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WORD OF THE EDITOR

Serbian Project Management Journal is a journal presented by the Serbian Project Management Association – YUPMA, who had launched this publication on the occasion of its 25th anniversary.

This specialized journal has been presenting the most recent knowledge and best practice in the field of project management and other management disciplines.

So far, many authors from more than 15 countries have recognized Serbian Project Management Journal as a vital reference in their academic or professional career. Most of the articles are based on research undertaken by scholars and specialists in the field. In addition to research articles, the Journal publishes commentaries, researches in brief, and book reviews.



The Journal is deposited in the Serbian National Library and is recognized in Serbian Citation Index, Google Scholar, and Research Gate. In the time to come, the editorial team will pay particular attention to indexing Journal in other scientific databases.

It is our genuine wish to continue further contribution to the project management development and implementation in Serbia through publishing latest achievements and research in the field.

Editor in Chief

Prof. Vladimir Obradović, PhD

A handwritten signature in black ink, appearing to read 'V. Obradović', written in a cursive style.

PROJECT MANAGEMENT SOFTWARE APPLICATION IN THE NIGERIAN CONSTRUCTION INDUSTRY

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Abstract: The desire to investigate the application of project management (PM) software in the Nigerian construction industry is imperative because despite a plethora of project management software packages with the capability of improving project performance, the rate of successful execution and delivery of construction projects remains alarmingly low. The research study surveyed 144 respondents involved in 16 construction projects in three states in Nigeria. Using t-test statistics and correlation analysis as analytical tools, two crunch findings were made: (i) there is a poor use of web-based project management software packages in the construction industry (ii) there is a misplaced emphasis on the cost of software and software graphic displays during selection. The study calls for the extensive application of PM software in the construction industry especially web-based PM software packages. It also recommends that in evaluating software for selection, other criteria more value-adding than cost and graphic displays be used. These include: user friendliness, report templates, task capacity, the speed of processing, collaboration and file sharing capacities, customizability, interoperability and integration.

Keywords: project management, project management software, web-base applications, desktop-based applications, Nigerian construction industry.

1. INTRODUCTION

Project Management software applications have capabilities to manage the in-built difficulties, uncertainties and risks inherent in construction execution; and by so doing they can significantly reduce construction project failures. However, despite the proliferation of project management software applications in the market, construction projects are consistently failing. It is, therefore, imperative to analyze the application of these computer packages in the construction industry to understand why construction projects are consistently failing when solutions to prevent the failures abounds. This would significantly arrest the high incidence of failures in construction project delivery.

Research focus has been on improving existing software packages by adding extra features, such as making it more interactive, improving the user

interface, adding charts as opposed to lists, adding collaborative chat apps, and so on. The “frantic race” for project management software development and improvement has only resulted in a proliferation of the market with software applications of varying features (John, 2007); but this has not translated into significant reduction in project failures because Amade et al. (2015) reported that the rate of project failure is still alarmingly high.

The specific objectives of this study are:

- i. To determine whether project management software are extensively being applied in the construction industry in Nigeria
- ii. To determine the project management software selection criteria critical to the successful delivery of construction projects

This research study aims to fill this gap, by investigating all areas of project management software implementation by construction companies. Specific areas to be investigated include: the main project management software packages applied in Nigeria construction projects; and the emphasis during project management software selection.

2. LITERATURE REVIEW

In the world of project management, the computer applications play an increasing role in the delivery of projects (Gharaibeh, 2014), and are expected to replace traditional project management methods (Becerik, 2004; Nitithamyong and Skibniewski, 2007).

In this review, we look at the meaning of project management software, trace the origin of project management software applications, examine some prominent software applications and also the criteria for evaluation and selection of project management software applications.

2.1 Definition of project management software

By definition, computer applications or software are series of computer program or coded languages designed to perform specific tasks. Project management software applications are therefore computer programs that perform project management tasks.

Project management software packages that provide the general project management techniques such as PERT/CPM, Gantt chart, resource leveling, WBS and cost tracking, and are used in planning and managing projects to successful completion.

Project management software applications are simply the computer packages that can handle the fundamental tools for project management. In other words, project management tools are simply computerized. According to most authors (Hawkins, 2007; Westland, 2006; Akpan and Chizea, 2002) these project management tools include: CPM, PERT, GERT, Gantt Chart, Risk Management plan, Expenditure control loop and S

– curve, Resource loading and leveling and Fishbone Diagrams.

2.2 Project management software applications

The origin of project management software is rooted in the 1950s when Dupont chemical collaborated with mainframe computer maker Remington Rand (Univac) to devise the Critical Path Method (CPM) of network scheduling (Hawkins, 2007). A long time concern has been the concept of project scheduling by Critical Path Method (CPM). Thus, of all modern engineering and construction tools, CPM was one of the very first to be computerized, and the computerizing of CPM gave birth to the development of project management software Gharaibeh (2014).

The major categories of project management software applications in use in the construction industry are; Desktop-based applications and web-base applications.

2.2.1 Desktop - based applications

This project management software implemented as programs that run on the desktop of each user. Project management tools that are implanted as desktop software are typically single-user applications used by the project manager or another subject matter expert such as a scheduler or risk manager. Desktop software applications include Primavera, Microsoft Project

Primavera – the Primavera application is written for Windows as GUI packages (Graphical User Interface). This means that the package depends on graphics and charts to illustrate the different tools and functions it provides. Primavera offers to organize, analyze, communicate and accelerate projects. The main planning graphic in Primavera, as in most other GUI packages is the Gantt charts (Gharaibeh, 2014).

Microsoft (MS) Project

MS Project is a desktop application designed by Microsoft that assists a Project Manager in: developing a plan, assigning resources to tasks, tracking progress, managing a budget, and analyzing workloads (Rewaskar and Shukka,

2013). MS Project is an extended part of the widely used Microsoft Office suite (Hawkins, 2007). Therefore, MS Project offers better compatibility with MS Office applications than any other project management software package. Microsoft project achieved prominent success with its user friendliness characteristics.

With a well-organized menu structure, commands and help wizards, it is relatively easier to learn, requiring less time to learn the basic functions of the software (Gharaibeh, 2014). Microsoft Project has also been found to be a cost-effective project management solution. Some see it as a lower cost, individual scheduling tool suitable as a feeder to more comprehensive Project Management Software Package (PMSP) for large projects (Gharaibeh, 2014). Its main features include budget management, collaboration, Gantt chart, and milestone tracking.

2.2.2 Web-base applications

This project management software implemented as web applications to be accessed using a web browser. This may also include the ability to use a smart phone or tablet to gain access to the application. Web-base Project Management Software include Basecamp, Wrike, Clarizen, and LiquidPlanner

Basecamp – A basecamp is a web-based software that makes it simple to communicate and collaborate on projects. It is especially useful in communicating with teams who are physically distant, particularly those who are working in different time zones. It is very adept at handling images and artwork. If an image URL is added to a project discussion, Basecamp displays the image rather than just the link. This feature of Basecamp is convenient when working with art directors and other visual creatives.

One special feature of Basecamp is its catch-up button that summarizes the day's activity, making it possible to see quickly anything on the project that might have been missed. This is also especially useful if one is pulled into a project midway through its development. Basecamp has a user friendly interface, supports multiple languages, and can be accessed on mobile phones.

Its main features include collaboration, email integration, file sharing, milestone tracking, and task management.

Clarizen - Clarizen is an online package that gives powerful project management, social collaboration, and real-time visibility for any project or task. It can be used to manage projects of varying complexities, eliminate double work, and boost productivity and profitability. Its main features include; Budget management, collaboration, email integration, file sharing, Gantt chart, idea management, issue management, milestone tracking, percent-complete tracking, portfolio management, project planning, time and expense tracking, resource management, status tracking and task management.

Wrike - Wrike is a web-based project management software offering true free accounts, easy and fast to set up, and integrate well with other services. Most project management platforms offer some form of free trial, but Wrike offers a true free level of service because unlike others there is no limit on the number of projects that can be managed in the free trials. In general, Wrike's interface is oriented towards lists and activities streams, meaning that reports in Wrike tend to take the form of lists, rather than graphs and charts. Wrike has some social media feel but lacks a built-in chat application that some project management platform now offers. Wrike supports a good number of integration with other services such as Google Drive.

Liquid Planner - Liquid Planner is a project management platform tightly focused on time management. Liquid Planner meets all the need of project organization, from multi-project scheduling and task management to time tracking and advanced analytics.

Liquid Planner is all about managing time resources. It has some excellent reporting tools that show a balance of hours logged versus estimated hours remaining on a project. Liquid Planner plots out each item on a time-line that dynamically changes as different factors (such as priority and other tasks assigned to the same team members) affect it.

2.3 Criteria for software evaluation and selection

In construction, different applications have been built specifically for different purposes. Project Management Software products are extremely varied. They are written and produced to fulfill very diverse requirements. Their context for use can also be varied. Therefore, the first thing in using project management software is identifying and selecting the package with features needed by the project organization (John, 2007). Particular organizations need to select carefully software packages that meet their particular needs. Ease of use of computer systems and applications is a very important selection criterion. According to Nitithamyong and Skibniewski (2007), contractors named the most important factor that influences the effective adoption and usage of computer systems and applications as the “ease of use” of the system/ application. Alter (1992) also commented that another very important selection criteria are designed issues, including user interface, screen design, page layout, color, icons, help facilities, menus, user documentation, and on-screen prompts.

The criteria for selection of project management software are not different from those in assessing software for selection in other industries. Belyk and Feist (2014) listed the following as criteria for project management software evaluation: Cost (Institutional and User); Complexity (User focus); Control (Password protection); Clarity (Resolution, Size, layout, etc); Common Technical Framework (Interoperability, Scalability, Integration, File

sharing etc); Features (Learner’s tools such as search, reference, glossary).

3. METHODOLOGY

This study is set up as a survey research. Random sampling method was used in selecting a sample of 144 individuals involved in 16 construction projects. These individuals were involved in the projects in the capacity of project managers or supervisors. They were required to provide: the project management software packages used in their projects; PM software selection criteria for delivering successful projects; and the criteria used for selecting their PM software for their projects. Simple percentages, t-test statistics, and correlation analysis are employed in analyzing the data collected.

The test-retest reliability technique produced a correlation coefficient of 0.89 proving that the responses obtained from the questionnaire survey are highly reliable.

4. RESULT AND DISCUSSION

To what extent is project management software being applied in the construction industry?

In answering this research question, percentages and t-test are employed as analytical tools. Table 1 and figure 1 present the statistics of the project management software packages used in the projects surveyed. Table 2 present the result of the t-test analysis that the data of Table 1 is subjected.

Table 1: Extent of application of Project Management Software

<i>PM Software</i>	<i>No</i>	<i>Percentage (%)</i>
<i>Primavera</i>	4	25
<i>MS Project</i>	7	43.75
<i>Wrike</i>	2	12.5
<i>Clarizen</i>	0	0
<i>Base Camp</i>	1	6.25
<i>Liquid Planner</i>	1	6.25
<i>Others</i>	1	6.25
<i>Total</i>	16	100

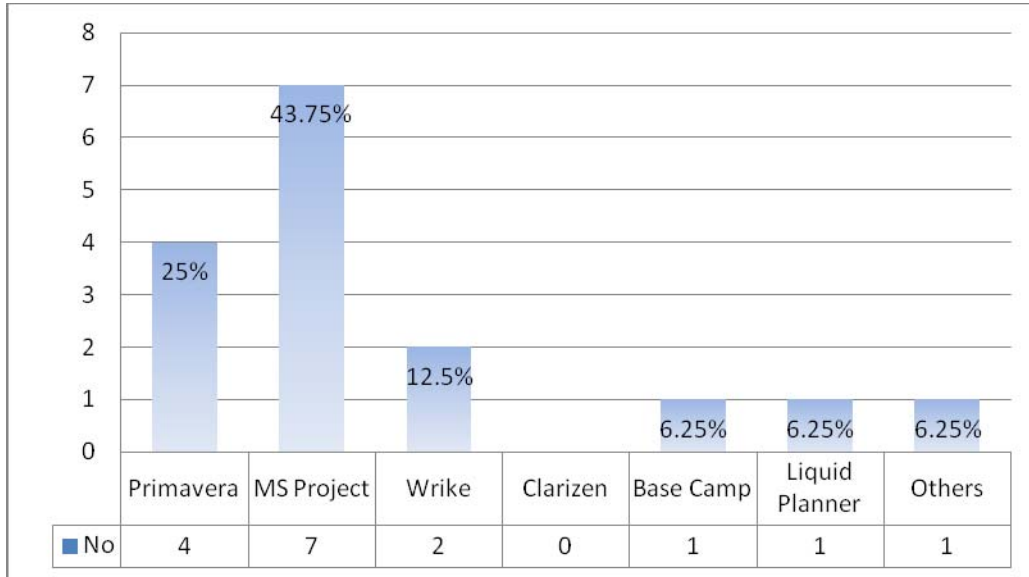


Figure 1: Percentage chart of project management software application

Table 2: T-test result (extent of application of cost management techniques)

Mean	Standard deviation	t_{cal}	t_{crit}	$p - value$
2.2857	2.25	2.0955	2.447	0.04049*

*significant at $p < 0.05$

Decision Rule: If $t_{cal} > t_{crit}$, reject that project management software are not extensively being applied in the construction industry. Accept if otherwise.

Decision: Since $t_{cal} (2.0955) < t_{crit} (2.447)$. It is accepted that project management software are not extensively being applied in construction projects in Nigeria. The p-value ($p < 0.05$) shows that the result is statistically significant.

Discussions: The PM software usage statistics presented in Table 1 explain that the PM software packages are not extensively being applied. The desktop-based packages (Microsoft Project and Primavera) are the most widely used making up 68.75% of the total usage; while there is a poor application of the web-based packages (Clarizen, Liquid Planner, Base Camp). There are more web-based PM software applications than Desktop PM Software applications; but at 31.25%, the usage of the web-based applications was less than half the usage of the Desktop PM software applications. It is concluded that there is more inclination towards the use of Desktop PM software packages; Microsoft Project is the most widely used of the

desktop project management software packages while Wrike is the most widely used among the web-based PM software packages.

What are the project management software selection criteria that are critical to the successful delivery of construction projects?

In answering this research question, correlation analysis is employed. First some software selection criteria were identified from a detailed review of the literature, and respondents were required to rate which of the criteria when used in software selection will deliver successful results. The weighted rating was used in ranking their responses as presented in Table 3.

The respondents were then required to provide us with the criteria that were used in the selection of the software package employed in their projects. Weighted rating was also used to process their responses as presented in Table 4. The two data sets were then subjected to correlation analysis, the result of which is presented in Table 5.

Table 3: PM software selection criteria for successful project delivery

<i>Selection Criteria</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>WR</i>	<i>Rank</i>
Task capacity	84	60	-	-	-	660	3
Speed of processing	80	64	-	-	-	656	4
Cost	56	69	19	-	-	613	8
User friendliness	101	43	-	-	-	677	1
Graphical Displays	42	71	28	3	-	589	9
Collaboration and file sharing	64	80	-	-	-	640	5
Control (Password protection)	8	14	67	50	5	402	12
Integration and Interoperability	56	88	-	-	-	632	7
Scalability	24	56	45	13	6	511	10
Customizability	59	85	-	-	-	635	6
Report templates	91	53	-	-	-	667	2
Clarity (Resolution and layout)	24	56	39	25	-	511	10

Discussions: The ranking of the project management selection criteria critical to successful project delivery is done using their weighted ratings as shown in Table 3. The most important criterion is seen to be User friendliness with a weight of 677. This result is consistent with findings of Alter (1999). Belyk and Feist (2014) in their study rated the “User focus” of software packages very high in evaluating software packages for selection. Gharaibeh (2014) also argued that MS Project owes its popularity to its user friendliness characteristics.

“Report templates” is the second-ranked software evaluation criterion for successful project delivery with a weight of 667. Status or progress reports are important tools for driving project success. Certain processes such as project tracking will be futile without reporting, and project control will also be impossible without an efficient reporting system. Emphasizing the importance of report templates in software packages,

Kezner (2000) contributed that “flexible report generator” is one of the extensive capabilities that higher level project management software packages should possess. Report templates help

each member in the project to confidently contribute to the project’s success.

Task capacity (660) is rated as the third most important criterion while the speed of processing (656) is rated fourth. Software packages should be able to handle a wide range of tasks and support the different project management processes. The processing speed of the software package is also important because applications that do not process data fast can cause the user a lot of inconveniences.

The least important criterion among the listed criteria is controlled (password protection) with a weight of 402. Scalability of the software package and clarity (layout and resolution) both have equal weight (511) and occupy the penultimate position from the bottom in the weighted list.

Table 4 below presents the criteria that were used in selecting software packages employed in the implementation of the surveyed projects. The table shows that the cost of the software and its graphical displays are the first and second most important factors used by the contracting firms in selecting software packages for use in their projects.

Table 4: PM software selection criteria in the project surveyed

<i>Selection criteria</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>WR</i>	<i>Rank</i>
Task capacity	60	84	-	-	-	636	7
Speed of processing	-	-	61	56	27	322	12
Cost	122	22	-	-	-	698	1
User friendliness	71	73	-	-	-	647	3
Graphical Displays	97	47	-	-	-	673	2
Collaboration and file sharing	62	82	-	-	-	638	6
Control (Password protection)	20	40	53	17	14	467	10
Integration and Interoperability	24	31	50	39	-	472	9
Scalability	-	18	54	41	31	347	11
Customizability	68	76	-	-	-	644	5
Report templates	40	64	20	20	-	556	8
Clarity (resolution and layout)	71	73	-	-	-	647	3

Table 5: Result of Correlation analysis

Summary of Correlation Analysis	
<i>R</i>	0.257384
<i>R Square</i>	0.066247
<i>Adjusted R Square</i>	-0.02713
<i>Standard Error</i>	84.49654
<i>p-value</i>	0.41931

There is a weak correlation between the two data sets (PM software selection criteria for successful project delivery, and PM software selection criteria used in the surveyed projects). This is shown by the correlation coefficient of 0.257384.

This implication of this result is that; in the application of software packages in the construction industry, there is a critical area of misplaced emphasis. The misplaced emphasis is on graphic features and cost of the software during selection.

This would explain why project management software applications are being used in certain projects, and yet the desired results (improved project performance and successful delivery) are not being realized. As highlighted by Table 3, there are other evaluation criteria that are more important and value adding than both graphical displays and cost of the software package, these include: User friendliness, Report templates, task

capacity, a speed of processing, collaboration and file sharing capacities, customizability, interoperability, and integration.

5. CONCLUSIONS

Based on the results of this study, the following conclusions are reached:

- i. Project management software packages are not being extensively applied in the construction industry. Desktop-based PM software packages enjoy much usage, but the construction industry in Nigeria has not fully tapped into the potential of web-based PM software packages.
- ii. In the selection of project management software in the Nigerian construction industry, there is a misplaced emphasis on the cost of the software and its graphic displays. For successful delivery of projects, there are selection criteria that are more important and value adding than

should be prioritized over cost and graphic displays when evaluating PM software for selection

It is recommended that construction firms should tap into the potentials of web-based project management software packages as these packages hold certain advantages over their Desktop counterparts such as: relative lower costs; eliminating time, space and geographical barrier while giving distributed project team members the opportunity to access their project wherever they

may be. It is also recommended that when evaluating software for selection in construction projects, the emphasis should not be on costs of the software and their graphical displays; the emphasis should be on other evaluation criteria that are more important and value adding than both graphical displays and cost of the software package, these include: User friendliness, Report templates, task capacity, speed of processing, collaboration and file sharing capacities, customizability, interoperability, and integration.

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ECONOMIC INSTRUMENTS AND FUNDS FOR IMPLEMENTATION OF SUSTAINABLE DEVELOPMENT GOALS IN SERBIA

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Abstract: The implementation of sustainable development goals depends on the application of certain instruments and funds. Identification, combination of various instruments and application of more than one instrument over a period of time encourages economic activity that causes economic development. Beside economic instruments such as taxes, charges, subsidies, fees, subventions, bonuses, customs, tradable permits, deposit-refunds, voluntary agreements, etc., there is a need for public, private and foreign sources of financing in order to achieve real progress. Economic instruments and sources of financing were first introduced by the Rio Declaration and Agenda 21, and then through national strategies. The aim of the paper is to present advantages of economic and financial instruments, along with certain limitations that occur when they are applied in implementation of sustainable development goals.

Key words: economic instruments, funding, sustainable development.

1. INTRODUCTION

Harmonisation is the prerequisite for a country to become a part of European and/or global flows. Developing countries need to harmonise their policies and regulations with developed countries. European enlargement and economic development have emerged as current issues. EU membership, implementation of structural reforms, establishing market economy and achieving economic development are the steps towards the next issue to be solved – implementation of sustainable development. The goals of sustainable development can be achieved through adequate policies, instruments and sources of financing. That is a long-term process which demands investments with long payback.

Sustainable development is oriented towards the future, as it tries to efficiently allocate resources and meet the needs of both current and future generations. Then, there are the goals of improving the standard of living and quality of life among population. Three components are used to achieve these goals – economic, social and ecological. Such components are interrelated and cannot be observed separately. Sustainable development

leads the society towards a higher level of development, while preserving the environment, improving income distribution and reducing the exposure to economic crises.

Various strategies, policies, instruments and means are needed to achieve the goals of sustainable development. The aim of this paper is to present the strategies, economic instruments and funds that are used to encourage the realisation of sustainable development goals. The paper will present both advantages and some limitations of the instruments. Economic instruments that will be presented are oriented towards preserving the environment. This is primarily because sustainability implies establishing the production that enables efficient use of the available resources while preserving the environment. Sustainable development goals cannot be implemented without financing, and therefore different sources of financing are shown in the paper. The history of origin and progress towards achieving sustainable development, both in the EU and worldwide is also presented. Finally, there is a presentation of sustainable development strategies in Serbia and instruments used to implement the goals.

2. CONCEPT, STRATEGIES AND GOALS OF SUSTAINABLE DEVELOPMENT

The concept of sustainable development is a link between the present and future generations, since development should meet the needs of the present without compromising the needs of future generations to meet their own needs (Kragulj, 2014). Finite natural resources should be used so as to provide current economic growth, but should also be sustained for the future generations to improve their quality of life. Accordingly, the main concepts of sustainable development are: the concept of need and the idea of the limitations of our environmental resources' availability to meet our present and future needs (WCED, 1987). Therefore, sustainable development is based on sustainable production. There is a recommendation that depletion of natural resources should be minimised. Efficient management of the available resources and adequate knowledge can have positive effects on achieving sustainable development. Sustainable development implies a convergence between three main pillars: 1) *economic development*, 2) *social equality* and 3) *environmental protection*. Economic development includes economic sustainability, i.e. the possibility to maintain a certain level of economic production. Social equality is the state of affairs where a defined level of social well-being is indefinitely maintained, while reducing the gap between rich and poor social classes. Environmental protection is oriented towards the possibility to maintain a defined level of environmental quality and preserve natural resources. Some authors (Hawkes, 2001; Djekic and Hafner, 2013) recommend two more pillars: cultural diversification and political – institutional pillar. It follows that sustainable development marks optimal balance between economic, social and environmental factor within institutional framework (Jednak and Kragulj, 2015).

