a smart city is extremely important for the EU given the fact that as many as 75% of the European population lives in urban or urban areas.[14] The European Innovation Partnership for Smart Cities and Communities (EIP-SCC) is a modern initiative supported by the European Commission in order to jointly regulate cities, industry, small businesses, banks, research, and so on. The goal of this initiative is to improve life in urban centers by creating sustainable and integrated solutions and addressing

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[13]European Commission, Smart Cities: What are smart cities?, 2018, available on
 https://ec.europa.eu/info/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en
[14]European Commission, Energy and Smart cities, 2018, available on https://ec.europa.eu/energy/en/topics/technology-and-innovation/energy-and-smart-cities

specific urban challenges that can be recognized in energy, mobility, transportation, and ICT technology. But what has been stated above can not be viable if there is no participation by the public, industry and other relevant interested social groups in order to develop innovative solutions and participate in the management of city centers.

In general, the priorities of this initiative are: sustainable urban mobility, standards, focus on the citizen, sustainable urban areas and environments, integration infrastructures and processes (transport, energy, information and communication technologies), policy and regulation, integrative planning and management, knowledge, performance indicators, open data management and business models, public procurement and financing.

In line with the above priorities, this EU initiative has created the so-called digital platform as a specialized place for trading (ie supply and demand) of projects in the areas of interest. Any legal entity of international or national importance can participate in this digital platform if its goals are the development and implementation of integrated solutions for a smart city, providing support for partnerships and information exchange, and focusing on energy, transport and ICT technology.[15]

One of the EU's visions is to invest in ICT research, innovation and development in order to improve the lives of citizens and enable greater sustainability of cities according to EU 20-20-20 defined strategic goals. To this end, in July 2012, the European Initiative (EIP-SCC) was established, in order to accelerate the process of so-called smart urbanization of cities in the EU. To date, this EU initiative has received about 370 proposals and ideas for financing EU smart projects, especially in IT, transport and energy. These already launched initiatives include more than 3,000 project partners from EU countries and represent great potential for the future development of the concept of smart cities in the EU. These partnerships integrate energy, transport and ICT with the goal of innovative solutions in the area of city traffic jams, air pollution, energy costs, mobility, cleaner environment and energy efficiency.

In the course of 2014, the total number of 370 initiatives came from a total of 31 European countries, including Great Britain, Greece, Italy, Germany, Spain and the Netherlands were the countries from which came the most initiatives or were most active in using the EU funds for a smart

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[15]European Commission, European innovation partnership on smart cities and communities, 2018, available on https://ec.europa.eu/info/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en

city. They are followed by Portugal, France, the Scandinavian countries, Estonia, Austria and Slovakia. Finally, the least active in this EU initiative are the countries of Eastern and Southeastern Europe, the Czech Republic, Ireland and Denmark. The initiatives came from private individuals, non-governmental organizations, private businesses, public organizations and academia / research institutions. Their percentage share in total submitted initiatives to the European Innovation Partnership is shown in Table 3 below.

Table 3. Percentage participation in total initiatives by type of activity

Initiator for the concept of a smart city	(%)
individuals	2
NGO's	6
private businesses	26
public organizations	36
academic / research institutions	16
other	14

Source: European Commission, Smart Cities- Digital Single Market, 2014, available on https://ec.europa.eu/digital-single-market/en/smart-cities, accessed on 24.12.2018.

The European Commission constantly organizes and participates in initiatives within the EU Member States, but also internationally when it comes to urban / city multi-dimensional development. For example, in the area of sustainable urban development between 2014 and 2020, the European Regional Development Fund will allocate around 15 billion euros for strategies and initiatives for achieving sustainable urban development. It is planned that a total of 900 cities across Europe will use these funds for the so-called smart city initiatives and projects. For this purpose, a network for urban development was established, which aims to exchange information between cities in relation to the so-called smart initiatives. Also, smart initiatives and cities across Europe are supported through various EU instruments, such as the European Structural and Investment Funds, Horizon 2020, etc. Internationally, the EU's participation in Habitat III is noticeable at the United Nations Conference on Housing and Sustainable Urban

Development where a new urban agenda was adopted by the United Nations Member States.[16]

Table 4 below presents global initiatives transformed into EU-supported projects for the period 2016-2018.

Table 4. EU-supported initiatives & projects within the concept of a smart city

	Name of initiative & project
1.	FET Open project LIAR
2.	eWall: Smart wall to make life easier
3.	EU project to create ethical and sustainable wearable technologies and smart textiles
4.	Positioning kit for visually impaired smartphone owners
5.	The QUANTICOL project
6.	HPC4E
7.	CPS Engineering Labs - expediting and accelerating the realization of cyber-physical systems
8.	The SMARTH20

Source: European Commission, Projects about Smart cities, 2018, available on https://ec.europa.eu/digital-single-market/en/projects/76019/73883, accessed on 14.01.2019.

CONCLUSION

In the present contemporary living conditions, but also in the future, the concept of a smart city will be a central axis around which huge physical, human, financial and social resources will be concentrated to realize numerous smart project initiatives in order to meet the ever-increasing needs for healthy life of the population in the cities.

Unfortunately, in literature and in project activities there is no single definition of the concept of a smart city. It arises from the ultimate complexity, multi-disciplinary and widespread social significance this concept has for the development of urban environments. In any case, there is a general consensus that it is an integrated whole, which includes: smart people, smart mobility, smart living, smart economics, smart management, smart environment, etc.

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[16]European Commission, City initiatives, 2018, available on https://ec.europa.eu/info/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives_en#smart-cities

Undoubtedly, the role of the EU in the development of this concept is enormous. The European Innovation Partnership for Smart Cities and Communities (EIP-SCC) is a modern initiative supported by the European Commission in order to jointly regulate cities, industry, small businesses, banks, research, and so on. This initiative has developed a global digital market for initiatives and project proposals that would, on all grounds, meet the characteristics of the smart city concept, such as innovation, accessibility, flexibility, efficiency, effectiveness, and so on. Almost all EU member states are more or less interested and fully active in supporting the concept of a smart city. Initially, most of the initiators are public organizations, academic and research institutions, private businesses, etc.

In any case, on the European continent, the population more and more lives in urban centers or cities as a result of global movements for constant concentration of European and world capital, with cities having to become smarter to successfully meet the challenges in the future. Here, without the role of the EU, there will be no development at European and global level.

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