

ISSN 2334-9883



UNIVERSITY OF KRAGUJEVAC  
FACULTY OF AGRONOMY ČAČAK

---

**PROCEEDINGS**  
**CONFERENCE OF AGRONOMY**  
**STUDENTS**  
with international participation



---

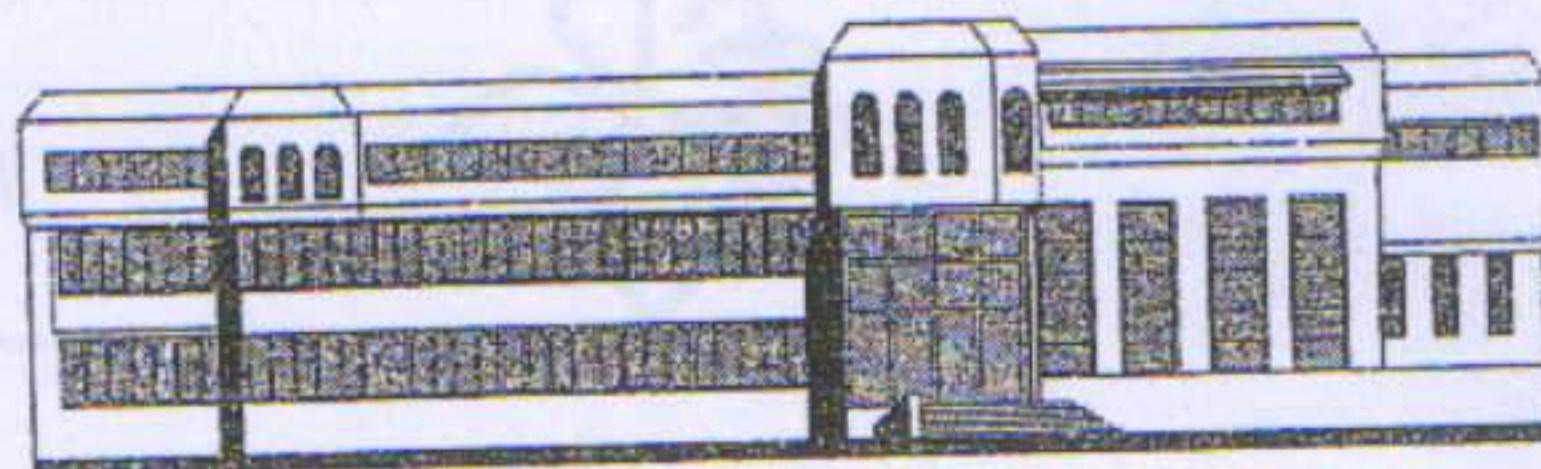
Vol. 9, Issue 9, 2015  
Čačak, 26-28 August 2015

---

## CONFERENCE OF AGRONOMY STUDENTS

### ORGANISER AND PUBLISHER

Faculty of Agronomy – Čačak  
Cara Dušana 34, 32000 Čačak  
e-mail: afdekanat@kg.ac.rs  
www.kg.ac.rs



**For the Publisher:**  
Prof. Dr. Vladeta Stevović

### ORGANISING COMMITTEE

**Members:** Dr. Snežana Tanasković, Ass. Prof. – Chair; Dr. Ivan Glišić, Ass. Prof. – Vice Chair; Dr. Milevica Bojović, Foreign language lecturer – Secretary; Dr. Vladimir Kurćubić, Assoc. Prof.; Radmila Ilić, BSc; Simeon Rakonjac, BSc; Dalibor Tomić, BSc; Dušan Marković, BSc; Mirjana Radovanović, BSc.