The term sustainable development was first defined and explained in 1987, by the United Nations World Commission on Environment and Development. A major document called *Agenda 21* was introduced in Rio de Janeiro, Brazil, in 1992. The main ideas of the Agenda

are turned into policies and activities of sustainable development. Basic concepts of sustainable development are also presented. It is pointed out that in order to attain the goals, the needs for development of both current and future generations have to be appreciated. Therefore, a relation between economic progress and environmental protection has to be made. For the implementation of strategic development, it is necessary to internationalise environmental cost and apply the policies, with special emphasis on economic instruments. Sustainable development should be conducted on local, national and global levels respectively. For that reason, all the countries were called upon to create their own national development strategies. In 1997, sustainable development was set as the main goal of the EU, since it had become the integral part of the Lisbon Treaty. The EU adopted its sustainable development strategy in Gothenburg, in 2001. The goal of the Gothenburg Strategy was to improve the quality of life and standard of all the citizens. In the course of time the strategy was subjected to some changes, and was revised in 2006. The goal of the revised strategy was to identify and develop the activities that enable the EU to establish a sustainable community that would improve the quality of life in the long run. It is estimated that such goals can be achieved by efficient utilisation of resources, using ecological and social innovative economic potentials that would bring about the prosperity, environmental protection and social cohesion. Economic growth is crucial for development. However, efforts are being made to find a balance between economic development and environmental protection. Prior to the Gothenburg strategy, economic activities had been considered as destructive and harmful for the environment due to inefficient utilisation of the available resources, without reducing poverty. Sustainable development tries to resolve this conflict. Sustainable development strategy set goals for the following fields: 1) climate change and clean energy, 2) sustainable transport, 3) sustainable consumption & production, 4) conservation and management of natural resources, 5) public health, 6) social inclusion, demography and migration and 7) global poverty and sustainable development challenges. The main goals are:

1) *environmental protection* – protection and improvement of the environment; 2) *social equity and cohesion* – democratised, socially inclusive, cohesive, healthy society with respect for diversity; 3) *economic prosperity* – prospective, innovative, knowledge-based, competitive and eco-efficient economy with high living standard and employment; and 4) *meeting international responsibility* – establishment of democratic institutions, peace, security and freedom (Council of the European Union, 2006). The Review of the EU Sustainable Development Strategy was adopted in 2009. According to the Review, the EU holds a leading position in the battle against climate change and the promotion of low-carbon economy. The goals that were harmonised to the long-term EU goals are: the orientation of EU economy towards a low-carbon and low-input economy; protection of biodiversity, air, water and other natural resources; strengthening the social dimension; and the international responsibility dimension of the Strategy of Sustainable Development. The EU Strategy of Sustainable Development should be related and harmonized to EU 2020 Strategy. EU 2020 Strategy promotes a more resource efficient, greener and more competitive economy. The EU Sustainable Development Strategy should influence EU policies and enable not only the coherence between long-term and short-term goals, but also between different sectors. The Strategy should enable better communication between the EU and national sustainable development strategies and influence economic policies to achieve better economic growth, employment, transport and health. Increased EU competitiveness and employment growth would be primarily achieved through eco-efficient economy. Eco-efficient economy implies the production of goods and services with the lowest possible utilisation of resources and lowest possible pollution of the environment. It implies achieving sustainability by promoting both economic and ecological efficiency. Such economy is measured as a ratio between added value and environmental impacts. Despite many successfully achieved results in conducting sustainable development, certain fields did not record any progress due to constant changes (European Commission, 2015). However, sustainable development strategy is considered as a long-lasting one, since its

goals should be achieved by the year 2050 (Council of the European Union, 2009). The EU monitors and biannually reports on the achieved goals of the EU sustainable development strategy, where it uses sustainable development indicators. There are more than one hundred indicators, whereof twelve are the headline indicators. Indicators have been organised into key themes and sub-themes (Eurostat, 2015).

After a strategy has been adopted and the goals established, it has to be implemented. In order to achieve and conduct the goals, various economic instruments and funds are needed.

3. TYPOLOGY OF ECONOMIC INSTRUMENTS AND FUNDS

Different kinds of crises and other conditions can cause a slowdown in economic growth, employment, quality of life and environmental protection. Sustainability process has decelerated and for that reason there are now attempts to find adequate instruments that could be used to achieve the goals of sustainable development. Governments try to encourage development by applying adequate policies and instruments. There are various economic instruments that can be used to achieve sustainable development goals. The applied instruments can affect economic activities both directly and indirectly. For that reason, different kinds of instruments exist, including – subsidies, regulations, education instruments, investments, creation of markets etc. Economic instruments are defined by policies that are adopted and controlled by the government. Such instruments function at decentralised levels and depend on market activities. The government sets certain goals and limitations through laws and regulations. However, market principle has to be applied in order to achieve the goals and adequately allocate resources. Thus, economic instruments should reconcile market and government controlled systems.

Economic activities cannot be conducted without incurring certain costs. There are private and social costs. Private costs are direct results of economic activities, such as production and/or consumption and they are included into the cost of a product/service.

Social costs are the results of economic activities, institutional failures, market failures and policy failures and they are not included into the cost of products/services. Institutional failures, market failures and policy failures increase costs and do not show the true picture of resource depletion. Such costs include costs of pollution, depletion of natural resources or degradation of the environment (UNEP, 2002). Economic instruments are intended to establish full-cost pricing. If costs of resource depletion and environmental protection are included into the cost of economic activity, i.e. production, efficient production and consumption can be achieved. The advantage of economic instruments is that they enable equal distribution of costs and benefits, while preserving efficiency and cost-effectiveness. Moreover, economic instruments influence the changes in economic activities, i.e. the changes in behaviour of both producers and consumers of natural resources so that the costs can be reduced and revenue increased for environmental protection. The instruments should be established so as to allow bonuses and discounts on the activities that promote health, education and environmental protection. Furthermore, they have to be adjusted to national and local conditions, funds and legal frameworks and regulations. The instruments have to be clearly defined, well-set and in accordance to the goals that have to be achieved. In order to achieve the goals, various combinations of instruments or more than one instrument over a period of time have to be used. Some of them are used to prevent certain activities that have a negative impact on environmental protection, and thereby on sustainable development, while others are used to encourage the activities that improve sustainable development. The greatest number of instruments is oriented towards environmental protection and preserving natural resources (Pestic, 2002). Most frequently used instruments are: taxes, charges, subsidies, fees, subventions, bonuses, customs, tradable permits, deposit-refunds, voluntary agreements, etc. This list confirms that there is a wide range and various sets of economic instruments. However, the instruments can be divided into two major groups: market-based and non-market based. Market-based instruments influence products and prices and generate revenue for the government, while

non-market based instruments are oriented towards management and monitoring activities.

Panayotou (2013) classified economic instruments as: property rights; market creation; fiscal instruments; charge systems; financial instruments; liability systems and performance bonds and deposit-refund systems. Some of the instruments, such as taxes, charges, subsidies and fees provide revenue for the government on one hand, and incentives for producers and consumers on the other. Governments control the level of taxes, fees, charges or some other instruments depending on whether the resources are heavily utilised or not, and whether the utilisation of resources threatens the environment.

One important characteristic of economic system is the existence of *property rights*. Property rights provide exclusive authority to determine how a resource is used and owned. The owner, whether an individual or government, has the right to determine the way the property/resource is used, i.e. the right to use the resource/property, the right to earn income from the resource/property and the right to transfer the resource/property. Inadequately defined property rights can result in inadequate allocation of resources, environmental depletion and pollution. Well-defined and legally regulated property rights enable sustainable use the resource/property. The advantages of applying adequate property rights are: low transaction and administrative costs and market distortions, internalised forever and adjustment to changed circumstances (Panayotou, 1994). However, there are some limitations. Property rights are politically sensitive issues and there are difficulties for property rights distributions.

Market creation is an instrument of a government. A government does market creation through creating a market where it charges the use of the environment, i.e. a government issues pollution permits and allows quotas (Panayotou, 2013). The instruments that are used are: tradable emission permits and tradable catch quotas. The advantages of this instrument are: government revenues; pollution standards are adhered to; environmental issues are solved;

the instruments are flexible and administratively easy to handle and apply. However, the instrument shows certain limitations: it is difficult to control and supervise; monopolistic and oligopolistic market can be created, since more powerful and competitive companies push smaller and less competitive companies out of market; relocating companies to the regions where permits and quotas do not exist.

Fiscal instruments are used to include all the costs into the price. The instruments include: taxes, tariffs and subsidies. Fiscal instruments are very efficient. They are applied both for producers and consumers. Producers try to develop clean production, while consumers try to show environment-friendly behaviour. Such instruments provide revenue for the government on one hand, while conserving the environment on the other. *Pigovian tax* is among the most popular instruments of its kind, since it corrects market failures and negative externalities in an effective and efficient way. This tax is levied to the companies that pollute the environment and cause social costs. It is very difficult to define the tax, since various analyses have to be conducted in order to find the optimal solution. A care should be taken to levy the tax on pollution and not on the level of output, so that the company could be able to continue performing its economic activity. This tax is most often levied to highly polluting industries and it is introduced to discourage the production that causes negative externalities. Different taxes are imposed depending on economic activity – lower taxes for friendly use of resources and higher taxes for the activities that cause pollution. Subsidies are also fiscal instruments with the same function as taxes. However, subsidies can cause problems in the long run, since they draw companies towards certain economic branches, but when the number of companies in a branch or industry grows, so does the pollution. The limitations of fiscal instruments include high administrative costs; their effects can be diminished by inflation; the tax can be miscalculated so that it fails to cover all the costs (Panayotou, 1994). Furthermore, taxes are used to collect funds to finance government expenditure. By imposing a tax, a price of a product/service rises, which may cause a change in consumer behaviour in

terms of slacken demand for that product/service.

Charge systems imply different kinds of charges, fees and tolls (Panayotou, 1994). Taxes represent a revenue-rising instrument for the government, while charges and fees are used for offset costs. Charges, fees and tolls are payments for the use of resources. There are user charges, pollution charges, product charges, utility charges, road tolls, product charges etc. User charge is to be paid for using certain resources. Pollution charge is calculated with regard to the quantity of matter emitted into the environment that causes pollution. Product charge is to be paid for the product that is considered to pollute the environment. Utility charge is to be paid for the use of water, electricity, gas, etc.

Liability systems are instruments used to promote socially responsible behaviour. Liability systems are actually legal liabilities for environmental damage. They represent legal activities that reimburse damage. They are a kind of incentive and are usually ex-post effective (Schanzenbacher). The limitation of this instrument lies in the fact that it cannot be applied in the countries with underdeveloped legal systems.

Performance bond is a bond issued by one party of the contract as a guarantee against the failure to fulfil the contractual obligations. *Deposit-refund systems* are a combination of product charge (the deposit) and subsidy for recycling or proper disposal (the refund). Performance bond transfers the responsibility for pollution or irresponsible disposal to the producer or consumer that is charged in advance for potential pollution of the environment. If the performed economic activity results in pollution, producers or consumers are charged for the damage, but if the economic activity does not cause the damage bond refund is conducted (Environmental Protection Agency). In the deposit-refund system producers are encouraged to dispose of their products, such as beverage containers, batteries, plastics, materials in a proper way, or to recycle them. This instrument is rather the advantage of developed countries than the undeveloped ones, since developed societies have a high level of environmental awareness.

Financial instruments are used as incentives that have to be repaid. These instruments comprise various kinds of financing, such as funds, loans, grants, concessions and aids. As regards environmental protection, most widely applied instruments are revolving funds, green funds, relocation incentives and soft loans (Panayotou, 1994; Panayotou, 2013; Schanzenbacher).

Although economic instruments are directed towards reducing costs and increasing revenue, they can help overcoming the financial gap of sustainable development: 1) by motivating economic subjects to change their behaviour so as to cause less environmental changes that will then reduce investment changes, 2) generating revenue that can be used to finance investment and 3) introducing direct and indirect regrouping of social resources towards sustainable activities (Panayotou, 2013).

Agenda 21 recognises the need for new and additional financial resources to cover the costs of dealing with environmental and developmental issues, establishing institutions, laws and policies needed for implementation of sustainable development goals. The estimated costs of conducting the activities defined by the Agenda 21 for the period 1993-2000 amounted approximately to \$8.8 billions. According to UNEP (2015), the resources needed for sustainable development are estimated to \$17 trillion. In order to achieve the goals, all available financial resources are needed: private and public, national and foreign. In global terms, there are enough financial resources to achieve sustainable development. However, adequate policies, structural and system reforms, along with fresh and innovative approaches to financing are still necessary to make true progress. The ultimate goal is to achieve economic progress while preserving the environment.

The methods of financing sustainable development are presented in sustainable development strategies. Beside sustainable development strategies there are financial strategies of sustainable development where sources and methods of financing are presented in detail. The sources and methods of financing differ according to the level of

economic development. Financial sources can be domestic and foreign. Domestic sources come from national budget and other state and private funds, while foreign sources comprise various sorts of aid, donations, loans, etc. Each country should finance sustainable development activities by using domestic sources belonging both to public and private sector, and external sources, among which Official Development Assistance (ODA) plays the most important role for developing countries. In international aid program, a target was set to raise official development assistance to 0.7% of donors' national income. Donors are developed countries that provide assistance to developing countries in the process of achieving economic growth. The EU is the world's largest donor. (NIJE PREKID) Over the period 2002-2011, EU ODA intended for developing countries grew annually by 3.4%. However, ODA was not enough for developing countries to achieve the goals of sustainable development. Still, it continues to remain the main source of financing. Along with the Official Development Assistance (ODA), the multilateral development banks and funds provide additional sources of financing including: The International Development Association (IDA), regional and sub regional development banks, The Global Environment Facility managed by the World Bank, UNDP and UNEP, and other relevant specialised agencies, bodies, organisations and multilateral institutions for capacity-building and technical cooperation. Their programmes such as: bilateral assistance programmes, debt relief, private funding, investment, innovation financing and supportive systems are also included. Innovating financing refers to new methods for raising both public and private funds. Such sources include: various forms of debt relief, use of economic and fiscal incentives and mechanisms; tradable permits; new forms and schemes of fund-raising and resource relocation.

In recent times, EU sources have become the most frequently used sources of financing. The EU offers loans and aid for various projects and programmes concerning education, health, consumer protection, environmental protection, etc. EU members have about 75% of EU budget at their disposal. This includes structural funds used

for financing regional policies, social and training programmes and agriculture. Structural and cohesion funds are financial instruments used by the EU in order to eliminate disparities among regions and achieve economic and social cohesion. Member states can use these funds for strategic investment based on the principles of sustainable development. Although such funds seem to be attractive for investors, they are strictly controlled and the access is highly restricted. Sustainable development is a horizontal objective with ecological dimension for each of the European funding programmes. In fact, a significant number of funds are intended for environmental protection. The funds can be directed towards investment into enterprises (mostly into the sector of medium and small enterprises), building infrastructure (in the fields of transport, education, research and development (i.e. innovation), energy systems – energetic efficiency, renewable energy sources, environmental protection), employment and equal chances for employment. EU candidates and potential EU candidates have the Instrument for Pre-Accession Assistance (IPA) at their disposal. This instrument is primarily used to facilitate economic and social transformation of the countries in the process of joining the EU. There are funds within this financial instrument that are intended for development. Sources of financing are necessary to overcome market failures and finance long-term investment in infrastructure, high-risk investment in innovation and new technology, public goods for social protection and elementary education. However, beside public sources of financing, there is a need for increasing private sources for long-term investment. It is important to integrate all dimensions of sustainable development and consolidate all sources of financing to achieve the set goals (UNEP, 2015).

4. OVERVIEW OF POLICY INSTRUMENTS FOR IMPLEMENTATION OF SUSTAINABLE DEVELOPMENT GOALS IN SERBIA

National Sustainable Development Strategy of the Republic of Serbia 2008-2017 (2008) was adopted in 2008 and harmonised to the principles of the Johannesburg Declaration on

Sustainable Development, UN Millennium Development Goals and the European Sustainable Development Strategy. National Sustainable Development Strategy defines sustainable development as “targets-oriented, long-term, continuous, comprehensive and synergetic process that affects all aspects of life (economic, social, environmental and institutional) at all levels”. Sustainable development satisfies socio-economic needs of citizens on one hand, and reduces the influences that are threatening or harmful for the environment and natural resources on the other. Knowledge-based economy, social and economic issues and environmental protection are the pillars of sustainable development. The goal of the Strategy is to coordinate the three pillars. The key national priorities and strategic objectives are: EU membership, development of competitive market economy and balanced economic growth, development of human resources and increased employment, development of infrastructure and balanced regional development, protection and promotion of the environment and rational use of natural resources (Jednak and Kragulj, 2015a).

National Sustainable Development Strategy of the Republic of Serbia 2008-2017 and Draft National Programme for Environmental Protection of the Republic of Serbia (2010) define and propose instruments for the implementation of sustainable development. Economic and regulative instruments refer to environmental protection. Economic instruments are supposed to encourage rational use of resources, to be an integral part of development strategy, with special focus on technology development, to be legally defined and market based and to provide sources for financing environmental protection (Nact nacionalnog programa za zaštitu životne sredine, 2010). The Law on Environmental Protection recognises certain economic instruments: charges for use of natural resources, environmental pollution charges, environmental pollution charges in the areas of special national interest and charges intended for protection and improvement of the environment. Special Regulations have been introduced to define the amount of charges and conditions for obtaining incentive funds for environmental protection. Most commonly used economic instruments are

charges that service users have to pay. There is a recommendation that certain reforms of economic instruments should be undertaken. The reforms refer to quantity-based cost; possible financial burden per instrument; subjects, i.e. obligor for charges; stronger administration; the purpose of using the collected funds and influence on economy and reducing environmental pollution. There are also certain limitations, as the collected funds are not sufficient and are not allocated to environmental protection. The reforms of incentive instruments will depend on monitoring, regulations and infrastructure.

The financing system of Serbia is decentralised and mostly depends on domestic income and budgetary funds. The funds are limited due to the unfavourable economic situation. National Sustainable Development Strategy of the Republic of Serbia 2008-2017 (2008) provides sources of finances: The Republic Budget and the budgets of local governments, 2) earmarked funds of different funds of the Republic of Serbia, 3) funds provided by the economy, 4) donor programs of assistance and loans from international financial institutions. The strategy recognises three observed periods of time (the period up to 2008, the period of 2009-2011, and 2012-2017) for envisaging necessary financial resources for the needs of sustainable development. Up to 2008, NIP financed sustainable development in the fields of: research and development, education, health, social dwelling, e-management implementation, etc. The earmarked resources for 2008 amounted up to about 11% of NIP total budget, i.e. more than five billion RSD. Furthermore, resources were dedicated to sustainable development from the EU Pre-Accession Assistance (IPA) worth €71 million, or about 40% of all the funds earmarked by IPA. Certain funds from the ministries were also used. Over the period 2009-2011 priority projects for all three pillars were developed and were funded through donations, earmarked funds, local government budgets and National Budget. For the observed period of time total value amounted approximately to €1.425 million, and if each year is observed separately: €330 million (2009), €475 million (2010), €620 million (2011). The greatest amount was dedicated to the environment and natural resources (€900

million), which was followed by social-economic conditions and prospects (€300 million) and the lowest amount was dedicated to knowledge-based sustainability (€225 million). The environment remained the major priority for the period 2012-2017. Economic growth is to be achieved by investing into clean production, energetic efficiency, reduced emission and environmental protection. The funds earmarked for environmental protection amount to 1.5% GDP (2014), and 2.5% GDP (2017). In order to achieve progress towards knowledge-based economy, it is necessary to increase the number of highly educated professionals in the structure of labour, create quality education and research and development and for the purpose of which about 6% of GDP is needed. In 2007, the investment in education made about 4.2% of GDP. For achieving social-economic goals, domestic funds need to be increased up to 44% (2014) as compared to 24% (2009).

Although Serbia has its own national sustainable development strategy that has been harmonised to the EU strategy, sustainable development goals still cannot be achieved, due to unfavourable macroeconomic situation. Economic crisis that caused a decrease in foreign capital inflows and low national savings, slow progress of structural reforms and investment orientation towards the primary sector resulted in inability to implement sustainable development goals. According the Report on the Progress in Realisation of Sustainable Development National Strategy for the period 2009-2017 (2009) Serbia achieved some positive results, but there are still many problems to be solved. Serbia is trying to reduce fiscal deficit by increasing austerity measures and decreasing expenditures. Economic growth is based on a new development model. Due to the lack of domestic sources of financing and decreasing number of external funds, Serbia needs to make efforts to find new ways of financing economic growth and sustainable development. Although financial resources used to be considered as a dominant factor of growth, human resources are emerging as the most important factor of development. Therefore, there is a need for investing in human capital which should be used more

efficiently. As regards environmental issues, regulations were adopted and conformed to the EU regulations: building environmental infrastructure, modernising the system of economic instruments for rational use of natural resources, natural resources preservation and establishing the necessary institutions. In spite of numerous limitations, Serbia is making efforts to achieve sustainable development by applying adequate economic instruments and funds.

5. CONCLUSION

Economic and environmental policies at national and global levels are dedicated to creating a relation between economic growth and environmental protection. Only through adequate policies, well-established institutions and proper economic instruments can sustainable development goals be achieved. Policies are used to define and apply the instruments that can influence economic growth, employment and competitiveness, while preserving the environment. Each country, depending on its level of development, defines policies and instruments for sustainable development. Many countries adopted sustainable development strategies that are in compliance with the EU Sustainable Development Strategy, Johannesburg Declaration on Sustainable Development and UN Millennium Development Goals. National strategies define major fields, policies, instruments and funds needed for the implementation of sustainable development goals. Economic instruments reduce costs and increase revenue for the government, and that is how progress is made. Developed countries have high levels of economic development, standard of living and competitiveness, and through adequate policies they are also able to achieve sustainable development. Their economies efficiently use resources, while preserving the environment. Developed countries, especially the EU members, provide technical and financial assistance to developing countries for achieving sustainable development. The EU established sustainable development goals that should also be pursued by other, less developed countries. However, these countries (Serbia included) encounter the problem of economic reforms that are mainly directed towards achieving economic growth, higher

employment and competitiveness, while efficient use of resources and environmental protection are not considered enough. Although strategies, regulations, economic instruments and financial resources exist, they are not fully applied, which is one of their major limitations along with the fact that the collected funds in the form of government revenue are not allocated to sustainable development, but to primary economic goals of developing countries.

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THE ROLE OF TRADE IN THE PROCESS OF NEW PRODUCT DEVELOPMENT

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Abstract: Although it does not directly carry out the production, trade is accountable to customers regarding product volume and quality. As a result, the trade should not be a passive observer of events on the market, but should assume an active role and influence both manufacturers and customers. Based on these facts, the aim of this paper is to highlight the role of trade in the process of new product development, relying on available research results in this field. Also, the work is expected to point to the scientific and expert community that product development is not only the result of the activities of manufacturers but also the result of the active involvement of trade in all stages of the product life cycle. These findings can serve managers of trading companies in making decisions about the introduction, modification, or withdrawal of a product from their product range.

Key words: Trade, manufacturers, product range, product, quality

1. INTRODUCTION

Trade, as a link between manufacturers and costumers, faces constant challenges, reflected in the establishment of long-term relationships with business partners, i.e. customers, on one hand, and manufacturers, on the other hand. Numerous changes in the environment affect the involvement of trade into cooperation with manufacturers and customers (Hampson, 2007). In this regard, the area of cooperation is very broad and varied (Glynn et al., 2012), and may refer to market research, brand development, and new product development (Ailawadi & Keller, 2004). Based on these studies, this paper will focus research on the active involvement of trade in the field of new product development. In this regard, the analysis will first focus on the goals that trade and manufacturers have in common. After that, based on available research, the work will point to the process of new product development, and the involvement of trade in the phases of the product lifecycle. The starting hypothesis in this paper is that the new product is not only the result of the activities of manufacturers, but also of the activities of trade. The hypothesis will be

tested through the analysis of the existing research in the field of new product introduction, product lifecycle, and the case study of the company Marks & Spencer.

2. THE COMMON OBJECTIVES OF TRADE AND MANUFACTURERS IN THE FIELD OF PRODUCT DEVELOPMENT

Following the market changes, trade can provide manufacturers with valuable help and suggestions, especially regarding product range and quality.

Nowadays, consumers are more educated, pickier, and more demanding than ever. Even seemingly “small” product defect can bring high costs to manufacturers, as well as trade. This has been illustrated in the famous maxim, implying that “a satisfied customer will tell their experience to five people while a dissatisfied customer will share their experience with ten people” (Kotler et al., 2014). For this reason, product quality, design, packaging, as well as the method of display, sale, delivery, or installation of the product, are gaining in importance. All this

opens the door to the establishment of strong ties between trade and manufacturers, for the purpose of achieving full customer satisfaction, which can have a positive impact on both manufacturers and trade.

Numerous studies (Pitta & Pitta, 2012; Rudder et al., 2001; Laplume & Srivastava, 2014) point to the increasingly active role of trade, already in the production preparation phase, when the needs and demands of customers could be included in the sales concept, thus reducing the risk of sales. In particular, the focus is on the importance of

product quality and the necessity of joint engagement in product research and development, preparation, as well as during the manufacturing process itself.

Cooperation in the field of product development brings to the fore the common objectives of manufacturers and trade, manifested in innovative products and product range, technical design (especially packaging), and quality assurance by customer needs and requirements. These common objectives are shown in Table 1.

Table 1: The common objectives of trade and manufacturers in the field of product development (Lovreta & Petković, 2015)

ELEMENTS	COMMON OBJECTIVES
Innovative products and product range	Preventing excessive innovation Creating new products to suit customers Lowering the risk and costs in the development process Improving certain levels of product testing Speeding up the process of diffusion Increasing the share of original new products (selection and narrowing) Coordination requires production and market orientation
Technical design (especially packaging)	Rationalization of the entire flow of goods Creating greater market transparency for customers Reducing costs of product packaging
Quality assurance	Improving physical and functional characteristics of the product Creating better conditions of product affirmation on the market Exchange of technical experience Reducing the cost of sales

The range product concept is established based on the information that trade and manufacturers obtain on the changes in customer needs and requirements. Trade's data on customer behavior can serve as a corrective factor in the manufacturing process. This process provides information on the speed of inventory turnover, the share of products in total turnover, and the like. It may be a sufficient initial impulse for further serious endeavors towards finding the causes of the disadvantaged position of the product on the market. In this regard, trade is expected to be more active and come up with more initiatives.

3. THE PROCESS OF DEVELOPING A NEW PRODUCT

Very important information that trade can provide to the manufacturer refers to the need for new product development (Chao & Kavadias, 2008). After the receipt of such information, the manufacturer undertakes a range of activities to develop a new product, and to introduce or launch that product on the market. Trade can actively engage in this process, by providing specific suggestions. Activities undertaken in the new product development process are shown in Figure 1.

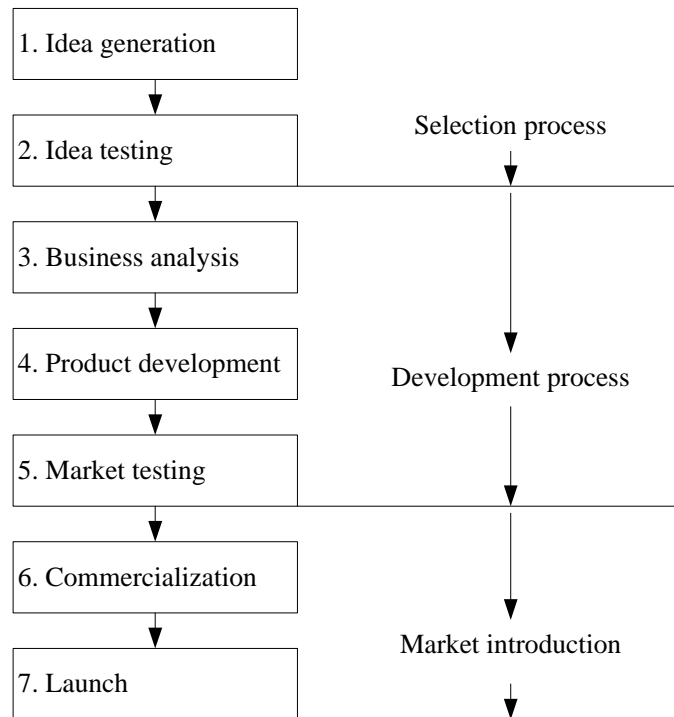


Figure 1: Development of a new product (Levy & Weitz, 2009)

1) *Idea generation* is the beginning of the product development process, when information and ideas are collected, one of which will become a new product to be introduced on the market. Ideas can be obtained from the sales staff, trading companies, as well as by the competition analysis, market analysis, and the like.

2) *Testing* represents an evaluation of the idea in terms of its market acceptability, future goals, and overall resources of the company. In addition, as part of this stage, the analysis of legal regulations and the economic situation is carried out, in addition to cost analysis and analysis of the existence of a potential market or market segment. A very small number of products are taken to the business analysis stage.

3) *Business analysis* involves a detailed analysis of ideas regarding costs, potential sales, and profitability. For something like that, it is essential to have the established methods of assessment of sales, potential risks, and the expected revenue stream, as well as the methods of assessment of financial, human, and production resources,

which are necessary for the introduction of the products on the market.

4) *Product development* refers to those products that have proven to be commercially acceptable. This stage includes (Creusen & Schoormans, 2005):

- Engineering for the development of an idea into a particular product prototype that will appear on the market;
- Testing customer preferences based on a given sample, to determine whether a particular product prototype meets the customer needs, or if there is a need to make certain adjustments;
- Packaging and branding were tested with potential customers, to test the ability of protection, comfort, and contribution to the product promotion.

5) *Market testing* is aimed at determining the market acceptability of the selected product, before the final launch. Within this stage, the specific factors determining the success of the product are identified. Also, it is also possible to detect some product deficiencies, whose causes may be: product or packaging failure,

lack of adequate promotion during the stage of market testing, and the shortcomings that made a trade not accept the product.

To carry out the successful market testing of the product, it is recommended to (Eisenman, 2013):

- Decide on the primary objective of testing (acceptability by the trade, acceptability by customers, packaging testing, and the like);
- Be realistic in assessment, without any subjectivity and bias;
- If possible, apply the test in various fields for the comparison of results;
- Engage professionals with adequate testing procedures;
- Analyze sales and market share of the competition;
- Analyze the repeated purchase trends;
- Analyze all the factors that affect the sale of products;
- Use reliable research techniques to collect the necessary information during the test;
- Avoid changing the testing plan because it can lead to bias, confusion, and so on;
- Take into account any changes that may occur during the testing.

6) *Commercialization* involves consideration of all commercial aspects of the market introduction of the product, such as a role of the sales staff, average price, market segments, time of product launch, advertising, etc.

New product development is a process that involves a series of activities, starting from the idea of a new product to the stage in which the product is being offered on the market. The development and introduction of new products on the market is often very expensive and risky. Before deciding on new product development, it is necessary to carry out good and high-quality research. The company planning to develop a new product should take into account the whole range of external factors, such as culture and customs of the country, geographic and climatic conditions, customer requirements, living

standard, the legal system, and the like. The lack of high-quality and objective research is often the leading cause of product failure (Ćuzović & Sokolov Mladenović, 2013b).

4. INVOLVEMENT OF TRADE IN PRODUCT LIFECYCLE PHASES

After the implementation of all activities of the new product development process, its market introduction occurs. The very act of market introduction of the product marks the start of its lifespan or lifecycle. The movement of product throughout its lifecycle creates conditions for the involvement of trade, which affects the competitive position of both manufacturers and trade (Lee et al., 2011). What is an issue here is what are the phases or stages through which the product passes throughout its lifecycle, and how can trade get involved in these stages.

4.1. The concept of product lifecycle

The concept of product lifespan or lifecycle gives an insight into the dynamics of product competitiveness. This concept can serve as the basis for making a product development plan, tailored to the needs and requirements of customers. The mere fact that a product has a lifecycle through which it passes means that (Kotler et al., 2014):

- The product has a limited lifecycle;
- The sale of this product goes through specific phases, each of them representing different challenges, opportunities, and problems to the seller;
- Profits rise and fall at different stages of the product lifecycle;
- Products require different marketing, finance, procurement, and human resources strategies in each stage of the lifecycle.

It is widely held that the product, during its existence on the market, goes through four stages:

1. *Introduction* – Period of slow sales growth in parallel with the introduction of product on the market. There is no profit at this stage due to high costs of product introduction.

2. *Growth* – Period of market winning and a significant increase in profits.
3. *Maturity* – Period of slow decline in profits because the product has been accepted by all potential customers. Profit is stabilized or is declining due to increased marketing efforts through which the product is defending itself from the competition.
4. *Decline* – Period of decline in sales and profits.

Due to the characteristics of individual phases of the product lifecycle, in each of them, the company operates in a different way. Company operations in individual stages are shown in Table 1.

Table 1: Typical business conditions in the stages of the product lifecycle (Kotler et al., 2014)

	INTRODUCTION	GROWTH	MATURITY	DECLINE
Number of companies	One or a few	Larger number of entries	Some leave	Much leaves
Sales growth rate	Moderate	Large	Uniform	Declining
Marketing costs as % of sales	High	Declining	Stable or declining*	Moderate, but depending on the number of companies that have remained in the industry
Production costs as % of sales	High	Declining	Stable or declining**	Moderate, but depending on the number of companies that have remained in the industry
Profit rate	Negative	Growing	Stable or declining***	Moderate or negative, but can be high for one remaining company
Marketing objectives of the company	Market acceptance of the product	To win the market share	To maintain the market share	To withdraw, and, if it remains, to minimize costs

* Depending on the intensity of competition

** Depending on whether and to which extent the costs are influenced by economies of scale and economies of size

*** Depending on the pressure of competitive prices

There is no doubt that the concept of the product lifecycle is extremely useful, allowing the creation of a development strategy of a particular product (Rindova & Petkova, 2007). Creating such a strategy opens the time factor, i.e. the issue of when the return on investment in a specific product will come. It also shows the corresponding functions in certain phases of the lifecycle, and, finally, allows for the planned changes to the existing product or timely introduction of the new product, so that the company could ensure growth and profits. From the perspective of trade, through which the product gets its full customer evaluation, it allows for its

involvement in all phases of the product lifecycle.

4.2. INVOLVEMENT OF TRADE IN THE INTRODUCTION STAGE

Introduction stage begins when a new product appears on the market. Because of the time required for a specific product to appear on several markets, this phase is characterized by slow product sales growth. Also, factors that further limit the rapid sales growth relate to delay in expanding production capacity, delay in distribution, as well as customers' resistance to change in normal behavior. In

the case of exclusive products, slow sales growth is conditioned by unequal levels of customers' purchasing power.

In the phase of introduction, profit is very low due to high promotion costs, conditioned by the need to inform potential customers about the new and unknown product, as well as the need to ensure product distribution. Companies often tend to focus on those customers who are most willing to buy, i.e. high-income customers.

The involvement of trade in the introduction stage is achieved through the formation of procurement teams in a particular trading company. Procurement teams can give the production company the idea on new product introduction based on the analysis of market needs, assessment of trade potential, identification of the necessary resources, consideration of appropriate technological process, a design of future flows of sales, and the like. Since the introduction phase is critical to the continued market survival of the product, a trading company may include the market testing of the new product into its business practice (Chao & Kavadias, 2008). Testing is done in retail stores at a very favorable location regarding the customer visit frequency. As a result, feedback on customer behavior about new product is obtained within a very short period.

In the phase of market introduction of the product, the trading company can use the following marketing strategies (Dunne et al., 2014):

1. *Rapid skimming strategy* involves the introduction of a new product at a high price with the high costs of promotion. The high price is aimed at achieving the highest possible total profit per product unit. The high price is accompanied by high costs of promotion, aimed at persuading the market of the product characteristics, which affects rapid market penetration. This strategy is possible under certain conditions, such as a large part of the potential market is not familiar with a new product; those who are familiar with the product want to buy it and may pay a high price for it.

2. *Slow skimming strategy* involves the introduction of a new product at a high price with low promotion costs. The high price is aimed at increasing profits while low promotion costs reduce marketing costs. This should lead to high profits. This strategy is possible when the market size is limited when most of the market is aware of the product, and when customers are willing to pay a high price for it.

3. *Rapid penetration strategy* involves the introduction of a new product at a low price and high costs of promotion. This is expected to bring the fastest market penetration and the largest market share. This strategy is possible when the market is large, when it is not familiar with the product, and when most customers are price-sensitive.

4. *Slow penetration strategy* involves the introduction of a new product at a low price and low promotion costs. Low price causes rapid acceptance of the product, and low costs generate greater profits. This strategy is possible when the market is large when it is aware of a particular product, and when customers are price-sensitive.

4.3. INVOLVEMENT OF TRADE IN THE GROWTH PHASE

The growth phase is marked by rapid sales growth. One group of customers likes the product while others are just starting to buy it. New competitors enter the market, attracted by higher profit opportunities. Prices remain at the same level or slightly decrease, depending on the demand growth rate. Costs of promotion remain the same or at a somewhat higher level, to be in line with the competition and to continue with market information. Sales rate grows much faster than the costs of promotion. This phase is marked by the rise in profits due to the faster decrease of operating costs about the price.

Involvement of trade in this stage is reflected in its focus on providing an adequate quantity of products to retail stores, by the desired quality, price, and service method. Trading company's procurement teams are focused on efficient execution of trade and manufacturing

functions. In this respect, it is important to effectively respond to changes in the economic system and the sales potential. Cooperation of the trade and manufacturers allows prompt reaction and adaptation of production to market demands (Creusen & Schoormans, 2005). That is why it is often heard that, in this phase, trade does not buy products from manufacturers, but their production capacity (Ćuzović & Sokolov Mladenović, 2013a).

Taking into account the characteristics of the growth phase in the product lifecycle, within this phase, trade has the following strategies available (Kotler, 2010):

- Improving the product position in retail stores, i.e. placing the product in the proper place in the retail store to attract customers' attention and make them buy that product on impulse, i.e. without any plan;
- Introduction of new models and related products into the product range, in addition to the existing ones;
- Entry into new market segments;
- Shift from advertising that makes customers familiar with the product to advertising that creates preference for the product;
- Lowering prices to attract customers who are price-sensitive.

4.4. INVOLVEMENT OF TRADE IN THE MATURITY STAGE

At the **maturity stage**, a slowdown in sales occurs. This phase can be divided into three sub-phases (Kotler & Keller, 2006):

1. The growth of maturity – sales growth rate begins to decline,
2. Stable maturity – sale starts to be synchronized with the population; the majority of potential customers have already tried the product, and the future sale is under the influence of population growth, and
3. Maturity in decline – sale completely declines, and customers are beginning to focus on other products.

This stage is characterized by intense competition, so that brand loyalty becomes essential for retaining the existing customers. The involvement of trade is reflected in the fact that trading company's procurement teams pay high attention to product development, which means finding new development opportunities. It often happens that trading companies perform certain modifications of the products that are at the stage of maturity, which affects the extension of the product lifecycle. Modification most often occurs as regards the packaging, so that, instead of one, the packaging may contain two or more products at a lower price (Olsen & Sallis, 2010).

At the stage of product maturity, trading companies can apply the following strategies:

- Promotion of more frequent use of the product among the existing customers;
- Development of different variants of use among the existing customers;
- Attracting new consumers through market expansion; and
- Finding new possibilities for the use of the product.

4.5. THE INVOLVEMENT OF TRADE IN THE DECLINE STAGE

In the **decline phase**, product sales and profit decline. The reasons for that are multiple, and the most common ones refer to changes in customer taste and increased competition. All this leads to a glut, lowering of prices, and, consequently, to a decrease in profits. As sales and profits fall, some companies withdraw from the market.

From the standpoint of trade, this points to the need to make a decision about product withdrawal from the market. In this regard, trading companies can apply a rigorous and planned product range selection procedure and withdraw the product with stagnant sales volume. Operationally, this is done through checklists that provide complete information about the sales volume of each product. These lists provide other information as well, relevant for monitoring the product in the

process of its lifecycle evolution (Bart & Pujari, 2007).

In the decline stage of the product, it is possible to implement the following strategies (Blythe & Zimmerman, 2005):

- Increasing company's investment to establish dominance on the market or strengthen the competitive ability;
- Maintaining the current level of investment until the uncertainty regarding the product is resolved;
- Selectively reducing the level of investment by abandoning unprofitable customer groups and enhancing investment in market "niches";
- Collecting return on investment to rapidly return cash.

5. MARKS & SPENCER – EXAMPLE OF INVOLVEMENT OF TRADE IN NEW PRODUCT DEVELOPMENT

Involvement of trade in new product development will be analyzed through the case study of the company Marks & Spencer. Specifically, it is a company that has, since its establishment, been a true leader in the field of cooperation with the manufacturers. Therefore, it should not be surprising that, as early as 1975, Harvard Business School carried out a special case study following the example of MS. Also, numerous studies point to the leading position of MS in field of application of modern techniques and methods of management and partner relationships (Whitehead, 1994; Kippenberger, 1997; Stewart, 2011; Jackson & Sparks, 2005; Rippin, 2005).

The largest clothing retail company in the UK, Marks & Spencer, holds 17% of the domestic market share. It also serves about 4% of the food retail market, and thus manages to combine the activity of mass placement of clothing with the sale of food at a luxury level. This combination of roles, i.e. the dominant retailer on one market and luxury offer on another market, may help explain why the company Marks & Spencer has achieved success in its attempts to conquer new markets in other countries as well. Based

on its business policy, it provides additional services as well (such as financial services), and, in this way, it offers new products to existing customers, while also expanding the business into new markets (Čuzović & Ivanović, 2010).

Theory and practice give such scores to the company Marks & Spencer that put it into the group of best-run world companies. There are numerous reasons for this, but one of them is the new product development policy and practice that the company fosters. Research has shown that MS is directly involved in all stages of the product lifecycle, which means that the example of this company practically confirms the theoretical basis presented in previous parts of this work (Rippin, 2005).

Specifically, the company MS has established strong cooperation with its suppliers, i.e. manufacturers of products included in the structure of its portfolio. Therefore, the MS procurement teams get the role that product managers have with manufacturers, which means that each product is controlled in all stages of its lifecycle. In the introduction stage, the MS procurement teams develop possible ideas on products, based on the analysis of market needs, market potential, determination of resources, designing future flows of sales, and the like. In this stage, MS carries out the market testing, through careful arrangement and display of products in the selected retail stores, i.e. stores at a high-frequency location. This brings feedback on the behavior of customers concerning new products (Roberty, 2013).

In the growth phase, the emphasis is placed on ensuring adequate quantity of the defined product in all retail stores operated by MS, by the desired quality, price, and service method. The procurement teams take care of how to ensure more efficient execution of trade and manufacturing functions, and, in all this, it is important to react quickly to changes in the current market trends and placement potential.

The stage of maturity exhibits the first signs of market saturation, which means that the majority of potential customers have become actual customers. At this stage, MS procurement teams pay high attention to the

product development, i.e. look for new development opportunities. For this reason, the majority of products in the MS range are modified, with the aim of prolonging the lifecycle.

In the phase of decline or decay, the company MS is challenged to make a decision on withdrawal of certain products from the market. Traditionally, these decisions are largely made by the manufacturer. However, the company MS is known for quite a rigorous product range selection procedure and withdrawal of products with stagnant sales volume. This is done through fourteen-day checklists that provide complete information about the volume of sales of each product. This provides other information as well, relevant for product monitoring in the process of its lifecycle evolution.

6. CONCLUSION

Following the changes on the market, trade can provide manufacturers with useful help and suggestions, especially regarding the product and the level of product quality. In this way, customers get the expected benefits, as a function of added value that is delivered to them. Numerous studies point to the increasingly active role of trade, already in the preparation of production, so that the needs and demands of customers could enter the sales concept and reduce the risk of sales. In particular, this highlights the importance of product quality and necessity of mutual engagement in product research and development, preparation, but also during the manufacturing process itself. In the field of new product development, trade and manufacturers have common objectives, which the paper has analyzed. Given these objectives, the work has placed special emphasis on the process of new product development and activities that this process involves. Furthermore, by presenting the relevant research results, the paper emphasized the involvement of trade in all stages of the product life cycle. The practical verification of theoretical assumptions about the involvement of trade in the product life cycle relied on the example of the trading company Marks & Spencer, whose procurement teams are actively involved in all

phases of the product life cycle. Although this work contains certain restrictions that apply mostly to the analysis of existing research results, the subject and content of the work can have a stimulating effect on future, broader and more complex research into the role of trade in the product development.

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IMPACT OF STRATEGIC AND OPERATIONAL DECISION ASPECTS ON PROJECT PORTFOLIO SELECTION

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Abstract: Effective management of project portfolio is critical to the success of any organization. After defining the strategy and strategic objectives to be attained, it is important to choose the right means to achieve them, and these means project. According to that, it is obvious that the selection phase in project portfolio management is of crucial importance. Many companies have a decision-making problem of balancing investments between operational and strategic because portfolio selection needs to be focused both on operational and strategic values. This paper analyzes strategic and operational levels and factors that may affect the process of selection and presents a part of the research in which it is shown that interdependencies between these two aspects must be taken into consideration during the creation of an optimal portfolio of projects.

Key words: components, decisions, operational, project portfolio, strategic

1. INTRODUCTION

Project portfolio management is a framework that translates the strategy into programs and projects and adjusts these to the company's financial and management capacities. One of the most important activities necessary so that the organizational strategy should be effectively implemented is the selection of projects to be included into the portfolio.

Project portfolio management has a clear strategic component. Long-term strategic planning is the basis of project portfolio management and, on the other hand, project portfolio management is an essential instrument for the implementation of strategic plans of the organization (Jovanovic, 2010).

Defining the strategic objectives includes defining of the projects, programs, and portfolios whose implementation leads to achieving these goals. In this way it is possible to integrate the strategic component of the strategic plan and the operational component that project management has, building the foundations for project portfolio management.

Starting from this point and moving forward through the project portfolio management process there are many factors and aspects that should be considered to explain the constant need for balancing between strategic and operational components and values and interactions among them.

Project portfolio selection is a critical phase of project portfolio management and a crucial decision in many an organization. The organization must make informed decisions on investment, where the appropriate distribution of investment is complex, due to varying levels of risk, resource requirements, and interaction among the proposed projects (Ghasemzadeh & Archer, 2000).

An optimal mix of projects in the portfolio includes balanced strategic and operational components. To achieve that, it is necessary for organizations to implement a decision-making process at both the strategic and the operational levels. Each of these levels uses different data and models, according to their scope and character. This type of approach allows managers to concentrate on the variables that are relevant at each level, but

decisions made at any of them may affect the performance of the portfolio in the long term.

2. DIFFICULTIES IN SELECTION PROCESS

The project portfolio selection is the periodic activity involved in selecting a portfolio of projects that meets an organization's stated objectives, without exceeding available resources or violating other constraints.

Some of the issues that have to be addressed in this process are the organization's objectives and priorities, financial benefits, intangible benefits, availability of resources, and risk level of the project portfolio.

Difficulties associated with the project portfolio selection result from several factors:

1. objectives are multiple and often conflicting,
2. some of the objectives may be qualitative,
3. uncertainty and risk can affect projects,
4. the selected portfolio may need to be balanced in terms of important factors, such as risk and time of completion,
5. some projects may be interdependent, and
6. the number of feasible portfolios is often enormous.

In addition to these difficulties, due to resource limitations, there are usually constraints such as finance, work force, and facilities or equipment, to be considered.

There are some and operational aspects that should be taken into account in the portfolio selection process.

First of all, it is important to make a distinction between strategic and operational values. The operational value represents short-term benefits usually by reducing costs and increasing operational efficiency. The strategic value indicates long-term benefits by being aligned with the company strategy and by improving the competitiveness of the company. Although strategic components that provide strategic value are indubitably important, major projects in most of the companies do not have a high strategic value. Some of the reasons for this discrepancy can be found in the fact that investments in strategic components are riskier than investments in operational components and

that returns from strategic components can be achieved in the long term, hence, the investments may be worthless if a company's strategy has changed while some of the projects are being implemented.

The effective management of a portfolio is critical to guarantee the survival of the organization in the long term while maximizing the creation of value. This is a challenging goal, due to the following factors:

- (1) the presence of uncertainty (internal and external),
- (2) the interdependency between projects,
- (3) a limited availability of resources,
- (4) the discrepancy between strategic and tactical/operational goals,
- (5) the dynamic propagation of the effects of lower level (tactical and operational) decisions in response to the resolution of uncertainties,
- (6) an overwhelming number of decision and state variables due to the length of the time horizon and the combinatorial nature of a portfolio (Blau et. al, 2004), and
- (7) the difficulty to terminate projects once they are started (Buyukozkan&Feyzioglu, 2004)

A wide variety of strategies capable of dealing with one or more of the features mentioned above has been proposed to help manage portfolios, especially in the area of new product development (Cooper et. al,1999; Hans et. al, 2007). However, all of them assume that the decision-making process can be decomposed into independent hierarchical levels, and therefore use models that do not take into consideration the dynamic propagation of the effects of lower level (tactical and operational) decisions when projects are analyzed as part of a portfolio.