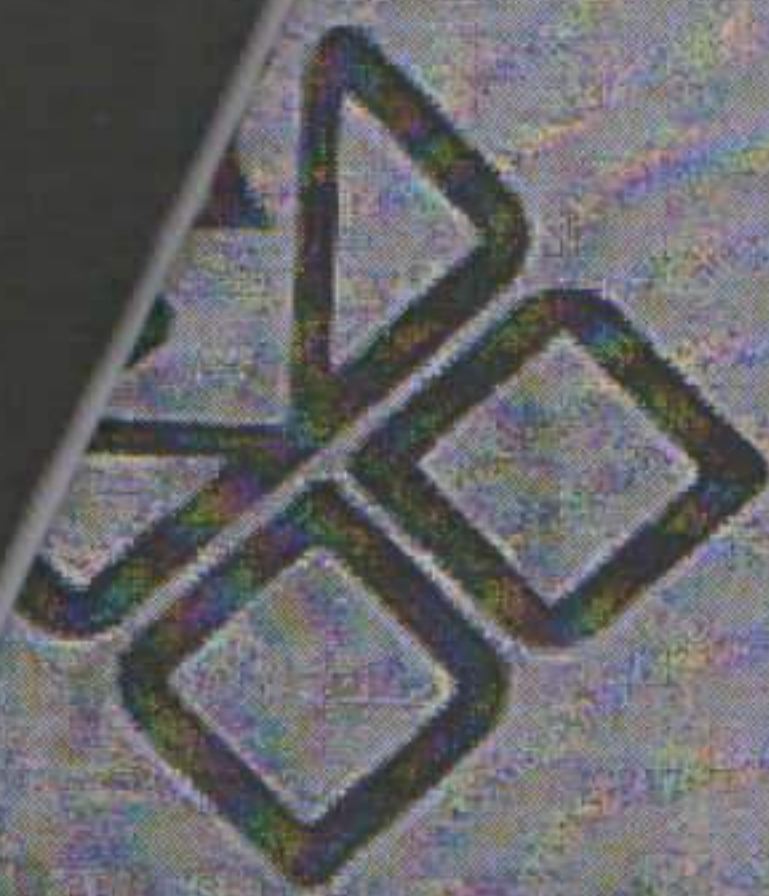
### PROGRAMME COMMITTEE

**Members:** Prof. Dr. Vladeta Stevović, Dean, Faculty of Agronomy, Čačak, Serbia; Prof. Dr. Miroslav Spasojević, Čačak, Serbia; Prof. Dr. Tomo Milošević, Čačak, Serbia, Acad. Prof. Dr. Dragutin Djukić, Čačak, Serbia; Acad. Prof. Dr. Vsevolod Yemtsev, Moscow, Russia; Assoc. Prof. Dr. Zlatko Zlatev, Plovdiv, Bulgaria; Prof. Dr. Vlado Kovačević, Osijek, Republic of Croatia; Ass. Prof. Dr. Boris Krška, Brno, Czech Republic; Dr. Kovács Ernő, Keszthely, Hungary; Dr. Yuriy Kravchenko, National Agricultural University, Kyiv, Ukraine; Prof. Dr. Dragi Dimitrevski, Skopje, Macedonia; Dr. Nataša Štajner, Ljubljana, Slovenia; Dr. Miljan Cvetković, Banja Luka, Bosnia and Herzegovina; Dr. Sc. Želimir Vukobratović, Križevci, Croatia; Dr. Vesna Milić, East Sarajevo, Bosnia and Herzegovina; Prof. Dr. Dimče Kitanovski, Bitola, Macedonia; Dr. Aleksandra Despotović, Podgorica, Montenegro; Assoc. Prof. Dr. Asea Timus, Moldova; Assoc. Prof. Dr. Orkun Baris Kovanci, Turkey; Prof. Dr. Milica Petrović, Zemun, Serbia; Prof. Dr. Milan Popović, Novi Sad, Serbia; Prof. Dr. Desimir Knežević, Kosovska Mitrovica, Serbia; Prof. Dr. Tomislav Jemrić, Zagreb, Croatia.