It is critical to determine if it is necessary to use a comprehensive approach to optimizing the portfolio in which the dynamics of all the different decision making levels are considered simultaneously (Zapata et.al, 2008). One part of this paper is dedicated to the presentation of research in which it is shown that interdependencies between them must be taken into consideration to select a portfolio of projects that is aligned with the company's strategy and, at the same time, that provides benefit for the organization. Before presenting the survey, it is important to explain the strategic and operational components of the portfolio as well as

strategic and operational planning and management.

3. PROJECT PORTFOLIO STRATEGIC AND OPERATIONAL COMPONENTS

By the Standard for Portfolio Management (PMI, 2008), project components are programs, projects and other work that form project portfolio.

Apart from the division on projects, programs, portfolios and other work, these components can be broadly divided into strategic and operational, depending on their purpose, goals, complexity, and other characteristics. Project portfolio management interacts and affects a large number of organizational functions. Functional groups may be stakeholders in the portfolio or sponsors of the various components of the portfolio. Achieving the portfolio objectives can affect the functional groups within the organization in their daily operations. Also, the operational budget may affect the decisions of project portfolio management, including resource allocation to the portfolio components.

"Operation" is a term that is used to describe everyday organizational activities.

Organizational operations may include manufacturing, finance, marketing, law, information systems, human resources and administrative services, etc.

The processes and operational management products are often outputs of portfolio components. Therefore, the portfolio management team has to manage the relationships and interdependencies with operations if they want the value of each component to be implemented.

Operational projects (a group of operational activities, managed as projects) are often critical and strategic projects. The portfolio of operating components connects the subset of these activities and the organizational strategy. When operational projects are implemented, organizations have a solid basis for the realization of strategic components. Portfolio management maintains links between components, monitors progress and maintains consistency with the strategic goals. Therefore, at the highest level, strategic and operational components need to be managed simultaneously within a single, combined portfolio, implemented in the organization. Figure 1. represents a combined portfolio of the projects proposed by PMI (2008).



Figure 1: Combined portfolio of projects (PMI, 2008)

To ensure alignment between portfolio components and the potential impact on operations, the processes of project portfolio management must also take into account the key stakeholders from the operative part. Below we will explain the relationship between the individual operations in the organization and project portfolio management. Projects and activities that can be implemented within these units are equally important for the organization, as well as strategic activities because they contribute to the improvement of business processes and support the realization of the portfolio.

Finance - effective portfolio management requires tangible, timely and accurate financial information. The Portfolio Manager considers financial objectives in managing the portfolio. Therefore, the finance function can monitor budgets, compare spending on projects with the allocated budget, examine the flow of benefits.

Marketing - market analysis, benchmarking, research, play an important role in managing the portfolio, because the components of the portfolio are created based on considerations of market opportunities or competitive advantages. For a non-profit, government or military organizations various analyzes are necessary.

Human resources - this function can identify the skills and qualifications necessary for success and then work to ensure that resources with the required skills are available when they are needed.

Information technology - portfolio management has a significant impact on the operation of information technology. Portfolio components often require support operations of information technologies such as business process analysis, development, services, infrastructure support, etc.

Each of these functions contributes to the development of the portfolio, and their activities are necessary for the successful implementation of the portfolio components. To carry out a correct categorization of strategic and operational components, it is necessary to understand their purpose and means of implementation and management.

The most effective way of categorizing projects for strategic purposes is not the same as the best method of categorization for operational purposes.

Strategic purpose includes:

- Selecting projects: Determining which of the potential projects will be funded and implemented.
- Prioritization of the selected projects: Determination of the relative importance of selected projects that is necessary for the allocation of limited resources.
- Defining portfolio: Determination of the most effective ways for grouping projects within the specifically defined project portfolio.
- Project portfolio management: Designing, implementing and operational implementation of the project portfolio management process in the organization.
- Allocation of resources to the projects within the portfolio: Deciding on the best allocation of money and other limited resources at the portfolio level and between projects in the portfolio.

Operating purposes: this area focuses on specific practices, systems, and methods of approving, planning and control of projects and programs. It includes:

- Selection/assignment of project managers. Connecting knowledge and experience were available to project managers with individual projects. This job is a lot easier if the projects are appropriately categorized.
- Selection or creation of the best life cycle model: determination that of the existing models is best for each project. This job requires that for each project it must be identified which category it belongs to.
- Selection / improvement of methods for project planning, implementation, and control. Best practices for each of these features vary depending on the category of the project.
- Selection/development of software applications: strengths and

weaknesses of the currently available software packages also vary depending on certain project categories.

- Building a best practices knowledge base. It is not necessary that the best practice for one category should be the best practice for another.
- Improving risk management methods. On a general level, risk management is almost the same for all project categories. If the problem is observed deeper and in more detail, significant differences in risk sources and methods may occur.
- Assessment of organizational maturity in project management. Research of literature led to the conclusion that there are large differences in the maturity of the project management discipline when categories are compared to each other.
- Connecting the factors of success and failure. Factors that are important to the success or failure of certain categories vary widely on factors of other categories.
- Selection of tools and approaches: A set of project management tools is very large and various. Not every method, technique, best practice or system can be used on every project. An effective categorization of each project, and then the classification of projects within categories are necessary to determine which tools and techniques will be used for each project.

When it comes to the strategic purpose of projects, they are usually categorized by strategic inputs and market share. When, on the other hand, it comes to operational purposes, they are usually categorized into types of projects, based on the final results of each project, and different models of the life cycle are identified for each category.

In large organizations it is desirable (according to PMI standard) that there should be more than one portfolio, reflecting different strategic goals, as well as the product

line, geographic or technological organization divisions, industries or markets.

According to Combe & Githens (1999), there are three types of portfolios:

- Value is creating - strategic or enterprise projects.
- Operational - projects that make the organization more efficient and satisfy some fundamental functional work.
- Compliance - "must-do" projects required to maintain regulatory compliance.

For better understanding, it is useful to make the distinction between strategic and operational project management. Strategic Project Management includes the following six important processes and responsibilities (Archibald, 2008):

1. Select and authorize new projects and programs to be added to the appropriate, currently active project portfolios within the organization.
2. Validate that each selected and authorized project and program properly supports the currently approved strategic objectives of the organization.
3. Prioritize all validated projects and programs within each established project portfolio to facilitate proper allocation of money and other key resources between these "portfolio components".
4. Allocate key resources (money, equipment, competent people) to each portfolio and each project and program therein.
5. Establish the master schedule for each project portfolio reflecting the established priorities and the approved allocation of money and other key resources to each project and program.
6. Cancel or change the scope, schedule, result, and cost of approved projects and programs when such actions are required or justified.

Operational project management involves the application of all the knowledge areas and processes, including the specific practices, systems and methods to be used for authorizing, planning, and controlling projects and multi-project programs. These responsibilities include, for each project / program within the portfolio and for each defined project category, the following:

1. Select and assign project and program managers.
2. Design / select / apply the best life-cycle models for each project category.
3. Select and implement the specific project planning, scheduling, executing and controlling methods and software tools to be used (Archibald, 2008).

4. STRATEGIC AND OPERATIONAL DECISIONS

With the evolution of the field of decision support strategies it has become evident that decision support techniques must serve as an efficient vehicle through which managers will take an insight into how to minimize risk while optimizing an objective or a set of objectives (e.g. maximization of expected net present value, minimization of time to market, etc.) in the presence of various constraints.

The literature on the strategic decision support systems reveals different techniques shaped by the type of data used, both qualitative and quantitative. Strategies based on qualitative data and not taking into account project interactions are static strategies.

The methodologies in this area are classed into scoring methods (Coldrick et. al, 2005; Cooper et al., 1999), analytical hierarchy approaches (Calantone et. al, 1999; Poh et. al, 2001) and fuzzy logic based approaches (Buyukozkan & Feyzioglu, 2004; Lin & Hsieh, 2004; Lin et.al, 2005).

On the other hand, the purpose of methodologies based on quantitative information is to provide a realistic simulation of the behavior of each project along the time horizon considered, so that the possible outcomes regarding rewards and risk should be determined. This group includes dynamic

deterministic strategies such as classical financial models (e.g. NPV, internal rate of return (IRR), etc.) (Cooper et al., 1999), as well as dynamic stochastic strategies, such as neural networks (Thieme et.al, 2000).

In the case of strategic decision support techniques used to capture interactions, it is well known that the number of interactions between projects grows exponentially as the length of the time horizon increases. Such a level of complexity cannot be handled by decision makers through the use of simple judgment (Nutt, 1998). Therefore, quality-based approaches are static and limited to the consideration of global interactions, such as constraints for average resource usage (Coffin & Taylor, 1996; Kolisch et. al, 2005) and “on/off” dependencies (i.e., project dependencies are considered at the project level rather than on the task level) (Eilat et. al, 2006). On the quantitative side, most of the approaches that capture project interactions combine or build on strategies implemented to characterize projects independently.

At the operational level, decisions are time dependent. Despite the fact that their number is substantially larger and their interactions by far more complex in comparison with those required at the strategic level, they are mostly Markovian in nature (information concerning the current state of the system is sufficient to characterize the system and enable the managers to make decisions). This has enhanced the development of operational decision support systems based exclusively on quantitative information and dynamic in character. These techniques mainly focus on scheduling and resource allocation, with some inroads in capacity expansion.

Decision making is usually broken down into three independent hierarchical levels: strategic, which provides direction and goals for the organization; tactical, which sets the framework to achieve the set goals, and operational, which deals with the actual implementation of the tasks required to achieve the goals (Zapata et.al, 2008).

Recently, a trend has emerged to reduce this classification to two levels in that tactical decisions are grouped as strategic or operational according to the needs of the

organization. In either case, the current philosophy is to use decision support methodologies based on models whose degree of aggregation depends on the scope of the specific level. The strategic level uses average values from the tactical and operational levels, while the tactical and operational decisions are based on the fixed set points dictated by the strategic level.

Obviously, uncertainties and interactions between projects can be described as the main factors affecting the accuracy of the decisions regarding project portfolio creation. All the decision support methodologies found in the literature are based on decomposition and model simplification assumptions, which are typically not validated.

5. RESEARCH

The study presented in this article is part of a larger survey conducted to analyze the possibilities of applying the concepts and methods of project portfolio management in Serbia. The survey was carried out towards the end of 2011 and during 2012 (Beric, 2013).

The investigated sample included representatives of the for-profit and nonprofit sectors, micro, small, medium and large organizations, employees and managers at various levels, men and women of different ages and experience, for which it is assumed that, in smaller or greater extent, applying the concept of project portfolio management in their operations, as well as a number of people who have international certificate in the field of project management

The questionnaire was divided into seven main parts that relate to the following:

I PART – Basic information (demographic data)

II PART – Elementary data on portfolio/project

III PART – Portfolio/Project management

IV PART – Challenges and problems in portfolio management

V PART– Project portfolio selection

VI PART – Benefits from the portfolio

VII PART –Portfolio/project success

After the literature research, the composition and implementation of the questionnaire survey and descriptive statistical analysis, measures for variables that will be presented in the model were selected.

The following groups of variables are defined:

TP – project type

VP – portfolio area

SCI – strategic objectives in the selection of projects

FAI – financial analysis in the selection

OP – operational planning

SP – strategic planning

OU – operational management

SU – strategic management

In this paper, only the small part of this research will be presented. That part is related to strategic and operational planning and management, and the idea was to question if it is necessary to use a comprehensive approach to optimizing the portfolio in which the dynamics of all the different decision-making levels are considered simultaneously (Zapata et.al, 2008). At the beginning of the research one of the hypotheses was that:

The current implementation of the method does not take into account the coordination and interdependencies that exist between strategic and operational components of the portfolio.

To examine the assumption the most important were the variables related to operational and strategic planning and management.

1. OP - Operational planning
 - OP1. The plan on how certain business benefits will be achieved and how the extent to which they are achieved will be measured is defined and coordinated.
 - OP2. Responsibilities as to ensuring and monitoring the achievement of expected business benefits are allocated and coordinated.
 - OP3. Mechanisms for monitoring and reporting on achievement (realization) of all business benefits are established.
 - OP4. Roles and responsibilities of project managers in individual projects within the portfolio are defined and coordinated.
 - OP5. Roles and responsibilities of the staff engaged in the projects within the portfolio are defined and coordinated.
2. SP – Strategic planning
 - SP1. There is a special project management unit in the organization.
 - SP2. Each project in the project management unit is selected by criteria defined in advance.
 - SP3. Connection between the portfolio and the rest of the organization is defined and coordinated.
 - SP4. Portfolio/project is planned in detail – connections and interrelations between the projects, programs and subprojects are determined, identified and coordinated.
 - SP5. The organization has made a categorization of the project to ensure a balanced project mix – short-term, long-term, strategic-operations, etc.
 - SP6. Rigorous assessment of portfolio financial value.
 - SP7. Coordination of project portfolio with organizational strategy.
 - SP8. Advanced managing of dependences between projects.
 - SP9. The organization has a list of current and significant projects proposed.
 - SP10. Projects are selected in each category separately.
 - SP11. The organization has a strategic plan or another document on medium-term or long-term development.
 - SP12. Business benefits expected from the portfolio are identified, defined and coordinated.
 - SP13. Relations between individual benefits (benefits from individual projects / activities) and costs of their achieving are defined and coordinated.
3. OMa– Operational management
 - OMa1. An established system for monitoring the progress of all projects or parts of the portfolio.
 - OMa2. Compliance of portfolio with the IT architecture.
 - OMa3. The impact of clients on the results of the portfolio.
 - OMa4. Top management is involved in the selection process.
 - OMa5. Centralized control of projects.
4. OMb – Operational management – challenges
 - OMb1. Lack of knowledge about the techniques of portfolio management.
 - OMb2. Frequent changes in the scope of projects.
 - OMb3. Lack of resources.
 - OMb4. Lack of a clear strategy for the company.
 - OMb5. Lack of a suitable method for measuring the benefits of projects and portfolios.
 - OMb6. Lack of communication between functions.

5. SMA – Strategic management
- OMb7. Lack of methods for portfolio is optimizing.
 - SMA1. Compliance of the portfolio with the organization's strategy.
 - SMA2. Analysis of the impact of new projects in the portfolio.
 - SMA3. Annual or more frequent prioritization of projects in the portfolio.
 - SMA4. Management of dependencies between projects.
 - SMA5. Management of overlapping and duplication of competences.
 - SMA6. Management of bottlenecks in project implementation.
 - SMA7. Management of competition for limited resources.
 - SMA8. Management of organizational capacities for adopting the changes at the portfolio level.
6. SMB – Strategic management – challenges
- SMB1. The problem of too many projects.
 - SMB2. Lack of coordination between projects.
 - SMB3. Lack of alignment of projects with the strategy.
 - SMB4. The problem of conflicting goals.

Reliability of the sample was tested through the Cronbach's Alpha test. The reliability assesses the internal consistency of the data, that is, how consistently respondents answered the questions. According to this test, the sample is reliable, if the value is higher than 0.7. The obtained values are shown in Table 1.

Table 1: Reliability statistics

	Cronbach's Alpha	N of items
Entire sample	0,958	91
Operational planning	0,885	5
Strategic planning	0,894	14
Operational management (divides into two groups) - OMa	0,755	5
Operational management (divides into two groups) - OMb	0,778	7
Strategic management (divides into two groups) - SMA	0,839	4
Strategic management (divides into two groups) - SMB	0,895	8

The group of variables obtained from the survey can be used for the selection and optimization of the portfolio, regardless of the type / field of projects. Depending on the needs and characteristics of organizations, some of the variables may be excluded from consideration. The variables within each group are issues that need to be asked and to be answered in the decision-making process in

the course of project selection. Depending on the purpose of the study, all the proposed variables can be presented as independent or latent and thus examine the variance and covariance of variables to test whether the variables possess a set of linear dependencies. The analysis of the interdependence of groups of variables related to the strategic and operational planning has been provided by

using Structural Equation Modeling. For testing this hypothesis the analysis of relations in the model was executed, and the obtained result shows that the covariance between

strategic and operational planning is 0.86. Model of correlation between certain groups of variables is shown in Figure 2.

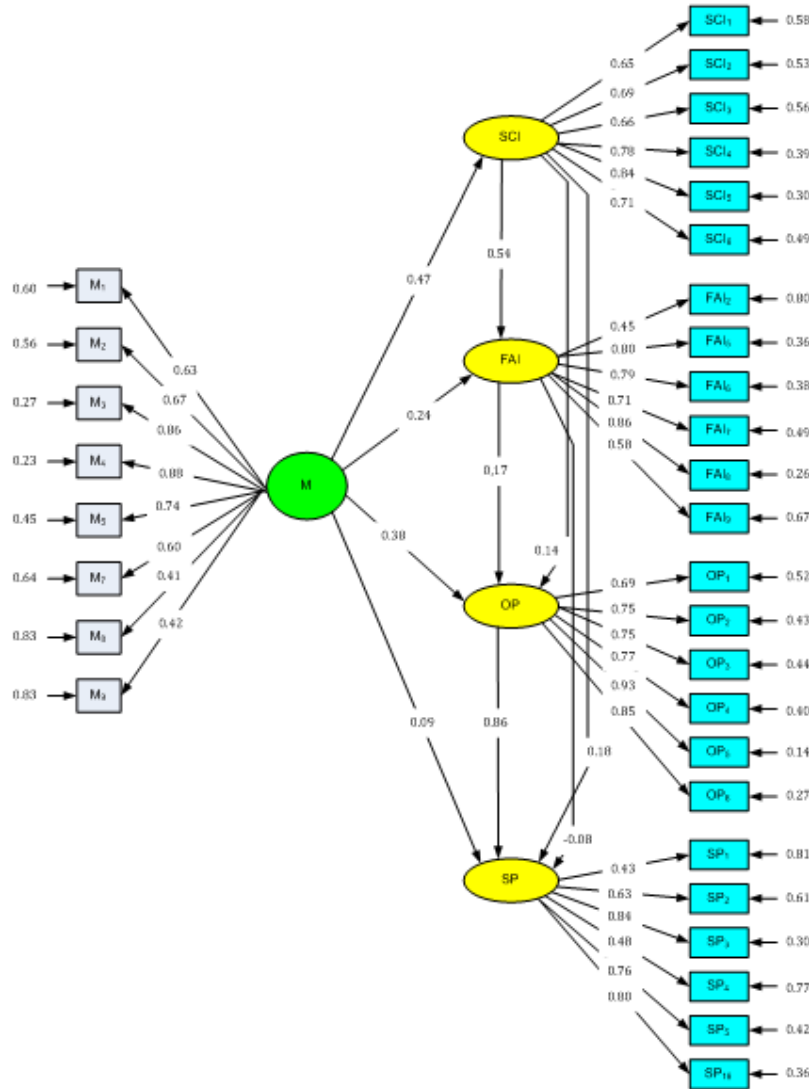


Figure 2: Structural Equation Model (Beric, 2013)

The high value of covariance indicates that the assumption made in the hypothesis is wrong and that this hypothesis can be refuted, in the analyzed domestic companies engaged in the practice of project management. Although this research shows that implementation of the method does take into account coordination and interdependencies that exist between strategic and operational components of the portfolio, it is important to emphasize that there are still a lot of

limitations regarding this matter. Some results obtained by descriptive statistics show that respondents see the lack of clear defined strategy (62%) and lack of the communication between operations in the company (66%) as the two of the biggest challenges in project portfolio management. It is clear that if either of these two aspects is not properly defined, we can call into question the quality of selected portfolio.

6. CONCLUSION

Project portfolio management has become a significant factor in the long-term strategic success of organizations. By implementing this concept, the organization responds to the needs and expectations of the strategy and establishes a delicate balance between strategic and operational requirements. Portfolio management and project selection are one of the three most important strategic issues managers are faced with.

In today's conditions of doing business, companies that wish to be competitive through the selection of most appropriate projects are forced to implement portfolio selection techniques and procedures based on the most critical project measures; however, these techniques cannot be implemented if decision makers do not understand them. The number of portfolio evaluation and selection techniques is by no means small; what is lacking, however, is a framework in which these techniques can be logically organized into a flexible process that supports the project portfolio selection process.

Organizations prefer projects that require minimum investments, a low level of competencies, projects that can be completed in a shortest possible time and have a potential for highest returns. In reality, ideal projects are difficult to find, so that the most acceptable project is selected by comparison with the existing, already proposed projects. Projects neither commence nor end in isolation; they are part of a complex system in which they are interrelated both with each other and with a business context. When a large number of projects are linked by a mutual goal or resource dependence, we talk of programs or project portfolios.

In the case of project portfolio management in Serbia, a rather small number of researchers and practitioners have so far paid attention to the problem of portfolio selection and optimization. Similarly, portfolio optimization methods and techniques are not formally included in the selection process to a sufficient extent.

The competitiveness of the company largely depends on successful and profitable projects.

An effective project management involves a plethora of effective decisions; the first and perhaps the most important is whether a certain project should be executed or not.

Regardless of the organization's field of business and specific goals projects may have, projects in a portfolio have to fulfill three project portfolio management goals: maximization of value, business balance and strategic harmonization. Before investing its capital into any project, the organization has to establish an appropriate strategy for project proposal assessment, by corporate goals as well as of other proposed projects.

To create a really effective project mix, the organization has to make a categorization of project to ensure a balanced project mix – short-term, long-term, strategic-operations, etc., and to analyse a wide range of factors that involve organizational goals and strategy; it has to establish a project monitoring mechanism, mechanisms for measuring the returns of individual projects, for continual harmonization with corporate goals, etc. Once the organization has established the goals and strategy of investment, it has to create an optimal group of projects or a mix to implement the strategy and enable the achievement of the defined goals.

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THEORETICAL PERSPECTIVE OF IT PROJECT MANAGEMENT APPROACHES, SUCCESS FACTORS AND MATURITY MODELS

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Abstract: This paper presents different approaches in IT projects analyzing value-based approach, performance-based approach, socio technological approach, project-based approach and knowledge based approach. Also, historical development and characteristics during the system development will be presented, emphasizing iterative system development and structured system development. According to history development, in the last decade maturity models has got increasing importance. IT industry has been perceived as a best suitable place for maturity model implementation, and therefore we will present two separate groups of maturity models - generic project management maturity models and IT maturity models.

Keywords: IT projects, approaches, success, maturity

1. INTRODUCTION

Information Technologies area is also developed parallel with the project management field. IT project management includes overseeing projects for software development, hardware installations, network upgrades, cloud computing and virtualization rollouts, business analytics and data management projects and implementing IT services. Richard Nolan emphasized three eras in the computer development: the era of electronic data processing (DP era), micro era and the era of networks. It is very important to look at all three previous measures, in order to gain knowledge about the project management approach in each of them. Information Technology (IT) projects represent organizational investments. When an organization decides to implement IT solutions, stakeholders consider the time, money, the resources which will be invested in the project, and for an adequate return on investment.

EDP era began in the early 60's of the last century and is characterized by the purchase of the first mini computers in organizations. IT projects during this era focused on automating various organizational transactions such as

general accounting, inventory management and production schedules. The manager of these technologies is often called the manager of data processing and reporting is often tolerated manager for finance and accounting. The aim of using technology was to improve efficiency and reduce costs automating many tasks. Since the requirements or business processes on IT projects were very little variable, changing them is not caused major problems. IT projects during this era were structured, and there is going to be used and access to the structuring of the project. In the early 80's IBM personal computers created a new era called micro era. However, transition and integration of centralized computer to a PC did not happen immediately and without conflict. Often excessive expansion of PC questioned the centralization of control managers of information systems. This is, often lead to independent systems in the organization, or towards ever greater demand. Security, integration and sharing of data, maintenance, training, support, emphasize the standards in this era as a one of the contentious issues that are most often discussed. The organization often had the IT resources that included a centralized computer and collection of decentralized computers for each individual user. In this

period controlling IT resources has been perceived as a strategic IT use in the organization. IT hasn't been perceived as a tool for automating transactions, but from the other hand IT has been perceived as a tool for acquiring knowledge. Computers were no longer under the direct control of the IT function, but were extended through the different levels in the organization. Project managers and teams could no longer rely on the stability of business processes, requirements, or the technology used to create project schedules. Shorter project horizons that are included in each functional area have become the norm, and a shorter life cycle has become one of the main features in software development.

Since 1985, the network of computers known as the Internet has led to an era of networks which begins in 1995. In this era IT projects are focused primarily on the creation of IT infrastructure to support the system created for partners, strategic alliances, suppliers and customers. Integration of data, audio, graphics and video enabled new way of delivery of products and services to customer. While the micro era focused on creating internal networks in the organization, in the network era that framework extends to the external environment, too. The network era faces challenges not only for coordination and control, but also to support dynamic business strategies and new organizational structures. For IT project managers in this period was necessary to understand technology and organization and its competitive environment. The benefits and risks in the management of IT projects since 1990 with advent of dot com systems have become much higher than in the previous two eras.

With new millennium IT gained increasing importance in the media and educational era. Electronic commerce, corporate resource management, customer relationship management are on the top list of IT projects for many organizations. The need for IT professionals are increasingly prominent, which says that today's universities can't educate enough skilled staff according to market requirements. A large number of authors suggest that we have entered a new era of

globalization. The project manager and project team members are involved in projects that are more dynamic, allocated geographically, ethnically and culturally diversified than before. The risk and rewards are now far more prominent than before. So you need a higher level of technical, behavioral knowledge and skills in project management to successfully manage projects in the new environment.

Decisions on financing and investing in IT projects are based on the values that completed projects will bring to the organization. In the second case it is not practical to spend money, time and energy. Often the question is related to the investment in information systems of company. Does successfully implement information system brings little value to the organization, and on the other hand if implementation of an information system brings value to the organization, but is poorly developed or poorly managed? In both situations it is adversely affecting the success of the project. Also decisions on investment in information systems is based on the budget that the organization create, competing reactions within the industry or area, the strategic plan of the organization, available resources, etc. Therefore, the decision on financing IT projects is often an important management decision that have a significant impact on organizational performance.

Information technology managers have long recognized the importance of project management in the system development. The study that was conducted in 186 project teams shows that the pre-project activities of the project influence on success of the project and on the functioning of the team. This is important for the organization because the work on the project begins before the project (Jiang, Klein & Discenza, 2002).

2. IT PROJECT MANAGEMENT APPROACHES

Value-based approach - IT Projects must provide value for organization. Many organizations define the success of the project in the context of the implementation of the

project on time and within budget. Although the cost and time factors are important, they are not sufficient conditions for the project to say that it was successful. Compliance information technology is defined as the degree to which the results of the information system projects consistent with the aims and values of the project, as shown in the strategy of development of information systems (Jenkin & Chan, 2009).

Performance-based approach involves two separate issues that need to be integrated: the allocation of projects to project managers and evaluation of performance where Xu & Yeh (2014) proposed a target-oriented process for awarding projects, project managers and the DEA method to evaluate performance. Sometimes for the success or failure of ICT projects is difficult to determine the factors that have led to. Barclay (2008) proposed the integration of existing system development model that contributed to the success of IT projects, the list of harmonized criteria (Balanced Scorecard) and the practice of project management, thereby creating a harmonized list of criteria of project performance. Park et al. point out " the effect of mothers " where as the main engine failure of the project referred to the concealment of bad information by project managers concerning issues on the project. "The effect of mothers' has become extremely important in today's environment of software development for two reasons:

- The software can develop faster and create in relation to the real extent of the time required to develop the software;
- Wrongly given responsibility, where the project manager doesn't want to admit a mistake and therefore doesn't provide information for external participants.

Socio technological approach - In the past, organizations have sought to increase the success of the project focusing on the tools, techniques and methodologies of IT development. This approach focuses only on technology. Socio-technological approach is based on the active involvement of users in the design of IT systems, so that the application of

technology brings value to the organization. This means to actively participate in achieving the objectives of the project. Communication, shared understanding of the problem, management support and evaluation of investments in IT investment is the key parameters when you synchronize IT projects, particularly at the operational level (Vermerris, Mocker, & van Heck, 2013).

The project-based approach - Application of principles and tools of project management should be part of the methodology in the management of organizational projects, among which are classified IT projects. Project success depends primarily on the team, but also of a set of processes and infrastructure. A common set of tools and control mechanisms provides a common understanding of the projects and the ability to compare each other in the organization. Also one of the suggestions CHAOS study emphasize better implementation of project management in the organization. Zimmermann et al. (2012) point out the framework for managing the portfolio of IT projects, as well as the importance of portfolio management in the context of the proper allocation of resources for software projects, while the limits that are set for IT projects are constantly changing in the negotiation process based on previous experiences in practice (Elbanna, 2010).

Knowledge based approach - Excellence in managing IT projects for the individual and the organization is based on experience and time. Knowledge management is the systematic process of collecting, creating, synthesizing, sharing and using information, knowledge and experience, in order to transform ideas into business value. Lessons learned representing a document which states the reasons of success and failure can be a valuable tool in reimplementing the project. For a person who has more experience say he/she is more mature. Also for an organization that learning based on experience, we can say that is more mature. Similarly, an organization that learns from experience can be on a higher level of process maturity if the lessons learned from creating best practices. Haapio & Eerola (2010) point out

that learning from experience with previous projects impact on the success and accuracy of the estimates of future projects. Successful creation of IT products and processes depends on the ability of management to integrate specialized knowledge in various stages of the project life cycle by integrating external access to knowledge and internal accumulated knowledge (Mitchell, 2006).

The need for different types of organizational culture is a determinant that affects the division of knowledge in the organization, especially in project-oriented organizations (Wiewióra, Trigunarsyah, Murphy, & Coffey, 2013). Analysis of the success of the project has a positive effect on knowledge acquisition and sharing of knowledge in accordance with the results of previous projects (Todorovic et al. 2015). Pemsel et al.(2014) differentiated knowledge management and organizational learning concept in project-oriented organizations. During the project, the development of information systems there is a positive relationship between knowledge sharing in the project and performance of the project team (J.-G. Park & Lee, 2014).

3. PROJECT LIFE CYCLE

The life cycle of a project is a set of logical phases of the project which shows the project from its beginning to the end in order to define, create and deliver a product, service or information system. Each phase should provide one or more results. The result is a tangible and verifiable work product (project plan, design specification, delivered system, etc.). Results also at the end of each stage provide measurable benefits on which basis defines the amount of work that needs to be done and the resources that will be used. On the other hand, the technical complexity has always been a factor affecting the performance of the project, which if not brought in connection with social factors affect the reduction in performance (Antoniadis et al, 2011). Although the life cycle depends on the industry and projects that are already implemented, following characteristics are similar for most projects:

- effort and energy - in the context of the level of costs and hiring of human resources, at least at the beginning of the project, then increases with the amount of work and at the end decline with the completion of implementation
- risk and uncertainty - the highest at the beginning of the project
- the impact of stakeholders on the scope and cost of the project - the highest impact at the beginning of the project. Changes in the scope of the project later require higher costs and increase the cost of the project.

Generic project life cycle includes the following phases:

1. Define the project objectives - Objectives should focus on providing value to the organization. Well defined objectives provide the project team a clear focus. Project objectives should respond to the question: How will we know whether the project was successful in the context of time, costs and resources that have been made?
2. Create a project plan - Project plan is formally approved document used for the implementation and control of the project in all phases of the project life cycle. Results, costs, resources for the completion of each activity must be defined.
3. The implementation of the project plan - Progress in the implementation of the project should be documented, in order to compare planned and actual values. Also, according to progress and performance project manager should inform interested parties.
4. Closing the project - Within this phase project manager ensures that the job is completed in accordance with the agreement between the team members and sponsors. So, there should be some kind of formal recognition by the sponsor in the context of the acceptance of the delivered product. This includes the presentation of the supplied solutions to the client.

5. Evaluation of the project - Sometimes the value of an IT project is not yet known when the manufactures, services or information system delivered. For example, electronic payment system is not only the construction of platforms, hardware and software installation. Revenues are achieved refer to the next period of time, and evaluation of the project is realized after the implementation of the system. Also the evaluation can be implemented in other ways, such as lessons learned and best practices. The project manager should evaluate the performance of each team member in order to give him feedback on the results, professionalism and ethical behavior.

4. THE LIFE CYCLE OF SYSTEM DEVELOPMENT

Although the projects follow the life cycle of the project, the development of new products, services or information systems follows the product life cycle. The life cycle of product development in IT is called the life cycle of systems development, and includes the following phases:

- ✓ Planning - The planning phase includes the identification and responses to problems and opportunities, as well as the processes and activities of project management and system development. Within this phase project manager sets the objectives, scope, budget, schedule, technology, processes, methods and tools.
- ✓ Analysis - in this phase are detailed study issues and opportunities. In this phase it is necessary to document the needs and requirements of users.
- ✓ Design - This phase includes network design, configuration of hardware, databases, user interface and applications.
- ✓ Implementation - This phase includes the construction of the system, testing and installation. In this phase it is necessary to provide training, support and documentation.

- ✓ Maintenance and support - Changes and corrections to the system occur frequently. When the system once created, within it can appear also some disadvantages that were not contained in the original specification. In these situations it is necessary to provide support to end users of the system. Changes to the system are often accompanied by organizational changes.

5. SYSTEM DEVELOPMENT APPROACHES

There are numerous ways of implementing the system development cycle. The chosen method and approach depends on the complexity of the project, as well as from the experiences and skills of the project team. The appropriate method defines not only the software processes and the necessary tools, but also the critical factors for the development of the project plan in the context of defining phases, results, activities, resources that will be used to assess the budget and the time of realization of the project. Today IT projects follow one of two approaches: structured development approach or iterative development approach.

5.1. Structured system development

Structured system development appeared between 1960 and 1970. Better known as the waterfall model, which was developed as a simple model that follows the life cycle of systems development in a sequential and structured way. The key idea is based on cascading actions from one to the next stage, where the next stage begins when the previous completed Waterfall model of software development stands out through a series of sequential activities, with links to the end of the beginning. For example, design information system can start after the requirements specification fully defined. Cause and effect, create can begin only after the completed activity design. According to (Boehm, 1996) standard key events within the waterfall model include complete system requirements, software requirements, preliminary design, detailed

design, coding, software acceptance tests, acceptance tests of the system are the main flaws in software development..

Although there are some stages where developers can take a step back, it's not easy and desirable. One characteristic of the waterfall model is to spend a lot of time at the beginning of the stage of requirements specification and design, because they spend a lot of time, money and energy to correct the error in the later stages of the project. One of the advantages of the waterfall model is that planning of each stage at the operational level (detailed planning) gives a summary as a result of the time and cost of each phase of the simple sum of all activities within the same. The structured approach is useful for application in the design of large systems, where the requirements defined in the early stages of the project do not change greatly in the later stages.

5.2. Iterative development system

Iterative development of the system focuses on the shorter life cycle of the system and it is based on the idea that all the requirements are difficult to define and that it will be changed during system development. Criticism of structured approach refers to the dimension of time of realization of the system and the variability of the system requirements. Inexperienced programmers are sometimes mistaken regarding user requirements, where they find that users know what they want with clear and complete requirements. However, we don't know what they want in the earliest stages of the project. So for years proposed iterative schemes for the development of information systems. Markus(2004) indicates the iterative incremental approach in the implementation of IT projects, where at each stage of the project life cycle of new IT functionality monitored and related organizational changes, such as the redesign of business processes, new performance metrics and training.

Rapid application development - RAD suggested by James Martin in 1990. RAD is trying to compress the analysis, design, creation and testing a series of shorter iterations. Active

development is much more notable in relation to the activity planning. This approach is good for use when developing software is "user driven". RAD consists of the following stages: planning, user involvement in the design specifications, construction of the products, and transition phase. Ahonen et al. (2015) point out that there is a positive relationship between effort which should be invested in the project, team size and project size, while on the other hand does not consider and do not understand the internal dynamics of suppliers.

Creating a prototype - Similar RAD prototyping is an iterative approach to developing systems where users and developers work together in designing and creating systems. Often it can be used for modeling the entire system. The phases of this model are: the identification of basic requirements, the development of the initial prototypes, revision, improvement of the prototype.

Spiral development - was first proposed by Barry Boehm in 1988. By applying this approach, the project is divided into several mini-projects which are awarded to specific risks for each of them. The basic idea is based on the development of the system through the smaller pieces so they can be identified risks. When risks are identified development team creates a plan and evaluate potential alternatives. The results of each iteration are identify and verify before moving to the next phase.

Agile system development - Agile methods have become increasingly popular in developing systems and include various methodologies such as Scrum, Dynamic System Development Method (DSDM), and methods of adaptive software development (ASD). One of the most popular agile methodology is Extreme Programming (XP) which was created by Kent Beck in 1996. For XP methods system was transferred to users in the series version. Each edition can be developed using several iterations within a few weeks or a month. Each edition is part of the system and includes one or more functions of the system specifications. XP involves a number of activities where the user

requirements documented as user stories. After that is used model object orientation and develops a set of acceptance tests for each user story. XP often involves a team programming, where two programmers are working on the same part of the system. This in many situations leads to overtime work of programmers. Collaboration with stakeholders is a key point in the application of agile system for managing IT projects, where collaborative patterns have the following implications: tracking progress of team collaboration, better teamwork orientation in decision-making, improving infrastructure in collaborative teams that are geographically diversified, and improved system for design solutions (Inayat & Salim, 2014).

6. GENERIC PROJECT MANAGEMENT MATURITY MODELS

Since when is the Software Engineering Institute launched the first model of maturity Capability Maturity Model (CMM) there are more than twenty years, and published hundreds of maturity models proposed by various researchers around the world. Later this model is replaced with Capability Maturity Model Integration (CMMI) model. The existence of CMMI modes led to the development of other models. According APMG International, the use of a maturity model allows an organization to have its methods and processes assessed according to management best practice, against a clear set of external benchmarks. Maturity is

indicated by the award of a particular "Maturity Level". Although there are published hundreds of models of maturity, many of them remained without implementation, with the primary aim of the researchers created a new approach, but from an organizational point of view angle sufficiently useful tools to improve performance. CMM model occupies an important place on the basis of whom were later created different models in other industries. Figure 1 shows generic maturity models in project management.

7. IT MATURITY MODELS

Maturity level assesment experts primarily choose already-tested models, using case studies and comparing them with their situation in the organization as a method for validation (Wendler, 2012). Similarly in IT industry if there are discrepancies and gaps in knowledge regarding software development leads to the inadequate implementation of the model for assessing the maturity (Shang & Lin, 2009). According to the report, the global IT Governance Institute from 2011 lists the following issues: increasing IT costs, lack of IT skills, problems with the implementation of new IT systems , problems with external suppliers of IT services, serious operational problems, return on IT investment is expected, IT security and data protection. Figure 2 shows IT maturity models.

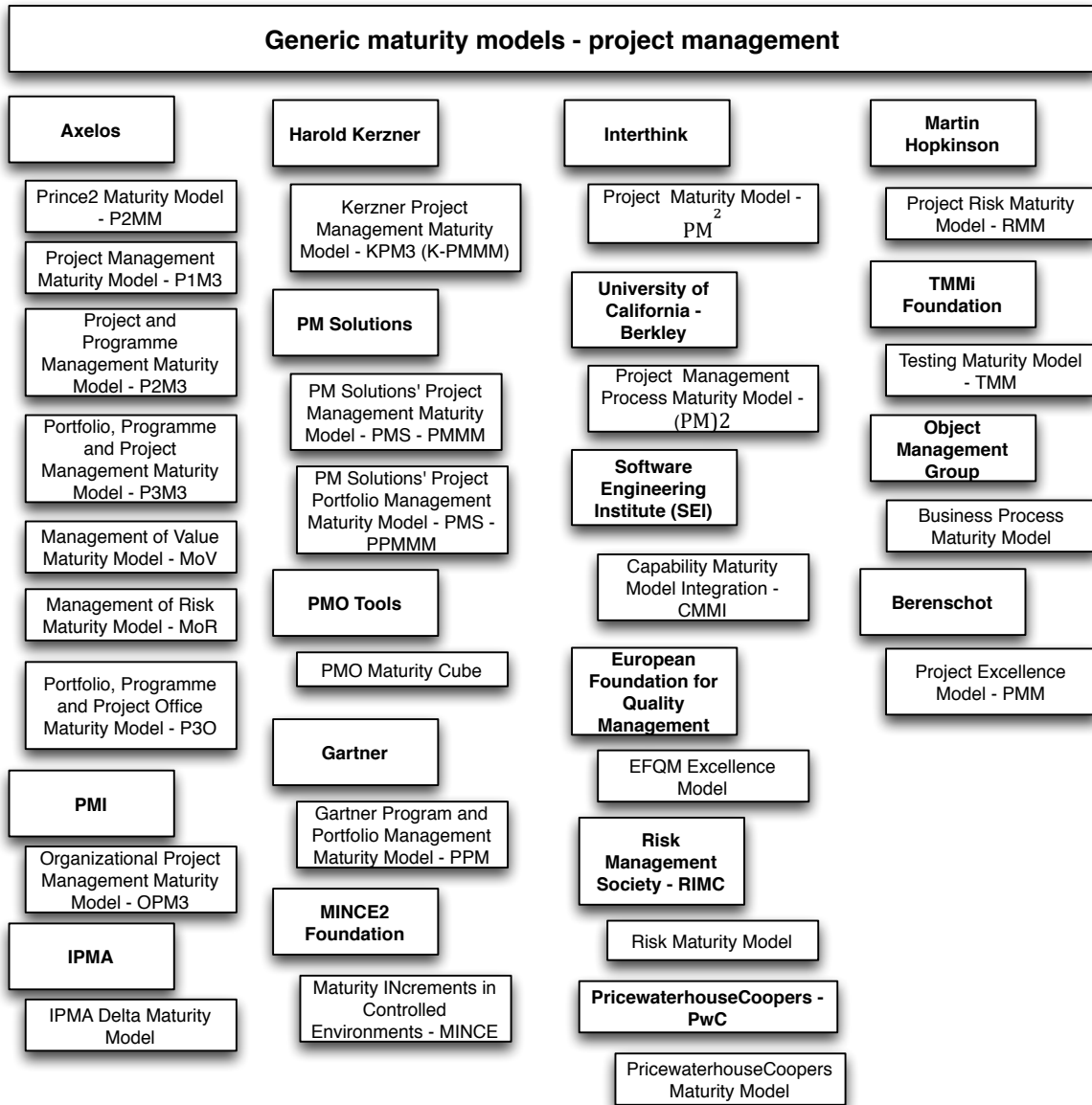


Figure 1: Generic maturity models in project management

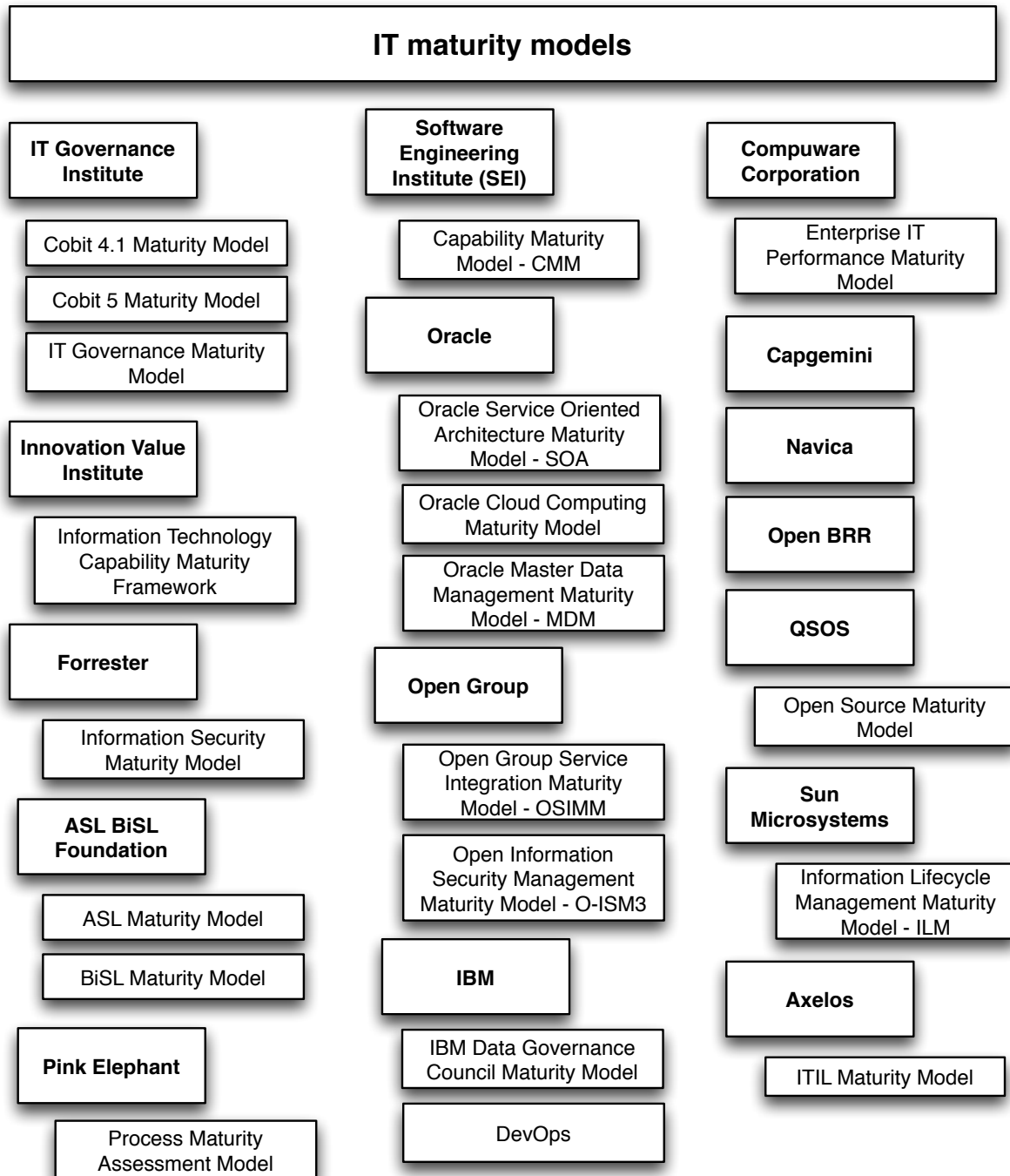


Figure 2: IT maturity models in project management

8. THE SUCCESS FACTORS OF IT PROJECTS

Although IT job became more realistic, faster and less expensive, costs, complexity and risks of managing IT projects continue to pose challenges for many organizations. Although IT projects since the era of electronic data processing faced with many challenges, research conducted by the Standish Group 365 IT managers in 1994 drew attention to the so-called "software crisis". This study is called CHAOS, where the results of the research showed that only 16% of application development projects were successfully implemented in the context of time and budget. Above all, 31% of projects were canceled before completion, while 53% of the projects exceeded the budget, time, and original specifications (Standish Group, 1994).

CHAOS study in 1994 became the most cited, although the Standish Group every two years created new CHAOS reports. The key is that the 1994 version was free, while later versions need to be paid. The latest research from the Standish Group in 2008 shows that the success of IT projects has increased to 32%. Chaos studies also reported the key factors of success of projects. In larger companies, only 9% of the projects done on time and within the budget (The Standish Group, 2013). Although completed in time many of them did not meet the requirements of the original specification. While Standish Group analysis of projects and the costs, time and functionality, reliability evaluation unit is brought into consideration. Therefore, Eveleens & Verhoef (2010) point out that individuals who commit time and cost estimates can't be in the initial stages of the project to determine the exact measures that will be used later to compare success. Also, if you take into consideration the project "New York City Automated Payroll System" which has exceeded the time and costs could be classified as ineffective by CHAOS analysis of successful projects (The Standish Group International, 2013). However, considering the size and complexity of the project gets the opposite conclusion.

On the other hand CHAOS study doesn't consider all the research success or failure as CHAOS research. CHAOS research indicates that the project is successful if it is implemented on time, within budget, and if you include all the planned functionality and plug-ins. For example, Robert Glass (2005) asks the following question - How projects can be classified as unsuccessful although the "functionally brilliant" even they exceeded the budget and costs by 10%? From the perspective of CHAOS research this project would be a failure, while in reality very successful for the organization. However, even though they exceeded the budget and time, these projects have brought great value to the organization.