**Computer editing and typesetting:** Dušan Marković, B. Sc., Dalibor Tomić, B. Sc.  
**Cover page:** Dr. Snežana Tanasković

**Supported by:** Ministry of Education, Science and Technological Development,  
Republic of Serbia and City of Čačak

**Printed and bound by:** "Studio za dizajn", Vukašina Ignjatovića br. 12, Čačak  
**Number of copies:** 80



University of Kragujevac  
Faculty of Agronomy in Čačak, Serbia

and

Programme Committee of the 9th  
Conference of Agronomy Students



present

# CERTIFICATE

to

**TANJE KJURCHIOSKA**

**REPUBLIC OF MACEDONIA**

**THE THIRD PLACE AWARD**

*(The Best Poster Award, the Second Place Award, the Third Place Award)*

**For Master students**

*(For PhD students / Master students / Bachelor students / Poster session)*

  
Prof. Dr. Vladeta Stavevski

## **Contemporary aspects of new product development in dairy industry**

**Student: Tanje Kjurchioska**

Master studies

**Mentor: PhD. Katerina Bojkovska, Ass. Prof.**

*University "St. Kliment Ohridski" - Bitola, Faculty of biotechnical sciences - Bitola, Management in bio technique, Partizanska bb, Republic of Macedonia, e-mail: tanje\_prilep@hotmail.com*

**Abstract:** Innovation through the creation, diffusion and use of knowledge has been recognised as a key driver of economic growth. Trends in dairy industry are challenging farmers, produce traders, processors and other stakeholders to improve the efficiency of their operations and to be more responsive to consumer demands as well as regulatory frameworks. It is obvious that all countries face challenges in the evolution of their dairy industry. In each case the focus must be on fostering competitive dairy industry systems that can provide income, meaningful employment, and milk and dairy products that meet the demands of the intended consumer or user. In the dairy industry, just as any other industry, product and process development is considered a vital part – indeed the lifeblood – of smart business strategy. Failure to develop new and improved products relegates firms to competing solely on price which favours the players with access to the lowest cost inputs (land, labour etc). The purpose of this paper is to provide a background context to discussions that will define further work in the area of dairy industry innovation. The paper defines Product Development Process in „Bimilk“ – dairy industry in Bitola, Republic of Macedonia as systematic, commercially oriented research to develop products and processes satisfying a known or suspected consumer need.

**Key words:** new product development, dairy industry.

### **Introduction**

Many companies in the food industry during the last forty years have based their business strategy on the continuous introduction of new products. The processing companies introduce a wide range of new ingredients; the

manufacturing companies launch thousands of new consumer products; supermarkets present a continuous change of many thousands of products; the food service companies continuously change their menus; and even the primary producers change the raw materials.

Many researches show that the driving engine of economic growth in today's business world is associated with new product development, where new ideas, new technologies, and new initiatives are the key factors of success and where business is built on the culture of innovation (Wall, Minocha, 2009).

Success in New Product Development process depends on numerous factors: competitive environment, market conditions and other external aspects as well as structure of New Product Development process, used technology, company policy and many other issues (Brentani, Kleinschmidt, Salomo, 2010). Besides inherent risk, the reason of failures is associated with requirements for technology, communications and shorter product life cycles. However it is almost impossible for companies to exist without new product development, companies without new products unavoidably stagnate (Yelkur & Herbig, 1996).

Product development is a process strategically implemented to bring innovation into the dairy industry company. Although the Product Development Process has a structure which remains the same, the activities within the structure change with the company, the personnel, the product, the processing, the marketing and the market. The decisions of the product development management are to select the project activities and their related techniques, to set the times and resources for the activities and to accept the outcomes of these activities. But they have to be aware from the beginning of the decisions that top management have to make at the end of each stage, and of the information on which these decisions must be made. They choose the activities to give outcomes with the necessary information, and the techniques to give efficient activities and accurate outcomes to the activities.