CHAOS manifesto 2010 identifies the following factors for the success of projects:

- Involving users - users are the most important stakeholders, so that they should be involved in making key decisions regarding business operations and processes. If the organization more closely cooperate with customers there are greater chances for a better understanding of business opportunities and limitations.
- Management support - Management support is important in the context of acquiring and maintaining financial support for the project. Visible support from senior management is important from the emotional point of view during support and negotiation in resolving organizational conflicts.
- Clear business objectives - Project stakeholders must focus on the core values of the project. This includes consideration of the broader picture of how individual project support business and organizational strategies.
- Emotional maturity - Projects are planned organizational changes. Emotional maturity is focused on the ability and competence to understand and manage emotions and activities of the various project stakeholders.
- Optimization - An information system should include functions that are

essential to end users, while adding a higher level of functionality of the system (adding unnecessary functions) can jeopardize the value to bring to the organization.

- Agile Processes - These processes help users and developers to support teamwork, collaboration and inclusion of user needs in all phases of the development of IT systems and products.
- Expertise in project management - Project managers must be professionals in the context of project management and organizational environment. On the other hand the organization must recognize and give support to project managers who are expert.
- Trained workers - To be a successful project manager must manage and control the power of the labor force in a timely manner. This includes the ability to develop skills among employees but also to replace a key member of the project team for the results that are needed to achieve this.
- Implementation - Development of the real plan requires leadership skills in addition to knowledge in the field of project management in order to achieve the intended results.
- Tools and Infrastructure - This segment includes the use of the right tool for the job, but also possess the knowledge and skills for the tool. Tools such as Microsoft Project are useful for planning, management and communication regarding the progress of the project, but it alone will not make a project successful. Tools and infrastructure must support the processes in project management.

Application of parametric techniques (use of formal models), bottom-up techniques (estimation of cost, time, and other segments of the individual activities) and expert advice contributes to the success of the project, while the use of analog techniques (based on experience from previous projects) did not prove advantageous for project managers with

experience, as opposed to project managers with less experience (Henry McCray, Purvis, & Roberts, 2007). Karlsen, et al. (2005) list five most important success criteria for IT projects:

- IT system works as expected and solve problems
- IT system meets the needs of users
- The IT system has a high degree of reality
- The proposed solution contributes to a higher level of efficiency and improved competitive strength
- IT system ensures the realization of strategic, tactical and operational objectives

9. CONCLUSION

The methodology for managing IT projects provide strategic planning level for the management and control of IT projects. The methodology recommends phases, results, processes, tools, and knowledge areas to support IT projects. Waterfall model is a sequential process design software solution, which consists of eight stages: conception, initiation, analysis, design, construction, testing, implementation and maintenance. Since this process is sequential, when one step is completed, the developers can't return to the previous step. In this approach the outcome of the project and the comprehensive plan must be placed at the beginning, followed by the careful implementation. Unlike such sequential process designed, agile methodology follows an incremental approach. Application and development of agile framework for managing IT projects based on the values that are provided, iteratively, and continuous improvement phase, selection of best practices, adaptation, evaluation, and retrospective adjustment. Agile software development is a set of techniques that is based on iterative development system. IT project should create value for each interested party, and therefore organizations implement maturity models, specific or generic, to assess processes, documentation, management approach, metrics and competencies. In this paper we summarize 48 maturity models into two segments - generic

and specific (IT oriented). Future research directions will focus on maturity segments and cluster analysis according to IT industry and specific characteristics of IT projects.

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PROJECT MANAGEMENT IN PHARMACEUTICALS: THE CASE OF LAUNCHING INNOVATIVE MEDICINE IN OPHTHALMIC DRUGS MARKET IN SERBIA

Bojana Bogićević

Abstract: Project management is a discipline that can be applied to all industries. In the pharmaceutical industry, major changes in recent years have significantly impacted the way in which a pharmaceutical company brings a product to market. Objectives of the pharmaceutical companies are set at a high level in the modern treatment of patients. The goal of a successful therapy implies the improvement of the quality of patients' lives, and, in addition to a more efficient and effective therapy, this implicates a more comfortable use of the therapy by the patient. When launching a new drug onto a market, aside from pharmaceutical companies, other market participants play a significant role by dictating the pace and imposing their own needs that could be met by the introduction of the new drug. The topic of this paper is the project management of launching a new drug onto the market of the Republic of Serbia, as well as defining the specifics when introducing a new drug. A case study of launching an innovative ophthalmic drug is presented, with the recommendations for a more efficient implementation of the goals. There is a list of implemented activities in launching a new drug and the sequences of their execution. Whole projects last almost two years in total. Also given is the overview of employed actions, problems encountered and the manner in which they were overcome.

Keywords: project management, launching of a new drug, pharmaceutical market participants, promotion

1. INTRODUCTION

Today's market environment has become unpredictable, chaotic, global and interactive. Doing business in the 21st century is a challenge for companies since it questions the creativity, innovation, and the ability to acquire and update skills. The concept of a learning organization which takes care of its employees is becoming ever more popular, because they, more specifically their knowledge, experiences and skills, are the main asset of the modern companies. Reputation and human capital are becoming more valuable. The company will achieve ideal results if it combines these two types of capital with the held physical and working capital. The joint action of all the capital elements will lead to a better and more productive work of the companies.

Environmental changes are permanent and cannot be affected, but should be seen as business opportunities or opportunities that

could be exploited. Most companies realized the necessity of marketing in such harsh business environment, where competition is strong and very ambitious. The success of the company largely depends on the development level of the marketing feature.

Although it seems more tempting to react tactical, momentarily in certain situations, this may be in conflict with the general strategy and objectives of the company, and could reflect badly on the business of the company in the future. Therefore, if observed in the long term, the acceptance of a strategic approach to business is a necessity that the modern business imposes on us. Under strategic marketing, we imply continuous adjustment of the company to a changing environment, where the environment has a permanent impact on the company, but the company has a certain impact on the environment as well (Jovanovic, 2007).

Project management is a discipline that can be applied to all industries, regardless of the product or service they are designed to deliver (Cabanis-Brewin, 2014). In the pharmaceutical industry, project management is the key to addressing the unique regulatory, compliance and quality related needs of the industry. Organizations cannot operate without strategies, provided that there is not one universal strategy that would suit all companies, but each must find the best way to take advantage of its situation, the resources at its disposal and the opportunities that should not be missed (Campbell, 2005). Any serious company that has the desire to subsist, grow and develop in the modern business environment, and that maintains a developed organizational culture and climate, must have a defined vision and mission, which will direct both management and other employees to move and think towards reaching the company's goals.

2. VISION AND MISSION OF THE COMPANIES TODAY

Vision can be defined as the guiding star that determines the direction in which a company should act. Essentially, it is the idea of a future state, which should be reached. It includes aspirations, values and the philosophy of the company. It is an inspirational statement that defines the direction in which the company wants to develop, and to which it aspires. It needs to be simple, understandable to all, exciting, realistic, but also challenging. It should not contain empty phrases, buzzwords, and superlatives such as "top quality", "best company", "extra services", etc. Companies should not alter their vision due to the variability of environmental conditions. The vision should endure all situations in which the company might be.

The company's mission should define the reason for the existence and the rules under which the company behaves and acts. It indicates the method in which the vision will be achieved. The mission is an important part of the strategic plan and the basis for defining the goals and decision making. It must be realistic, i. e. by with the resource capacities, and it must match the nature of the organizations' business. The mission must be

inspiring, unique regarding image recognition, and simple in the sense that goals and tasks can be easily defined from it.

Today's missions respect the concept of stakeholders' management. Namely, in a statement, the company obligates to respond to the needs of customers, suppliers, employees and other stakeholders. Formulating marketing objectives are preceded by an analysis of the internal and external environment. The goals should be defined hierarchically, from the most important to the least important. Coordination of all levels of management is necessary, to align the objectives of business functions with the strategic goals of the company. The objectives of a certain business unit must be consistent with the objectives of other business units, and together they should contribute to the achievement of strategic organizational objectives. From the standpoint of strategic marketing management, the established long-term strategic objectives are the basic criteria for rational business decisions when choosing alternative courses of action, as well as the control standards of efficiency and effectiveness of operations (Jovanovic, 2007).

As for the mission of marketing, it articulates towards what the employees in marketing will strive in the future, their pair course of action through determining the tasks they wish to engage in, and what will differentiate them from the competition (Kerzner, 2009). Mission defines the business ratio of an organization:

1. The target groups of customers the company will serve
2. Needs of customers, the company will meet
3. Alternative actions that will be taken in order to meet the needs

When defining the mission, we should consider the areas in which the company stands out. One should pay attention to what consumers buy, and not what the company sells. A clear program of the mission should include groups of customers/consumers who need to be satisfied, the specific needs of consumers, and the technology that needs to be used. Marketing managers, executives of

individual departments and other employees in the marketing sector are involved in defining a marketing mission.

The functioning of pharmaceutical companies can be observed through three significant factors such as the role of the doctor as a prescriber, the end user or a patient, and organizations such as the Republic Health Insurance Fund, which fully or partially covers the cost of the drug. The pharmaceutical market is affected by a set of external factors that cannot be influenced by the company, at least not in the short term or directly. These factors are the social and cultural environment, legal and political

environment, economic, technological as well as demographic and the natural environment.

The consumer or the patient is the central figure in the sphere of marketing, and his decisions on the use of pharmaceutical products are not independent. This refers to the fact that the Republic Health Insurance Fund decides on the list of drugs whose costs will be partially or fully covered, while a doctor, or a prescriber, recommends a medicine for a specific diagnosis to the patient. All three stakeholders are affected by external factors in the process of gathering information and making decisions. Figure 1 demonstrates the elements that wield influence.

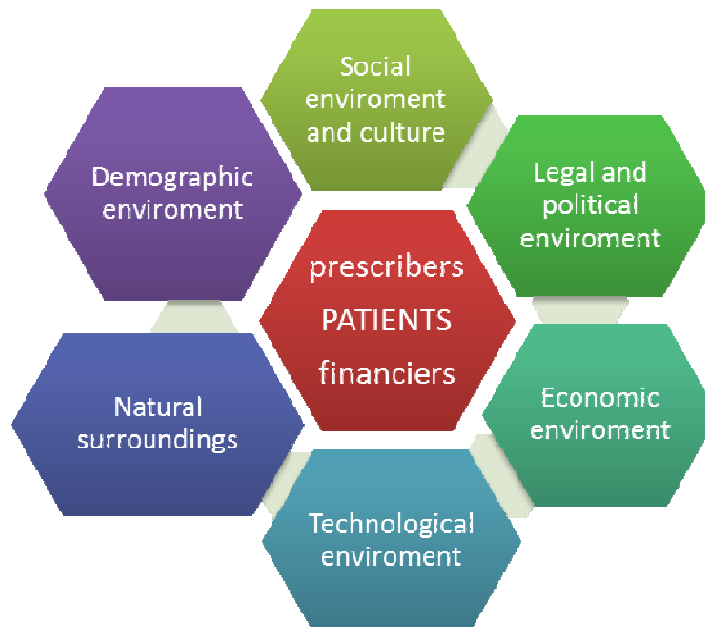


Figure 1: The environment in the pharmaceutical marketing (Campbell, 2005)

3. SEGMENTATION OF PARTICIPANTS IN THE PHARMACEUTICAL MARKET

The pharmaceutical industry has a duty to understand the consumer in his role as a patient, his motivation, and the decision-making process. The most important participants in the pharmaceutical market are prescribers, patients, and funders. Considering that the drug market does not operate like all other markets due to its specificity and the purpose of its products, the target market for the pharmaceutical companies are prescribers and funders of health care, and not the consumer or the patient himself. A prescriber

is a doctor who has the legal right to prescribe a medication to the patient by writing a prescription, with the difference made depending on whether it is a doctor at the primary, secondary or tertiary level of health care. The doctors at the primary level are general practitioners, who usually respect the decision of a specialist with a secondary or tertiary level who has recommended a specific medication to a patient that is indicated for the treatment of a certain disease. In particular, only a general practitioner may write a prescription for the recommended treatment if he or she agrees with the recommendation from the higher level doctor, with which the

patient goes to the pharmacy and receives the medicine. So, for pharmaceutical companies, prescribers can be primary, secondary and tertiary level doctors. In a broader sense, a prescriber can be a pharmacist or anyone in the patient's environment to whom the patient trusts and considers that his advice can help solving his medical problem, especially with medicines available for unrestricted sale (Chen, 2011).

Funders of health care dictate the availability of medicines since they reimburse a part or the overall cost of pharmaceutical products. The motives that lead funders and prescribers mostly affect the demand for a product in the pharmaceutical market.

In Republic of Serbia a number of laws and regulations define the functioning of the health care system, as well as the production, distribution and trade of pharmaceutical products, where the most important instance for the operating of the pharmaceutical market is the Law on Medicines and Medical Devices of the Republic of Serbia from 2004, and a number of regulations for the pricing of medicines also has an indirect impact. This Act also established the Agency for Medicines and Medical Devices (ALIMS) as the main institution that regulates the trade of drugs in the territory of the Republic of Serbia (ALIMS, 2014). The pharmaceutical companies developed, we could say, a dual regulation that includes legislative measures and self-regulation at the level of the industry and individual companies. It is not rare that the regulations at the level of industry and various non-governmental organizations are more rigorous than the legislation itself. Consequently, the pharmaceutical products certainly have the status of controlled substances.

A particularly significant area that drug manufacturers emphasize is patients' compliance with the prescribed therapy. Strict adherence to therapy (Patient Compliance), the so-called compliance, has two key segments: compliance with the prescribed treatment regimen (e.g. three times a day) and compliance with the prescribed period (long enough). The compliance with the prescribed therapy affects the success of the treatment, and, for the pharmaceutical companies it has

an economic effect. Non-compliance with the treatment regarding reducing the frequency of drug intake or shortening the duration of the therapy leads to a theoretical reduction of the market for a particular drug. The reasons for patient's non-compliance with the therapy are numerous and can be: of a financial nature, i.e. the price of the drug is a financial burden for the patient; the drug did not bring the expected improvement according to the subjective expectations of the patient; the adverse reactions that result in patient's resentment towards taking the drug, and of course forgetting to take the prescribed therapy.

Due to non-compliance with the treatment, the effect of the drug is also missing, while on the other hand, from a marketing aspect of pharmaceutical companies, a significant market potential is likewise lost. For this reason, many pharmaceutical companies conduct numerous educational programs and measures in order to raise patients' awareness about the importance of a disciplined and compliant application of the prescribed therapy. With most prescription drugs, 50% to 60% of patients comply with the prescribed therapy, while with some drugs, this percentage falls to as much as 10% to 20% of patients (Antonanzas, 2011). Based on these data we can conclude that the pharmaceutical companies may increase the usage of their medicines by drawing attention to the compliance, in addition to new indications for the use of drugs, or the battle with competitive drugs of the same group.

3.1. The patient and patient motivation

When considering the motivation of patients for the use of a certain therapy, the biological, social and personal motives must be taken into account. Biological motives refer to the process of reducing pain and the need for physiological activity as well as engaging organism functions. Social motives are based on psychological needs, and to achieve them, a social interaction is needed. Personal motives are the result of the complex personality of each and they depend on his beliefs, habits, inclinations, interests, etc.

In the future, pharmaceutical companies must take into account an increasingly active role

of patients which results from the following facts:

- Nowadays, patients have complete information on the illnesses as a result of changes of priorities in medicine from ex-post reaction - diagnosis and therapy, to ex ante action – prevention
- Patients now have a complete information on the therapies and the drugs that are available to them from some sources
- The patients are now forced to bear a growing financial burden, i.e. to participate in therapy costs

The role of the patient in the formation of demand for a pharmaceutical product can be observed through several phases (Campbell, 2005):

1. IDENTIFICATION OF CONDITIONS REQUIRING TREATMENT. The patient notices a health problem and seeks help.
2. DIAGNOSIS. As accurately as possible, the patient explains the problem he or she has, to gain a correct diagnosis.
3. THE CHOICE OF THERAPY. To the extent possible, depending on the type of the pharmaceutical product, the patient can influence the choice of the drug based on the experience.
4. ACTUALIZATION OF THE PRESCRIPTION. The patient who was sent to home treatment acquires the medicine based on the prescription through a pharmaceutical institution.
5. COMPLIANCE WITH THE THERAPY. It represents the personal responsibility of the patient towards the therapy, complying with the dosage regimen and the duration of therapy advised by a doctor.

The consumer, i.e. the patient or the user of health services is an integral part of the health care market and, as such, along with the market, society and opportunities, he evolves into a person who wants to be involved in the elections in healthcare market and pharmaceutical products. Although the aim of the innovative pharmaceutical companies is to contribute to the discovery of new medicines

for curing many diseases, and improve therapy through investing in research and development, their research must also be focused on improving the quality of the patient's life (Chen, 2011). Moreover, they must take into account the needs, expectations, and desires of the patient, as well as the increasing of the comfort while using a particular therapy, and all of that in some realistic financial framework that does not put too much burden on the patient.

3.2. Prescribers

Although, traditionally, doctors have been the focus of pharmaceutical companies for many years, when it comes to marketing and sales, new conditions in the pharmaceutical market also include new participants. It is expected that in the future, although at some levels it has already happened, doctors prescribers will lose their exclusive status of the "target" of the marketing activities, but that does not mean their importance for the pharmaceutical industry will be diminished.

Customers in the market of pharmaceutical products can be divided into prescribers and non-prescribers. The prescribers are those who initiate drug therapy and perform the selection of the drug according to the indication of the drug that would best help the patient with a certain disease, which means they have the right to prescribe a medication or issue a prescription. Regarding drugs being prescribed, the focus of the pharmaceutical industry is precisely on the intermediaries and not the final consumer, where he is much more important for OTC (Over the Counter) products. In this regard, the dominant expenditure of pharmaceutical companies in the promotion of prescription drugs is the so-called personal selling. Sales representatives of pharmaceutical products have two key tasks: to influence the prescribing habits of doctors and, in the process, to collect data and carry out market research (Antonanzas, 2011).

During prescribers' segmentation besides their specialization or clinical area, other relevant criteria are being taken into account, such as (Tasic, 2002):

- Preferences in prescribing
- Frequencies of medical prescription
- The amount of prescribed medication

- Age
- Type of practice
- Locations
- Accessibility
- Attitudes
- Willingness to adopt new methods and new therapeutic options
- Status of a thought leader (or reputation in professional circles)

In recent years, the pharmaceutical industry began reducing the number of sales representatives to rationalize the correlation between sales and costs. From the moment the sales representatives first emerged to this day, the relation between doctors prescribers and sales representatives has changed significantly. An intensive frequency of sales representatives' visits has led prescribers to have less time and desire to listen to a sales representative. However, representatives of the pharmaceutical companies may be seen more as medical representatives, because they have an educational role for the prescribers. Pharmaceutical companies and medical representatives take on the informal task of educating prescribers on new possibilities in therapy. Doctors guided by their aim to individualize therapy according to the patient's needs and provide the best possible treatment for each patient, expect from the producers to offer the drug with certain characteristics that will solve their existing problem. Medical advisor informs them on the mechanism of action of the drug, route of administration and dosage, possible adverse reactions, indications and contraindications. Based on all available information, the doctor makes the decision on the selection of a pharmaceutical product (Tasić, 2002).

However, big pharmaceutical companies see the cooperation with doctors as a partnership, because of the fact that they make certain efforts to ease their daily work, or to improve their daily practice. One example is the investment of a pharmaceutical giant in information technology, i.e. in the designing of a specialized internet site for information exchange and communication between doctors prescribers. Moreover, in the territory of the Republic of Serbia, there are no patients' registries for numerous diseases, which is of great importance for monitoring certain groups of patients. This is also one of

the aspects of doctors' cooperation with the pharmaceutical companies since the pharmaceutical companies offer software support for such type of projects. In this way the professional relationship between doctors prescribers and pharmaceutical companies builds up, since doctors do not observe the pharmaceutical companies as marketers who merely monitor the sale of their medicines, but also as partners in the improvement of therapy and treatment of their patients, and as a support through the facilitation and improvement of the daily practice.

3.2.1. Promotion

Promotion presents a variety of activities undertaken by a company to communicate or transfer the qualities of their products to certain customers. Promotion activities include advertising, sales promotion, personal selling, public relations, economic publicity, direct marketing, i.e. all the communicational and operational activities with the aim to: inform, present and promote the sale.

Establishment of good communication is based on the fact that the sender's way of coding and recipient's method of decoding the message match. To accomplish this, the message should contain the words and symbols the recipient is familiar with.

Companies need to find the appropriate way to communicate with end users since the mere possession of an excellent product with a reasonable price is not enough to maintain that product on the market. Therefore, the communication should be constant and well designed and not random or left to chance because there may be noise, i.e. interference in communication that may affect the sales and product life. Having well-trained distributors who are friendly, direct, attentive and helpful becomes an important part of the promotion since the manner of communication has become increasingly significant to the companies.

It is of great importance which is giving the information on the pharmaceutical products. Using a doctor or a pharmacist as a credible source seems more convincing. Since end-users, i.e. consumers, mostly have trust in doctors and pharmacists, pharmaceutical

companies are using their credibility to recommend certain products. When taking this approach to promoting, one should take care that the way of presenting appears objective and honest. Otherwise, it will have an adverse effect, the loss of doctor's or pharmacist's and company's credibility.

In addition, to doctors and pharmacists, celebrities who will promote the company and the brand can be used for advertising purposes. One pharmaceutical company used the famous actor Bata Živojinović for the promotion of their prostate product, and thus, with him and through his great credibility, directly influenced a specific group of users.

When advertising their OTC products, some pharmaceutical companies use standard ads that are identical in all markets in which they operate. Using standard ads reduces the costs of the company and influences global recognition as well as the image of the company and the product. Standardized advertising can be successful in markets that have similar purchasing power, cultural connections, customers' habits, competition, regulations, products that are in the same life stages when the ideas used in commercials are universal (symbols, fashion, lifestyle, ...). In fact, this type of advertising can be successful in markets with homogenized target groups that have the same needs and buy for the same reasons.

Through the promotion, the company strives to communicate with the target market groups, i.e. with the potential buyers, so that the promotional message itself must be adapted to them.

The objectives of the communication, i.e. the company's use of promotion, are:

- inform, teach, direct and/or stimulate an appropriate and timely response of specific markets or market segments
- help create the image of the company and its products and services
- indicate the characteristics of existing products
- help maintain the popularity of existing products, especially in the stage of product's life cycle decline, as well as the retention of the market

share of the company, or the creation of secondary demand

- introduce the market to new products and create primary demand
- stimulate the activity of the distribution channels
- contribute to a faster closing of the sales transactions and provision of the sold services to customers
- place their products in a favorable position against the competition
- have a direct impact on company's sales and profit growth
- help create customer loyalty and achieve a direct contact with the target audience essential for the success of the overall marketing program.

The goal of the promotion is to help the company inform the consumers, i. e. the target users, more fully, clearly and accurately about the values offered by the company and its products in comparison with the competition, and what makes it different from the others. Although it has a decisive role in achieving the appropriate level of market presentation and brand awareness, promotion alone cannot make a product successful.

3.3.Funders

Funders are a specific and diverse group of organizations and institutions that directly or indirectly influence the events and demand in the Pharmaceutical Market. The term funders in the first place refers to providers of health care, the government funds for health insurance, which fully or partially cover the costs of medicines and medical devices.

The role of a funder in the creation of the demand for pharmaceutical products (Campbell, 2005):

- In the identification of a problem that requires treatment and diagnosis. Sponsoring prevention programs and follow-ups, to allow an early and accurate diagnosis, thus affecting the preservation of the health of the insured, and avoiding the high costs that may arise if the disease progresses.

- The impact on the choice of therapy. Funders can set the rules for prescribing certain types of drugs. These include rules for advocating prescription drugs that are on the List of Medicines of the health insurance. Health Insurance Fund may fully cover the costs of treatment with a certain drug for a particular indication while for a different indication the patient must participate in the costs. Also, there are certain rules for the sequence of treatment prescription, meaning that in order to receive a particular drug, the patient must first undergo a treatment with a drug approved by the guidelines of the fund as the first-line therapy, and then transfer to drugs from the second or third-line therapy of certain diseases.
- The realization of a prescription. If the participation in the cost of a drug is high, the fund thus discourages the patient to buy the prescription drug and often the patient transfers to a more affordable drug, which may not be the best solution to a problem or a disease that the patient has.
- Patient compliance with therapy. Funders sponsor educational programs on the importance of the regular use of treatment and prevention of the disease progression. Also, they collaborate with the doctors, medical staff and pharmacists to implement educational programs.

Three key goals of the health system are quality, costs and availability. Funders direct their activities by these goals. During the last decade, especially the last few years, the funders are obliged to control the rising costs and rationalization costs in accordance with the budgets, which logically affect the quality and availability of health care. This has influenced the increase in the percentage of generic drugs, which are generally less expensive than the innovative drugs.

The main way in which funders affect the demand of pharmaceutical products, particularly prescription drugs, is through the

so-called positive list. In the Republic of Serbia drugs dispensed through a prescription may be in A or A1 list. Drugs from the A list are drugs which costs are fully covered by the Republic Health Insurance Fund, while the patients participate in a certain percentage of the cost of the drugs from the A1 list. The criteria for putting medicinal product on the positive list are different, and taken into account are usually: clinical effects and safety of the drug, approved indications, dosage and method of use, the administration of the drug, the impact on the overall health care costs and the impact on the quality of life, the cost of drugs, the reliability of the supplier, the attitude of the doctor towards the drug (expert opinion) but also the attitude of the patients towards a drug (demand)(ALIMS, 2014).

Although the goal of the health system is to rationalize costs, this rationalization can only go up to a certain level. Cost control has its own objective limiting the degree of customer satisfaction, who, if there is an alternative, may request another source of health insurance or the result of inadequate health care can lead to a poor health condition of the population, which can be measured by the lost working hours, decrease of the productivity and the like. What can be drawn as a conclusion is that the pharmacological therapy is the most rational one, because, with the deterioration of the health conditions, the interventions become more complex and, therefore, more expensive for the health system?

4. THE PROJECT OF LAUNCHING A NEW DRUG

4.1. Introduction of project

Glaucoma is a group of eye diseases which is in most cases associated with the increased ocular pressure (also known as increased intraocular pressure, or IOP). There are different types of glaucoma. Primary open-angle glaucoma is the most common form of glaucoma. Glaucoma is one of the major causes of blindness in the world. Today, 60.5 million people suffer from glaucoma, and it is predicted that this number will reach 79.6 million by the year 2020 (Meet glaucoma, 2014).

Possible serious outcomes of glaucoma can be prevented by early detection and control of the disease. However, this condition has not yet been diagnosed sufficiently and is associated with poor compliance with the treatment plan. Also, when patients are diagnosed with glaucoma, many do not comply with their treatment plan (Antonanzas, 2011). In one study, at least two-thirds of patients with primary open-angle glaucoma and increased intraocular pressure stopped taking the prescribed medication within a year.

4.2. Analysis and rating of the company&market

For these reasons, the pharmaceutical company *B-pharma* introducing the SL drug to the Serbian market, the last generation drug used in the treatment of glaucoma. According to the summary of product characteristics the features of this drug are that it significantly lowers intraocular pressure, provides long-term efficiency, reduces the progression of the glaucoma consequences, does not contain a preservative that implies an enhanced tolerance to the therapy, and thus ensures a better quality of life for patients.

4.2.1. Drug registration

Before it is launched onto the market and in the pharmacies, the drug must be registered by the Agency for Medicines and Medical Devices of Serbia (ALIMS) (Tasic, 2002). In order to obtain a marketing authorization, a representative office of a foreign company submits a request with the complete documentation enclosing administrative, pharmaceutical, chemical and biological, pharmacological and toxicological as well as clinical data that are required by the Law on medicines and medical devices, together with the proof of payment formulated by the ALIMS regulation (ALIMS, 2014).

4.2.2. Available resources

This is a multinational company that has over 20 000 employees in the world, and about 80 employees in Serbia. The plan of the company for the launch of a new drug onto the market is that four expert associates and a manager who will lead the team visit the targeted group of doctors. Behind this team the entire logistic support of teams will stand, managing

communication with distributors, the team for the registration and regulation of the drug.

4.2.3. Financial status

A large number of new drugs appeared in the anti-glaucoma market this year. Three major multinational companies have offered new drugs for the treatment of glaucoma. When it comes to the SL drug, it is on the list of medicines of the Republic Health Insurance Fund with the patient's participation of 35%. Other new drugs that doctors can prescribe for the treatment of glaucoma also have a certain participation sum, with two well-positioned drugs for those patients only pay a 50RSD fee monthly. Given the current financial situation in the country, in their choice of therapy doctors are often led by the ability of the patient to afford the treatment or not, and often opt for the cheapest option.

4.3. SWOT Analysis

Strengths:

- excellent results of the SL drug treatment based on studies and experiences from countries where already introduced
- long-term presence of the company B-Pharm in ophthalmology, which gives the new drug a certain credibility and confidence with ophthalmologists in the new drug
- the drug is being introduced in the market by a multinational company with large budgets invested in the launch of a new drug
- the only drug in the glaucoma market without preservatives
- a different drug with a new mechanism of action.

Weaknesses:

- financial participation of the patient in the purchase of the drug as opposed to the therapy that is fully covered by the Fund
- the inability of donating the drug to institutions because they are not sufficiently equipped for storing the drug.

Opportunities:

- the offer of a new drug with excellent results in the early stages of glaucoma

- existing contacts with ophthalmologists thanks to the years of cooperation
- an increasing number of patients who, due to long term application of the therapy, experience discomfort while using their existing standard therapy
- creating a registry of glaucoma patients.

Threats:

- doctors' habits of the old therapeutic options
- the appearance of new drugs in the treatment of glaucoma in the same period
- drugs that eye doctors use in therapy are perceived as sufficient enough
- reluctance to move forward with the introduction of new therapeutic options.

4.4. Implementation plan

The introduction of a new drug included some activities. The project of launching new drug lasts almost two years in total. The list included all the activities and their duration:

1. Development of the idea 40 days
2. Analysis of the idea 30 days
3. Realization of the idea 30 days
4. Writing the findings four days
5. Registration of the drug 60 days
6. Getting the registration certificate one day
7. Market research 20 days

8. Market analysis 20 days
9. Development of a feasibility study 22 days
10. Analysis of the feasibility study findings seven days
11. Writing a business plan 20 days
12. The completion of a business plan one day
13. Planning 15 days
14. Selection of the distributors 15 days
15. Obtaining import licenses 20 days
16. Import of the drug 20 days
17. Waiting and obtaining Medicine Agency certificate 15 days
18. Creating and writing a marketing plan 30 days
19. Getting the approved promotional material from ALIMs 30 days
20. Preparation of promotional material 20 days
21. Planning the cash-flow 20 days
22. Everything is ready for the start of the sale one day
23. Professional lectures 60 days
24. Promotional activities 180 days
25. Rank 240 days
26. Monitoring 520 days
27. Corrective actions 520 days

Figure 2. shows the schedule of activities –a Gantt chart for the activities abovementioned and the sequence of their execution.

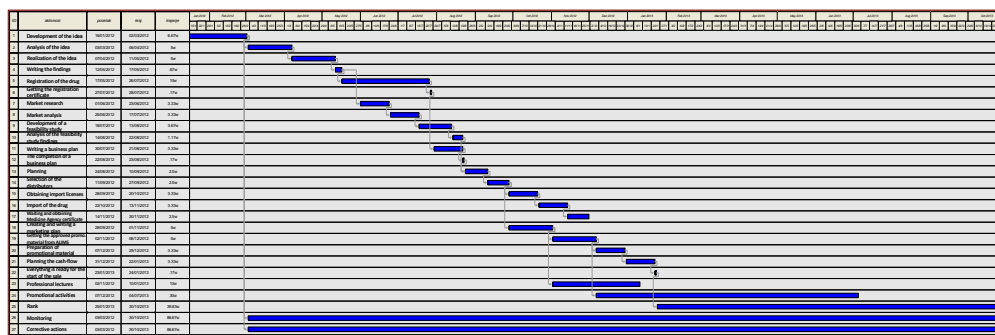


Figure 2: Timetable of the activities – Gantt chart

4.5. Financial plan

It is estimated that there are over 100,000 glaucoma patients in Serbia. Before the introduction of the new drug, pilot studies concerning the possible profits were made. In euros, the market is at 300.000eur on a

monthly basis. It is estimated that a large number of glaucoma patients have not been diagnosed yet, therefore it is logical to expect an increase in the number of patients. The number of patients who use the SL drug is large because it includes:

- newfound patients
- patients who were on another anti-glaucoma therapy that did not have satisfactory results
- all patients who might benefit from the drug without preservatives.

Expectations of the company for the first year when the active promotion of the drug started, are as follows:

- 1,000 patients, if the SL drug is used as the first-line therapy, with new found patients
- 2,000 patients, if the SL drug is introduced as a complementary therapy, or replaces an existing therapy.

A trend of the market is to grow 4% annually. That is not a surprise since each year the number of glaucoma patients increases. This is a result of a greater number of preventive examinations, which have increased due to numerous actions and campaigns for glaucoma and familiarizing patients with this problem and treatment options.

What was very important in positioning and initial promotion of the SL drug is that doctors did not see it as a drug intended solely for patients who have allergy problems, since it is the only drug in the treatment of glaucoma without preservative. As previously mentioned, the presence of the preservative in the formulation of eye drops can lead to a discomfort in the eye in the form of redness, itching, allergies. It is essential that the doctors perceive the new drug as an effective solution for the treatment of glaucoma, which is used by the patients regularly, precisely because they do not present the therapy due to the tingling or itching; and a more regular use of therapy leads to better results in it.

Company's expectations for the first 12 months from the start of the promotion is the market share of 1% in value. When it comes to the number of patients, 3000 patients will use the SL drug one year after the promotion.

Overall costs of a new drug launching would include: the costs of registration of the new drug; the costs of education of assistants who need to undergo the necessary trainings, such as medical and pharmaceutical trainings; the costs of regular visits by expert associates to

doctors; professional public presentation of the drug in the form of meetings where the main speakers would be foreign doctors and professors who already have a clinical experience with the drug and want to share it with glaucoma otologists and ophthalmologists from our country; support of conferences and meetings where the information on the drug would be presented, and experiences on the SL drug exchanged.

The goal of the *B-Pharm* company is to preserve and improve the health of people. All actions must be measured by the success in achieving these goals. Above all, the company is at service to anyone to whom the proper use of this company's drugs and services can be useful. *B-Pharma* company has been present on the Serbian market for 15 years and has established its name in other therapeutic fields as a true partner when it comes to adoption of better and more effective treatment options for patients, especially in therapies for chronic diseases, such as glaucoma. The process of introducing a new drug and placing it at the right therapeutic position will be at all times be under the control of the SL Ltd. management team of the company itself, and the manager in charge of that drug. The Ministry of Health of the Republic of Serbia is paying attention increasingly to the long-term effect of the drug and the patient's quality of life. There is a possibility that the drug will be included in the positive list of the Republic Health Insurance Fund under more favorable conditions for patients, which would certainly make SL drug more easily available to a larger population of patient (Legal Acts, 2010).

5. CONCLUSION

Project management is a discipline that can be applied to all industries, regardless of the product or service they are designed to deliver. Beyond its basic application across various industries, project management has tremendous value when effectively implemented to significantly increase the success of the product or service being delivered. Specifically in the pharmaceutical industry, there has never been a tougher time to be involved in drug development. In recent years, the market has become much more competitive, and the political, regulatory,

social and economic pressures have become much more intense. Also, each year, at least, one drug company experiences a recall of one of their drugs, lawsuits from their customers or lawsuits from their competitors. Management concept of launching a new drug onto a market is very complex and characterized by many specificities that do not occur, or less frequently occur in other industries. While following the introduction of a new drug on the market of ophthalmic products, in addition to the actions that were planned and gave good results, certain omissions and tasks that could have been done a better manner have been noticed. According to the experience from previous work, the list of the most critical events and the situations would be as follows:

- The chaotic environment that causes constant distractions and interruptions in work
- Deviation from the financial plan (rate and volume of investments)
- The lack of setting a clear priority in projects
- Lack of communication between teams
- Breaching the deadlines by the institutions responsible for certain issues.

This list leads us into the conclusion that meticulous planning, setting priorities in the work and organization are extremely important and can be of critical importance for the success of the project. In the process of a new product development it is necessary to pay attention to the waste of resources such as time, money and people in the realization of the job. This needs to be noted since in practice too many resources can be easily consumed and thus question the profitability of the business. Experience from practice suggests that precise record keeping and constant monitoring of resource consumption, as well as the comparison with the plan for the sake of control, along with the implementation of remedial measures for the correction of the deviations, is the greatest

model. In other words, market developments may differ from those envisaged by the plan, and that should be expected and prepared for, since even the best planning cannot predict the extremely variable market movements. Therefore, it is necessary to have an insight into those movements and adapt performance to the situation and the moment.

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PROBLEMS AND OBSTACLES FACED BY SERBIAN STARTUPS

Nina Đoković

Abstract: This paper presents basic characteristics of StartUps with a special emphasis on the challenges, problems, and obstacles they face. Also, results of official and relevant Serbian institutions are outlined. Considering the fact that these companies, as well as other small and medium enterprises, can be a significant driver of the revitalization of the Serbian economy, the Government of the Republic of Serbia introduced some strategies relevant to this sector, which are presented in this paper. Furthermore, this paper presents the results of a survey carried out in February 2015, which describes the main obstacles and challenges that are faced by Serbian StartUps. Finally, this paper illustrates the positioning of the Republic of Serbia in comparison to other European and world countries by various indexes.

Key words: Obstacles, problems, Republic of Serbia, research, StartUps, strategy.

1. INTRODUCTION

Today, StartUps are gaining popularity in Serbia equally among the younger and the older generation. The reasons for embarking upon this risky venture are many, including, among others: loss of job, desire to be “your own boss”, spotting a business opportunity, improving one’s social status, etc. (National Agency for Regional Development, 2013) In the 21st century, a century marked by changes occurring at lightning speed, extremely advanced technologies, innovations and accessible technology, it has become easier to create revolutionary products that may even change the lives of many. However, directly as a result of such accessibility, the competition has become huge, and the battle harder to fight.

There are many myths about how teams which have a good idea can make large sums of money “overnight”, that an idea itself, without being developed, can attract large investors, that people who gather around the same idea are willing to devote most of their time to the StartUp and that their motivation will sustain itself on its own, as well as many others.

The reality is, unfortunately, different and as Griffitt(2014) states, it’s a fact that 9 to 10 teams in the Silicon Valley fail. All teams,

however well-fitting they may be, knowledge equipped and motivated, come across many obstacles on their way to realizing their goals and it is not rare that these obstacles are so grave that overcoming them is impossible.

One of the biggest obstacles presents is financing, which is very limited in those early stages. This is why the Government of Serbia offers numerous strategies for providing support and incentive for entrepreneurship, an extremely important part of the overall economy. Aside from this, many individuals and private funds are interested in investing in promising business ventures, thereby presenting an important component of the StartUp community.

Due to the significance of these companies, a research was conducted to investigate the main obstacles faced by Serbian StartUps. It is the first such research that was conducted in Serbia on a sample of 74 StartUps. Taken as a parameter of origin was the nationality of the founder and not the place of registration of the company. The goal of the research was to obtain information on the difficulties entrepreneurs are facing so that new/young entrepreneurs would know what is it that they should pay attention to when they decide to embark on the risky and exciting world of StartUps.

2. STARTUPS

A StartUp could be defined as the first stage of an enterprise which can grow and develop rapidly, which is mainly financed with own funds and is intent on securing larger investments to ensure the company's rapid scaling, i.e. growth and development. Aside from this, there is a risk factor in consideration of the unknown demand and usually the first appearance on the market, as well as the pair solution presented by entrepreneurs given the fact that, in most cases, the final product differs from the initial idea.(Blank, 2010; Investopedia, 2007; Robehmed, 2013; WebFinance Inc., 2007)Often several teams work on the same idea while the team that succeeds is not necessarily the one who came up with the idea. Constant product improvement, which is directed by customers, is a requirement for a StartUp if it wants to survive on the market. Solving problems is the quintessence and core of StartUps.

The present-day Successful StartUps go through 6 pre-defined stages: ideation, conception, commitment, validation, scaling, establishment. In the first two stages, the emphasis is on establishing a fit between the idea and team members, in the third and the fourth stage making the product/service – market fit, and in the last two between the business model and the market. (StartUp Commons, 2014)

The product development model is suitable for companies launching a new product on an already established, clearly defined market, where the basis of competitiveness is clear, and the customers are known. The center of attention of this model is the product. On the other hand, the customer development model is suitable for companies launching a new product on a new market, competing with low prices or targeting a specific niche. In the focus of this model are customers and their needs, and the way to a perfect product involves numerous tests, feedbacks, and adjustments.

The product development model is linear and has clearly defined steps to be followed by the entrepreneurs. It has four stages: concept, product development, Alpha/Beta testing and

entering the market. The customer development model is iterative and also consists of four stages: identifying customer identification, customer validation, customer creation and building the company. To be successful, a StartUp must simultaneously carry out activities from both these two models.(Blank, 2007)

3. FINANCING STARTUPS

Financing is a significant factor determining the survival and growth of StartUps. StartUps are usually faced with limited access to pair sources of financing on the money market and capital market, particularly about the terms and prices of their utilization. In the early stages of development, most StartUps rely on their own resources for funding. In later stages of a StartUp's life cycle, the need for capital exceeds internal resources of the founders and this is when using external financing sources should be considered to obtain funds for needed investments and business development. (Ruiz, 2009)

Concerning the founding capital, StartUps have at their disposal four sources of funding: own funds, funds from family and friends, funds originating from informal investors – affluent individuals who are known as business angels, and funds originating from formal investors – venture capital funds or corporations.

Another option is borrowed funds that include private loans, different types of bank loans, as well as issue of securities of the debt instrument. Available to StartUps are also support national programs (domestic and foreign, as well as new forms of financing based on a share of ownership connected with mechanisms of a developed financial market, such as Venture Capital Firms, Business Angels, Private Equity Funds, IPOs, etc.). The issue of shares appears as a form of drawing additional capital in later stages of development and life cycle, when StartUps change their legal form, transforming from limited liability companies (LLC) to joint-stock companies (JSC). (Eric, 2012)

From 2001, the World Bank has helped finance 39 projects in Serbia, in the total value of almost 2,000,000,000.00 USD, including a

budget aid. Serbia joined the EBRD (European Bank for Reconstruction and Development) on January 19, 2001, and by 2012 EBRD invested in Serbia over 3,000,000,000.00 EUR. In the period between 2008 and 2011 EIB (European Investment Bank) concluded 13 loan agreements for small and medium-sized enterprises in Serbia, totaling 700,000,000.00 EUR.

4. PROBLEMS FACED BY STARTUPS

The problems StartUps face have been the subject of various research and according to a research conducted by CB Insights based on an analysis of 101 failed StartUps, teams most frequently cited as the reason for closing

down no market need (as high as 42%). It turned out that a great number of teams create products and services for which the customers are really not interested in and, as a result, are not willing to pay money for. In spite of having advanced technology, good advisors, great team members, StartUps fail because their technology or business models do not solve a problem of customers, at least not in a scalable way. Other cited reasons for failure were running out of cash (29%), not having the right team (23%), getting outcompeted (19%), bad pricing issues (18%), poor product (17%), wrong business model (17%), poor marketing (14%), ignoring customers (14%), bad timing (13%), etc. (CB Insights, 2014)

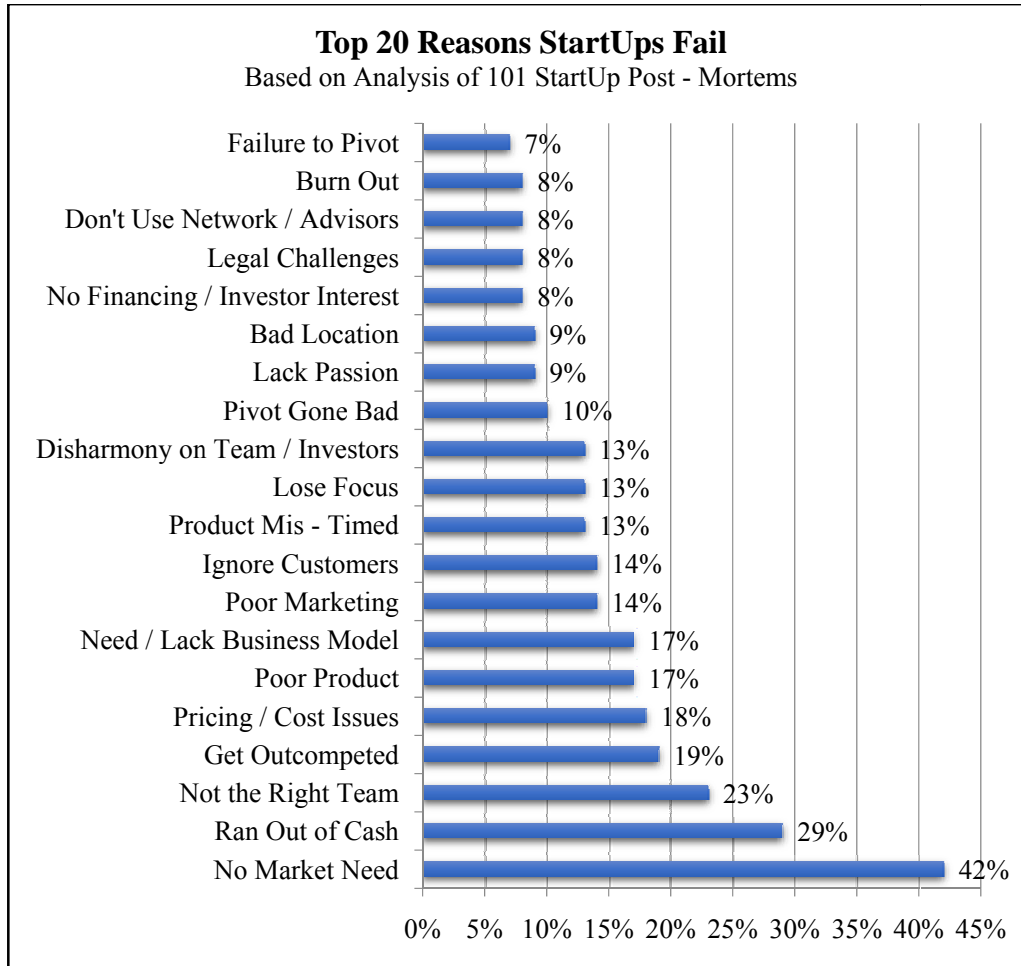


Figure 1: Top 20 Reasons StartUps Fail (CB Insights, 2014)

It is not rare that StartUps fail after they receive substantial investments. According to CB Insights “The R.I.P. Report – Startup Death Trends”, most often StartUps die 20

months after their last funding, and even after receiving 1,300,000.00 USD from investors. (CB Insights, 2014)

According to data of the U.S. Bureau of Labor Statistics, only 62.4% of companies survive to age three, less than a half survive to age five, and only a third manage to survive to age 11. (Bureau of Labor Statistics, 2014) According to a 2015 research, the largest number of companies that survive to age four are from the insurance and finance industry (58%), as well as real estate (58%). Immediately following is health and education (56%), agriculture (56%), services (55%), wholesale (51%). (Center of enterprise development, Bradley University and the University of Tennessee, 2015) As can be noted, companies from the technology industry are not on this list, and we can presume that less than 37% of these companies survive longer than three years. As the main cause of failure, this study cites incompetence (46%), unbalanced experience or lack of managerial experience (30%), lack of the experience in line of goods or services (11%), neglect, fraud, disaster (1%).