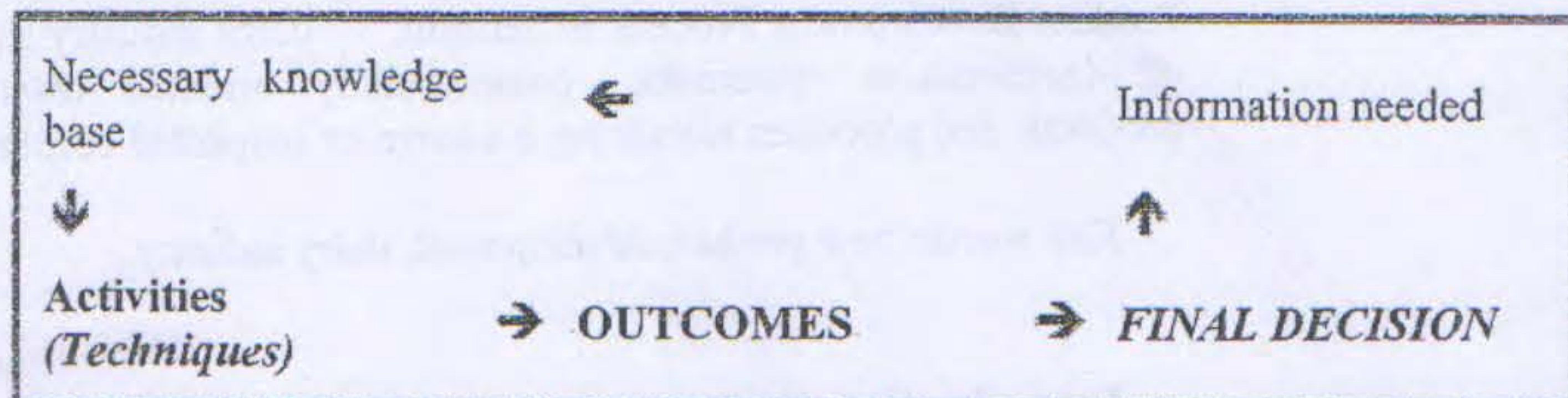


Figure 1 Important activities for successful product development decision

Today the activities, outcomes and decisions in product development are not only technical research, but need to include the total technology of the company, that is distribution, marketing, production, raw materials, quality assurance, and

also the consumers' needs and wants and the societal environment. The dairy industry company recognises that in many instances they cannot have the knowledge and the resources to cover every aspect of the total technology, and therefore they decide the risk level that they can tolerate. These risk decisions define the necessary outcomes required from each stage. The decisions of acceptable risk need to be made with knowledge of the formal Product Development Process and the various decisions, outcomes and activities involved throughout it.

In the Product Development Process in dairy industry there are only four stages: product strategy development, product design and process development, product commercialisation, product launch and evaluation; between the stages there are critical points where top management evaluate the project and give go/no-go decisions. Within each of these major stages there are interlocking activities which lead to outcomes and to decisions; these are the basis for the major management decisions between stages. Management identifies the decisions to be made and the outcomes needed for these decisions; the project team recognises these decisions and outcomes, then plans the activities and finally selects the techniques to be used. The project team organises and controls the activities so that the required outcomes are achieved at the right time and top management can make the correct decisions. Managing the Product Development Process is an essential responsibility of top management in dairy industry companies.

### **Material and methods**

According to Babie (2009) there are three types of studies according to their purpose: exploratory, descriptive and explanatory. The first one is used in order to clarify some concepts, find explanations, assess phenomena or seek for new insights. The main goal for such research is to develop a theory. Such kind of research is known as a very flexible one. Second type of research, the descriptive one, seeks to describe people, events or situations. The researcher must have a clear picture of phenomena before conducting the research. Thus all required changes must be done before the process of research has started. The last type, explanatory research, provides the cause and effect relationships between variables (Babie, 2009). The main goal of our research is to find how the New Product Development process is run in dairy industry companies: how the contemporary New Product Development model looks implementing to such dairy industry companies, as well as whom and how manages this process. According to Saunders (2007) the research that seeks to clarify the relevant theory and understand the problem classified is an exploratory research.

***Idea generation***

Idea generation is based on the interrelationships between:

Company ↔ Product ↔ Consumer

These relationships are constantly changing, and the surrounding environment is also subject to continuous social and technological change; understanding the changes that are occurring leads to innovative products which fulfil a need. The creation of all new product ideas - revolutionary or evolutionary - can only be successful if there is an atmosphere which stimulates innovative thought and the search for new ideas. If the company does not encourage the process of generating ideas, then new ideas will not be produced.

***Product ideas screening***

The aim in idea screening is to retain the successful ideas and eliminate the ideas which could be failures - much easier to write than to carry out in practice! If in doubt, keep the idea until more information is obtained. Idea screening can be based on tacit knowledge of the individual and of the company, with little new explicit information sought in or outside the company. But the aim in successive screenings is to build up the necessary information for the decisions to be made in a quantitative, objective way. The components in idea screening are product idea descriptions or concepts, screening factors and screening techniques. There is a need to have product idea descriptions that everyone involved in screening understands and is evaluating in the same way.

***Product idea concept development***

The product idea concept is first developed from market and consumer research but with consideration of the technical aspects of the product. Usually, it is a combination of internal company information searching combined with consumer or, in industrial marketing, customer discussion groups. In industrial product development, it has been shown that selecting the most innovative customers for product concept development reduces the time and improves the product concepts. The product idea concept research leads to a more detailed description of the product ideas and also includes screening of the ideas.

***Product design and process development***

Product design takes a long time and a great deal of effort. It is important to target the design programme to minimise time and costs and to plan for it to be successfully completed within allocated resources. Time is very much of the essence, the minimum compatible with optimal development. In a product design plan, there are many activities to be first recognised and then coordinated; some activities are worked in sequence, some in parallel. In

particular, multidisciplinary activities are focused in the same direction and coordinated in time. In food product design:

- **important marketing factors** are consumer acceptability, competitive positioning, legal regulations, ethical requirements, environmental mandates and distributor requirements;
- **important technical factors** are ease of processing, cost, raw material availability, attainability and reliability of product quality, shelf life, equipment needs, human knowledge and skills; and
- **important financial factors** are costs of manufacturing and distribution, costs of further development and the investment needed.

These are considered at various parts of the design so that at the end of the product design and process development they can all be included in the feasibility report for top management.

### ***Product commercialization***

From the product specifications, the marketing strategy and the final prototype product, commercialisation builds into three important functional plans (marketing, production and finance) and then into an overall operational plan. The outcomes from the three plans are combined in an operational plan for the launch. After the launch there is a review of the final outcomes.

### ***Product launch and evaluation***

The product launch is both the end and the beginning. It is the culmination of all the effort and thought that has gone before. It is also the start of a new product cycle if it is an innovation, the revival of a product cycle which appears to have levelled off, or just another product in the total product lifecycle causing a change in market share and perhaps a faster growth pattern. The new product affects the company's product mix. It may increase sales in one product area and decrease sales in another, but hopefully it will increase the total sales of all products.

## **Results and discussion**

### ***Case study – New product development in IMB“Mlekra“ AD-BITOLA - vitamin milk with the addition of 10 vitamins and 2,8 % mm.***

IMB Mlekara AD Bitola is absolute leader in dairy farming industry in the Republic of Macedonia. Bimilk satisfy the demand and meet the needs of the million consumers through:

- Long tradition in production;
- Modern technology which follow contemporary world trends;

- Constantly advancing of product capacities;
- care and commitment of all parties involved: subcontractors, suppliers, associates, employees and customers;
- Promoting of healthy life and healthy environment.

Bimilk stands for true blend of nature with innovation, which is confirmed by their healthy and high quality products.

### ***Tracking trends***

In the last ten years the dairy market has undergone numerous changes that significantly amended the direction of the whole market. Thanks to technological advances, and numerous scientific and clinical research has enabled the use of various innovations in the area of nutrition, and dairy drinks gets on new meaning and function.

Bimilk always tries to develop new products, because:

- satisfy the wishes and needs of customers and
- Match with competition or
- Maintaining or increasing sales

Bimilk is the first dairy industry in the region, which in 1995 launched milk enriched with vitamins.

### ***New product development in Bimilk - Bitola:***

One of the biggest challenges of marketing planning is the development of ideas for new products and their successful launch. Customers want new products and competition seeks to remove.

Product development can take place in two main forms:

- company can conduct its own new product development, the activities of their own sector to develop new products or
- in agreement and rental institutions, individual researchers, agencies

### ***What is NEW PRODUCT?***

The term new product involving new products, improved products, modifications of products and new brands of products that the company has developed for the specific market.

Company will be ready to develop new products after careful market research, selecting the target customers, identifying their needs and determine the desired market position.

New products are being developed to maintain or increase sales.

There are several categories of new products:

- New products for export
- New product lines (new for the company)
- Supplements to the existing product lines (new products that complement existing lines)

- Improvement and revision of existing products (more efficient products)
- Repositioning (existing products to new markets)
- Reduce costs (equally good products with lower costs).

Only 10% of new products constitute truly innovative and completely new products. The company who doesn't develop new products is sensitive to the changes of needs and taste of customers, new technologies, the shortened lifetime of the product and increased competition. New products do not have staggeringly success, it is estimated that about 75% of new products fail at the very beginning.

Reasons for failure can be:

- idea pushed despite the negative findings of the market,
- overestimated the size of the market,
- the product is not well designed,
- wrongly positioned on the market,
- not advertised enough or has too high price
- costs are higher than expected,
- Competition fight harder than expected

Number one factor for success is **unique superior product**.

Other factors are technological and market synergies, quality performance in all phases and attractiveness of the market.

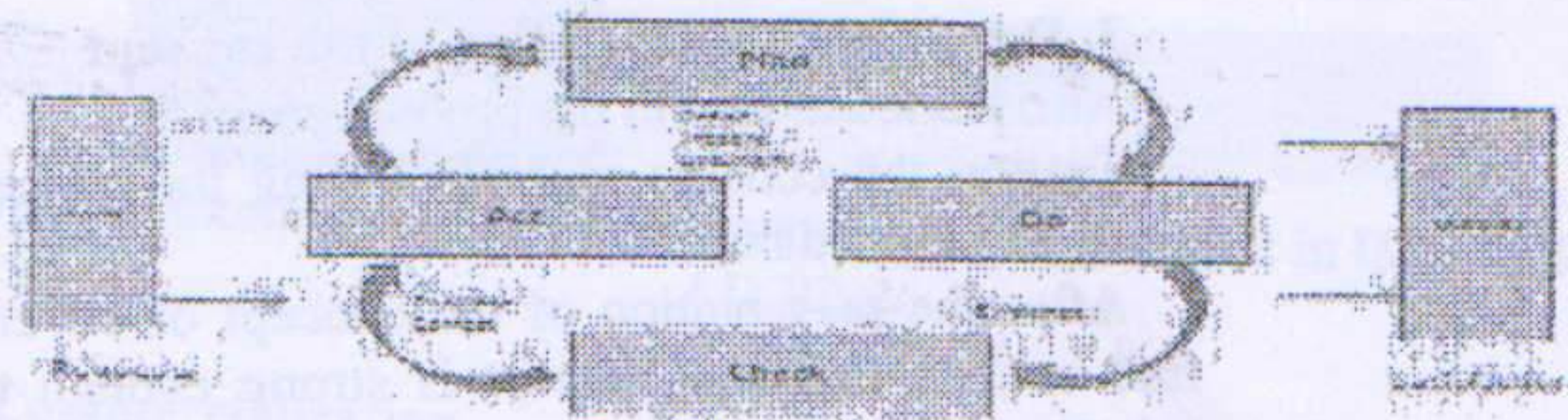


Figure 2 Deming cycle

### ***Everything start with IDEA***

At the core of each product development is primarily IDEA - the basic idea of offering a product according to the needs of customers to create profit

From 100 ideas for product development even 3 to 10% success in the market, 2/3 of new products fail in the first two years.

The development of new products takes place in several stages:

**1. Generate ideas**

The ideas for new products come from several sources: buyers, scientists, competitors, employees and top management.

**2. Selecting the idea**

The purpose of selection or review of the idea is the rejection of bad ideas as early as possible because the cost of developing the idea grows with each successive stage

Internal sources of ideas:

- Marketing Manager
- researchers
- persons for sale
- technologists
- other staff of the company

External sources of ideas:

- consumers
- competition
- marketing agency
- private research organizations

*Enrichment of milk with vitamins*

To meet the needs of children for vitamins company decided to produce the NEW vitamins "Bitolsko" UHT milk.

**3. Development and testing of the concept**

Attract idea to turn in the product concept.

Testing the concept requires testing the concept of a new product from a group of targeted buyers.

After the presentation of the concept of buyers respond more questions to find out whether the concept is strong enough to attract consumers and the solution to their needs.

**4. Development of a marketing strategy**

Follow preliminary plan for marketing strategy that consists of assessing the main strategic and operative; market and financial categories of planned product.

**5. Business Analysis**

- Includes projected sales, costs and benefits to determine whether this new product would be achieved corporate goals;
- If product does not meet financial expectations, can't go to the next stage of development.

*Quality control*

Testing of the required amount of vitamins in milk - is in accordance with the production specification.

Sophisticated equipment, procedures implemented, assuming the process and final control, and traceability are guarantee for high product quality.

Verification of quality is confirmed in external accredited laboratories in Macedonia and the EU.

#### 6. Product Development

- At this stage develops physical product, which requires a significant leap in investments
- The development of a successful prototype can last for days, months, even years
- The developed product should meet the requirements for functionality and be acceptable to consumers (consumer testing)

#### 7. Test Marketing

- It is the stage in which the product and marketing programs are tested in real market conditions
- The cost of testing the market can be high and the competition and can reveal the company's plans, although in recent times little used, it is worth spending on high-risk products which are invested

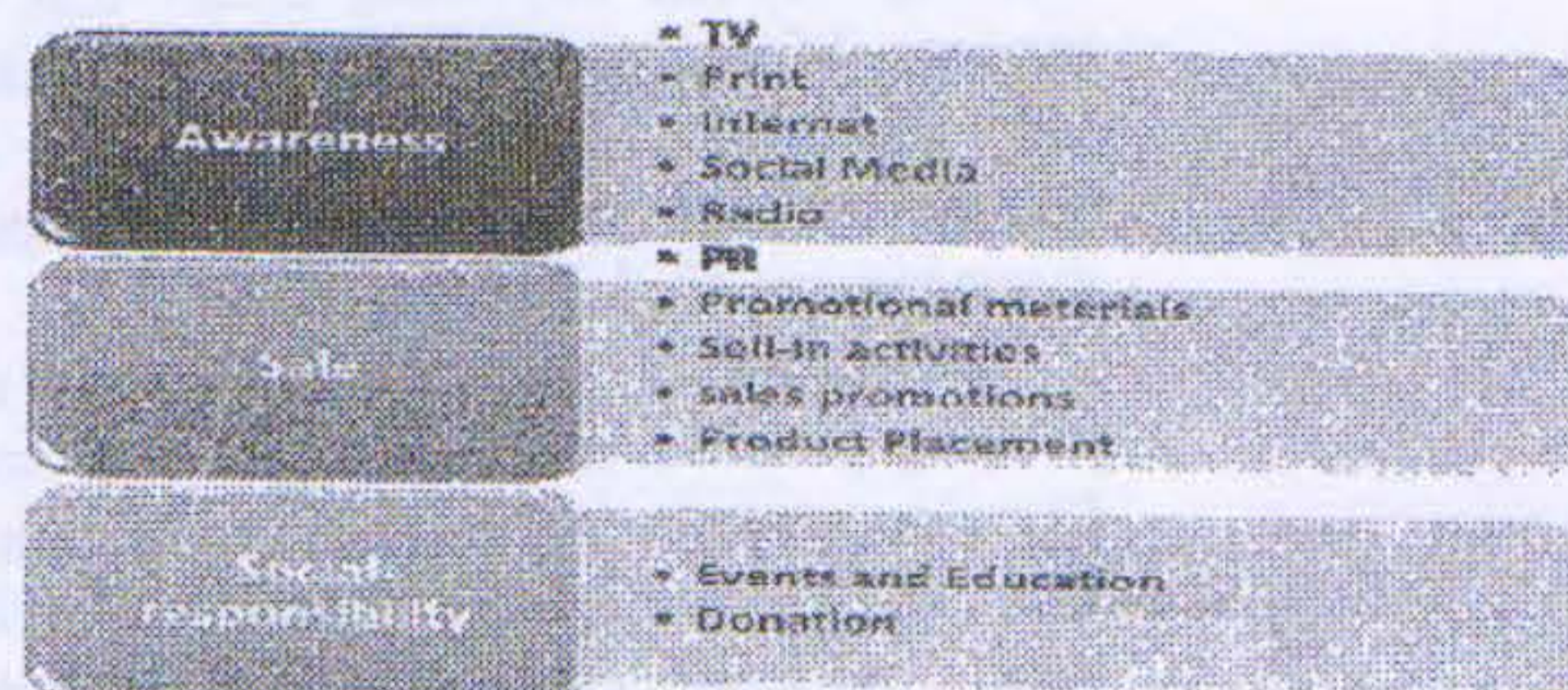


Figure 3. Marketing activities for new product development in IMB "Mlekara" AD Bitola

#### 8. Commercialization

Commercialization is introducing a new product on the market

This stage requires the most cost (manufacturing plants, marketing costs)

You need to decide:

- Time of launch of the new product (in relation to the competition, inventory or season)
- Geographic Strategy (local .... Global)
- Target (potentially best customers) and strategy for introducing market (specific marketing actions)

**Four winning combinations for development of new type of milk in Bimilk:**

1. To be better
2. To be different
3. To be cheaper
4. To be faster

**Conclusion**

The purpose of this research was to provide a scientific contribution to integrated topic of studies and New Product Development (NPD) concepts by adaptation of the current theoretical framework in the NPD field to the conditions of the dairy industry. NPD is a process that is crucial for all companies. Success in this field is closely related to the successful performance of the dairy industry companies. The research that was presented in this thesis provides for managers of dairy industry companies an overview of NPD and the perspective of this process. In spite of the fact that the results of our study were generalized to a wide range of dairy industry companies, it gives an overview of the important issues that should be considered during the NPD process. Moreover this research discusses such important managerial issues as how the NPD process should be run in dairy industry companies and who should manage this process. This can be used as valuable inputs for the management of global companies.

Understanding factors that influence consumers' perceptions and acceptances of dairy products is essential for dairy industry companies in their New Product Development strategies making. Factors that affect the increasing development of new dairy especially functional products are aging population, increasing costs for health care, autonomy in health care and awareness and desire to improve personal health, new research and scientific evidence that diet can change the frequency and progression of a disease.

**References**

- Babbie E.R. (2009): The Practice of Social Research. 12th edition. Canada: Cengage Learning, pp. 143-160.
- Brentani U., Kleinschmidt E.J., Salomo S. (2010): Success in global new product development: impact of strategy and the behavioral environment of the firm. *Journal of product innovation management*, 27: 143-160.
- Jones P.J., Jew S. (2007): Functional food development: Concept to reality, *Trends in Food Science & Technology*, 18: 387-390.

- Mark-Herbert C. (2004): Innovation of a new product category—Functional foods, *Technovation*, 24: 713–719.
- Siró I., Kápolna E., Kápolna B., Andrea Lugasi (2008): Functional food. Product development, marketing and consumer acceptance—A review, *Appetite* 51: 456–467.
- Spence J.T. (2006): Challenges related to the composition of functional foods, *Journal of Food Composition and Analysis*, 19: S4–S6.
- Saunders M., Lewis P., Thornhill A. (2007): *Research Methods for Business Students*. 4th edition. Prentice Hall, pp. 207-217.
- Wall S., Minocha S. (2009): *International Business*. Edinburgh: Pearson Education., pp. 497-508.
- Yelkur R., Herbig P. (1996): Global markets and the new product development process. *Journal of Product & Brand Management*, 5(6): 38-47.