4.1. Market – product fit

It is often the case that market-product fit is a critical factor of StartUps' success. According to David Feinleib, companies targeting big markets usually beat out companies targeting small ones. Failure comes from the following:

- entrepreneurs not confronting statistical data relating to the relevant field of business;
- holding on to the wrong study, i.e. wrong conclusions for too long;
- targeting small markets;
- spending too much time to reach even the market... (Feinleib, 2012)

4.2. Product

The most important success factor of today's StartUps are certainly products and services with which they want to enter the market and solve some of the problems of their customers. In the 21st century, a product is no longer dependent solely on marketing and sales, and, as a result, more attention must be paid to it. Simple and easy-to-use products are most valued today. On the other hand, entrepreneurs are failing to make the right kind of products which are needed on the market because they lack vision, focus, and

consumers who would provide adequate feedback. Sometimes, entrepreneurs even lack the necessary knowledge required to create the kind of product they want. (Feinleib, 2012) Also, at a time when new applications and web sites appear every day, if not every hour, it is very important to be certain that customers need them, i.e. are willing to pay for such new products. (Fagundes, 2013)

4.3. Leaders

The absence of true leaders is also a frequent problem that teams face, in other words, the absence of someone to take them where they want to go. Teams that are good executors, but a lack clear vision, quite often achieve only short-term success.

4.4. Marketing and Sales

Investing in marketing and sales too early can also prove to be fatal for entrepreneurs and can jeopardize all their efforts invested in getting an investment/grant. However, on the other hand, no investment in marketing in a period when there is serious traction with the market can have equally catastrophic effects. Unfortunately, determining when is the right time to invest in advertising and promotion remains a true art of doing business because there are no criteria or formulas that could pinpoint the right moment.

4.5. Communication

Very often, a serious problem teams need to tackle is communication, within the team, as well as communication between the team and other stakeholders. Entrepreneurs tend to have a problem with communicating their vision, their story, their ideas, inefficiently voicing their expectations, poor handling of meetings and, generally speaking, the wrong manner of expression which can lead to confusion and misunderstanding. (Feinleib, 2012)

4.6. Financing and Investments

One of the key features of StartUps is the constant "hunger" for additional resources. As was mentioned previously, teams can spend large amounts of funds at the wrong time and achieve small results with such funds. (Feinleib, 2012) Also, a frequent occurrence is

that entrepreneurs are not proficient at managing finances and, as a result, lose substantial resources. Other problems arise with the fact that investors are sometimes not interested in investing in the early stages of a company's operations or that StartUps are not considered suitable for loan approval, and are, therefore, not in a position to secure funds required for further development, or sometimes their very survival. (Fagundes, 2013)

4.7. Changes

We live in an era when changes happen at lightning speed, which is particularly true of technology. According to Andrew Van Noy, CEO of Warp 9 (e-commerce platform), if a

company is not flexible enough, or is not quick enough in realizing an idea, someone else will grab the chance and beat them to it. (Fallon, 2014)

On the other hand, the issue of change can be viewed from the point of view of customers, i.e. their unwillingness to accept change. According to the Network Readiness Index (NRI) Serbia is ranked 80th out of 148 countries included in this index, which presents a step up compared to 2013 when it ranked 97th out of 144 countries. If we compare this to countries in the region, this is not encouraging given the fact that Serbia is placed last in the region. Presented in the following chart are values of indicators that have led to this result.

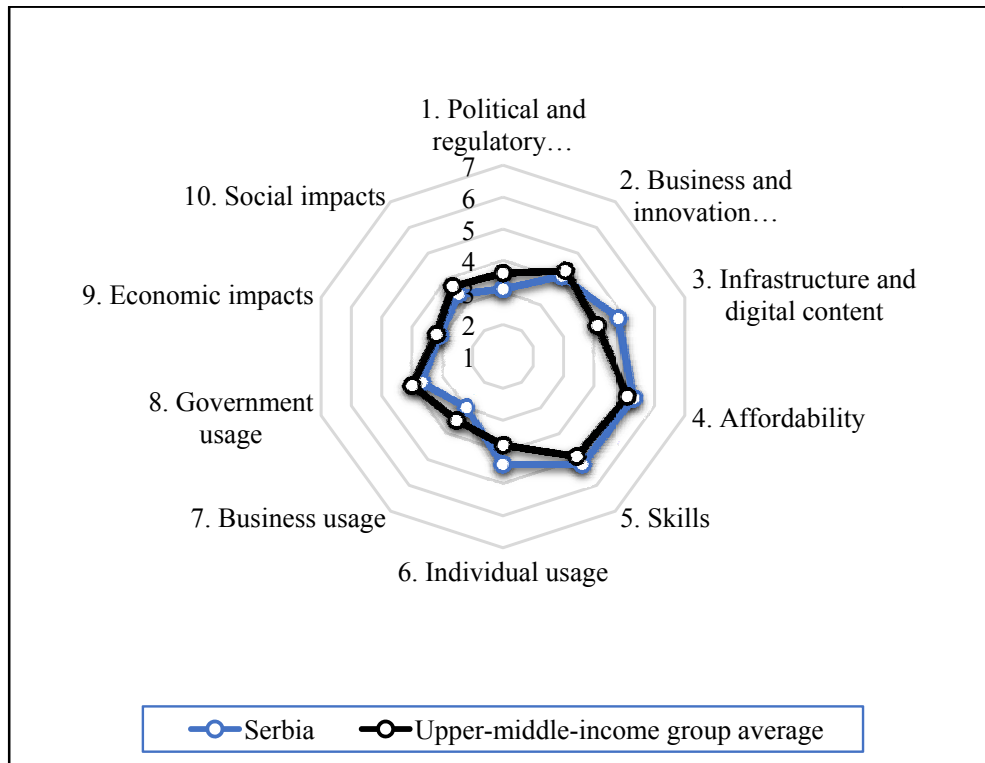


Figure 2: NRI Indicators (World Economic Forum and INSEAD, 2014)

4.8. People and Hiring

Quite often one hears at investment forums that “investors invest in people, not in ideas.” However, it is precisely this segment of an enterprise that is a source of hardship, namely having a team that is not good at handling a new situation. It isn't rare to have a situation

where individual team members have never worked with other members of the team before and are distrustful of their skills and ideas, so they insist on their own ideas. Team leaders then have to spend valuable time facilitating communication, instead of devoting themselves to other issues. (Zwilling, 2011) StartUps also find

themselves in a very difficult position when hiring new people. The problems here are manifold:

- First of all, StartUps generally are not in a position to offer high salaries and alluring bonuses to their potential employees and so, they need to attract qualified personnel with the values of the company;
- As a result of a limited budget, it is not possible to earmark funds for the employment process;
- The fact that a StartUp is not an established brand, in other words, not a well-known company, can also be an aggravating factor when hiring. (Healy, 2014)

4.9. Legislation

The legislation is often a crucial factor in the process of registration of a company. Therefore, founders of StartUps often decide to register their companies abroad. Unfortunately, Serbia is not viewed positively as far as its legislation and regulations are concerned:

- If taking into consideration the efficiency of regulatory bodies, Serbia is ranked 98th with a score of 3.2/7 among 148 countries;
- Serbia is ranked even worse on laws regulating IT technologies, ranking 103rd;
- We have an even worse situation when looking at judicial independence, with Serbia scoring 2.6/7 and ranking 124th along with Bulgaria, Gabon, Nicaragua, Mozambique and Mali;
- To make matters even worse, when considering efficiency of resolving legal disputes, Serbia occupies the infamous 137th place;
- We have a similar situation when taking into consideration how difficult it is for private enterprises to dispute government decisions and regulations through the legal system. 136th place and a score of 2.5 show that private entrepreneurs are by no means in an easy situation. (World Economic Forum and INSEAD, 2014)

4.10. Access to Resources

Aside from all the usual problems teams have to face anywhere else in the world, StartUps from Serbia, in addition to legislative, have other obstacles to overcome, primarily the lack of accessibility of needed funding. Serbia has quite a poor ranking when taking into consideration the following factors:

- Access to the latest technology (118th place)
- Access to investment capital (129th place) (World Economic Forum and INSEAD, 2014)

5. STRATEGIES OF THE REPUBLIC OF SERBIA

For the Republic of Serbia to help StartUps and other small and medium-sized enterprises in Serbia, on March 26, 2015 the Government of the Republic of Serbia adopted a Strategy to support the development of small and medium-sized enterprises, entrepreneurship and competitiveness for the period from 2015 to 2020. This Strategy is followed by an Action Plan for implementing the said strategies for 2015, with a projection for 2016. The Strategy outlines six pillars:

- Pillar 1: Improving the business environment (Specific goal for 2016 is improving the efficiency of implementing administrative procedures through a measure of ongoing activities for strengthening the system of e-administration).
- Pillar 2: Improving access to sources of financing (This refers to improving access to sources of financing such as venture capital funds, business angels, state grants, microfinancing and the Program for Western Balkans Enterprise Development and Innovation Facility (WB EDIF). The specific goals are: improving the quality of options offered by the banking sector for small and medium-sized enterprises, developing new financial instruments, as well as removing administrative obstacles and improving the possibilities for small and medium-sized enterprises and entrepreneurs to access different sources of financing through better information and

- knowledge and skills in the field of financing).
- Pillar 3: On-going development of human resources (Successful reforms in this area require adjusting strategic documents and legislation in the field of education. Specific goals are improving the quality of the labor force through harmonization of the formal system of education with the needs of the labor market and development of the system of informal education, as well as the support of developing education for entrepreneurship).
 - Pillar 4: Strengthening the sustainability and competitiveness of small and medium-sized enterprises (Of great significance for developing small and medium-sized enterprises is the development of infrastructure, namely: business incubators, industrial parks/zones and technology parks. This is to be achieved through improvement of efficiency of institutional support for businesses and developing small and medium-sized enterprises, optimization and improvement of the degree of utilization of existing and building of new infrastructure, as well as strengthening innovation in small and medium-sized enterprises).
 - Pillar 5: Improving access to new markets.
 - Pillar 6: Development and promotion of entrepreneurial spirit, as well as encouraging women's entrepreneurship, youth and social entrepreneurship. (Government of the Republic of Serbia, 2015; Ministry of Economy of the Republic of Serbia, 2015)
- Supporting IT entrepreneurship and StartUp projects (through grants for StartUp projects, support for developing technology incubators and support of IT clusters, as well as support in the form of construction of technology parks. Financial incentives granted by the Republic of Serbia would not surpass 50% of the value of overall approved budget for the project, and not exceeding 25,000 EUR, which would mean that the investor provides the rest of the funds for the implementation of the project)
 - Tax reliefs for software companies (relating to a tax credit for investment in R&D and a special procedure of accounting and payment of contributions for mandatory health insurance and insurance in case of unemployment. With the introduction of this procedure, fiscal burden (tax + contributions) calculated on net wages would be reduced by 35.5%, i.e. from 67% to 43%)
 - Support for exporters of software products and solutions (through covering costs of appearance on foreign markets, i.e. approving grants for covering part of the costs of appearance on foreign markets which is granted through a public tender, also support in the form of information relating to foreign markets, improving the legislative framework and improving education)(Government of the Republic of Serbia, 2013)

6. INTERNATIONAL POSITIONING OF THE REPUBLIC OF SERBIA

Aside from these two documents, referring to StartUps is also the Strategy for IT Industry Development and Support which the Government of the Republic of Serbia adopted on March 7, 2013. According to this strategy, the software industry and industry of IT services will be motivated and supported in four general segments: StartUp, outsourcing, development and export of original software products and development centers of large multinational companies.

The specific measures are as follows:

According to the results of Innovation Union Scoreboard 2013, Serbia belongs to the group of moderate innovative countries with innovative performances below average. As, according to the Summary Innovation Index (SII), the average score for 27 countries of the European Union for 2015 is 0.555, and then the Summary Innovation Index score of 0.385 for Serbia is significant below this average. On the other hand, relative performance to the EU has improved significantly from 48% in 2007 to 69% in 2014. (European Commission, 2015)

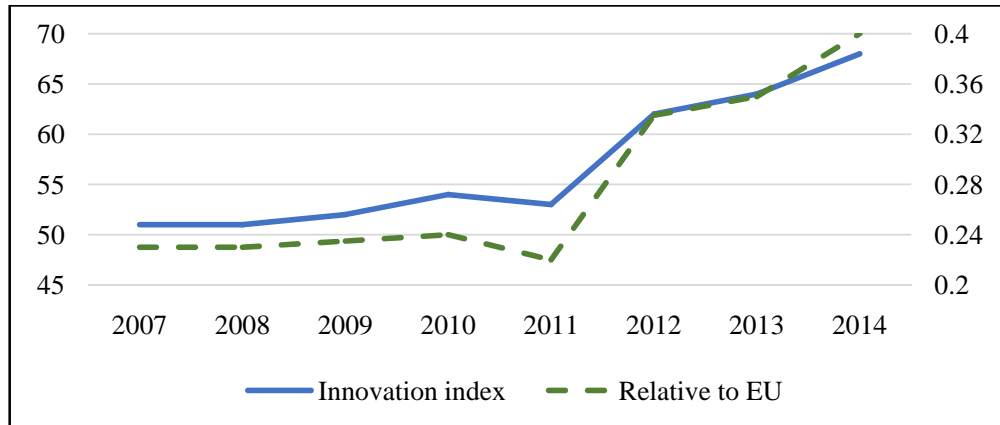


Figure 3. Relative performance of Serbia to EU (European Commission, 2015)

The GEDI index for Serbia in 2012, was 0.20 ranking it 80th-81st, and in 2013 the GEDI index score was 34 ranking it 69th. This year Serbia was the lowest positioned country in the region aside from Bosnia & Herzegovina. At present, the GEDI index for Serbia is 30.6 and Serbia ranked 78th globally, and 38th in Europe. This score is largely due to the skills of StartUps, i.e. their founders (0.84/1). (Global Entrepreneurship Development Institute, 2015)

Despite the unfavorable offer of commercial banks' loans, guarantee schemes and other alternative forms of financing have just begun to develop in the Republic of Serbia. Besides the first investment of venture capital funds and the first activities of Serbian Business Angels Network, development of the investment in equity and mezzanine financing market is still in its infancy. The Republic of Serbia was ranked 79th out of 118 ranked countries in 2014, according to the Venture Capital and Private Equity Country Attractiveness Index. (IESE Business School, University of Navarra, 2014)

7. RESEARCHES ON PROBLEMS FACED BY STARTUPS

The National Agency for Regional Development (NARD) conducted a Research on the conditions, needs and problems of small and medium-sized enterprises and entrepreneurs and produced a Report on small and medium-sized enterprises in cooperation with the Ministry of Economy and Ministry of Regional Development. According to this

Report, the Republic of Serbia Development Fund has already arranged credit support for the beginners in the form of StartUp loans. In 2012, 53 loans were approved under this program, of 110,371,437.00 RSD, and 33 StartUp loans in the amount of 67,785,530.00 RSD were realized in 2013, which is less by almost half in 2012. Aside from this, in 2012 the Ministry of Finance and Economy approved 48,100,000.00 RSD for innovative enterprises. In 2013, the Program of support for innovative fast-growing small and medium-sized enterprises supported 29 enterprises with 22,592,381.00 RSD. In February 2013 NARD conducted a Quantitative field research on a sample of 2,500 small and medium-sized enterprises and entrepreneurs. According to the findings of this survey:

- The great majority of respondents decided to start their own business because they wanted to be independent and avoid having superiors to answer to;
- StartUps expect increase in revenue in the future period;
- The respondents stated that what they lack most is support from the state, business banks and local environment;
- Business aspects that are highly graded are quality of products/services, qualified staff and relations with business partners;
- Tax-wise, small and medium-sized enterprises mostly object to income taxes, contributions on salaries and profit tax;

- Almost two-thirds of the respondents finance their current assets from own funds. That number is somewhat lower in the case of additional investments;
- As high as 50% more enterprises with credit indebtedness have difficulties in loan repayment or are late in payments in comparison to those who regularly repay their loans;
- High-interest rates are cited by the respondents as the biggest problem in utilizing bank loans as a source of external financing;
- In spite of their being a certain number of state supported programs, one-fourth of the respondents were not even informed about them. Aside from this, as many as half of the respondents only had partial information, which means that only one-fourth of the respondents were fully informed and they received their information mostly from the media and internet;
- A very small number of entrepreneurs use these state supported programs (a little over 20%). Programs of financial support are most utilized;
- According to the opinion of former users of the state supported programs, these programs have a positive influence on business and facilitate growth and development. The cause of this satisfaction is the fact that one-third increased the number of employees: one third increased their income and

more than a fifth introduced new products or services;

- The biggest market limitations cited were great competition, small demand and disloyal competition, as well as monopoly issues.(Ministry of Economy of the Republic of Serbia and the National Agency for Regional Development, 2013)

8. RESULTS OF THE “WHAT ARE THE MAIN OBSTACLES FACED BY SERBIAN STARTUPS?” RESEARCH

The survey was conducted on-line, from February to April 2015, and interviewed representatives of domestic StartUps. It is assumed that there are about 200 active StartUps in Serbia (AngelList, 2015). Therefore, the theoretically small sample of 74 respondents (68 active) accounts for more than 35% of the population, making the survey valid, as well as the tests applied.

Most of the respondents have been working in their StartUps between a year and five years (50%), while StartUps started before 2010 account for less than 15%, as is presented in Figure 4. This points to the fact that this type of business has only recently become popular in Serbia and that most Serbian StartUps are still in the early stage of operations. Another way of interpreting this fact is that a certain number of StartUps close down very quickly without reaching the later stages.

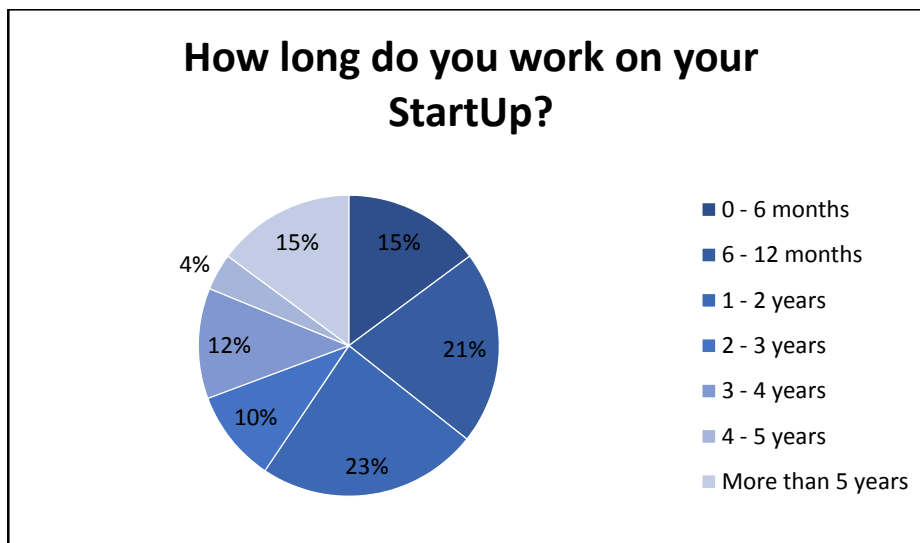


Figure 4: Serbian StartUps' Age

While StartUps in the Silicon Valley fail due to lack of market demand and funding, problems that are fatal for StartUps in Serbia are:

- Loss of motivation (67%);
- Insufficient financial resources (50%);
- Loss of focus (50%);
- Poor understanding of the market (50%) which is a result of poor market research (50%).

Most StartUps (76%) have SMART goals and key events in place, leading to the conclusion that they also have a clear strategy. However, this does not necessarily mean that companies with defined SMART goals generate higher income. Also, more than 70% of the respondents stated that they didn't have problems with scalability, or with too many customers or a fast-growing number of customers. This could lead to the conclusion that most entrepreneurs go about developing their business in the right way, although the scalability statement should be taken with some reserve considering that less than 50% of the respondents makes any profit, which may lead to the conclusion that they were not in a position to have too large number of customers presenting a problem. On the other hand, 73% of StartUps stated they have at least some free-of-charge services, so the lack of profit does not necessarily mean lack of customers.

As was already mentioned before, a line often heard at investment forums is that "investors invest in teams, not ideas", thereby emphasizing one of the premises of successful StartUps, meaning a well-fitted team, equipped with all the necessary knowledge. 84% of the respondents feel that theirs is a

good-fitting team, while 64% that team members have all the necessary knowledge required for successful operations. However, there is no statistically significant difference between entrepreneurs who feel that they can realize a project on their own and those who need help to do so, regarding securing investments, leading to the conclusion that investors in fact do not invest in people and their knowledge, but in the idea.

By studying the types of financing, we came to the conclusion that most entrepreneurs (61%) are financed with own resources. Another way to interpret this is that banks are not willing to approve loans to new companies who still have no results, and, at the same time, entrepreneurs are not happy with the high interest rates. This corresponds to the findings of a Study of the status, needs and problems of small and medium-sized enterprises and entrepreneurs according to which in 2013 these enterprises were financed mostly with own resources (67%). The problems they listed in utilizing loans are the following: high interest rates (78%), high bank fees (38%), securing loans (33%), limited loan amount (20%), time-consuming procedures for loan approval (18%) and others. (National Agency for Regional Development, 2013)

This is why most StartUps (57%) try to secure an investment, i.e. to sell ownership share to "business angels" (individual investors), investment funds, incubators or accelerators, for a certain sum. It is interesting that the investment amount is not statistically dependent on the industry in question.

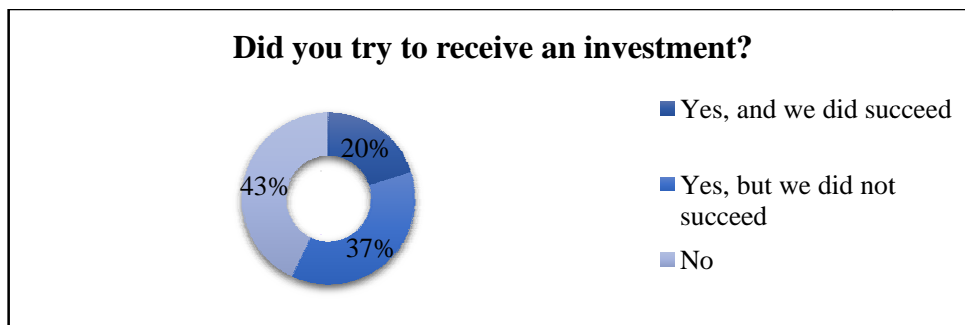


Figure 5: Intention to receive an investment

Another interesting fact is that as many as 20% of StartUps received in average a 150,000.00 EUR investment, while most got a 100,000.00 EUR investment. This also

represents a third of all those who tried to present their idea to investors, leading us to the conclusion that all the effort put into pitching an idea to investors pays off.

Table 1: Investments in Serbian StartUps

What amount of investment did you receive?	
We did not receive an investment	79.73%
Average investment	150,066.67 EUR
The most frequent investment	100,000.00 EUR
The biggest investment	1,100,000.00 EUR

However, it has been observed that there is a statistically significant difference of investing in big teams vs. small and medium-sized ones. On the other hand, this piece of information could be interpreted as quite the opposite, namely, that teams with investments were in a position to enlarge their teams. The biggest investment of 1,000,000.00 EUR received a StartUp that exists for more than five years and employs 38 people. According to a research “StartUp Investment Trends in Serbia in 2014”, Serbian StartUps collected a total of 4,344,322.00 EUR of foreign and domestic investments, which is far less than Croatia with 21,156,023.00 EUR and Slovenia with a record 60,855,500.00 EUR in investments. The largest investment went to a Serbian-American company Mainframe 2, namely 1,900,000.00 EUR from Venture Capital Fund Columbus Nova Technology Partners. The largest investors in Serbian Startups were the Innovation Fund established by the Government of Serbia in cooperation with the European Union, investing 1,300,000.00 EUR in 12 Serbian StartUps,

and the Bulgarian Accelerator Evelen who invested 745,000.00 EUR. Unfortunately, when compared to the previous Government investment cycle in 2013, the total amount of investments is down by 830.000,00 EUR, which means that the number of financing and co-financing projects is reduced as well. (Netokracija, 2015)

As many as 10% of StartUps are registered in Bulgaria, which coincides with the fact that the Bulgarian Accelerator Eleven is the second largest investor in Serbian StartUps, and teams receiving funds from Eleven often register their companies in Bulgaria. Also, more than 10% of teams opted to register their companies in the U.S. in the State of Delaware where taxes are significantly lower than in Serbia. However, the largest number of entrepreneurs still registered their companies in Serbia, possibly because of the fact that only 12 days and six procedures are all it takes to start a new company in Serbia. It should be pointed out that about 30% of StartUps are not registered.

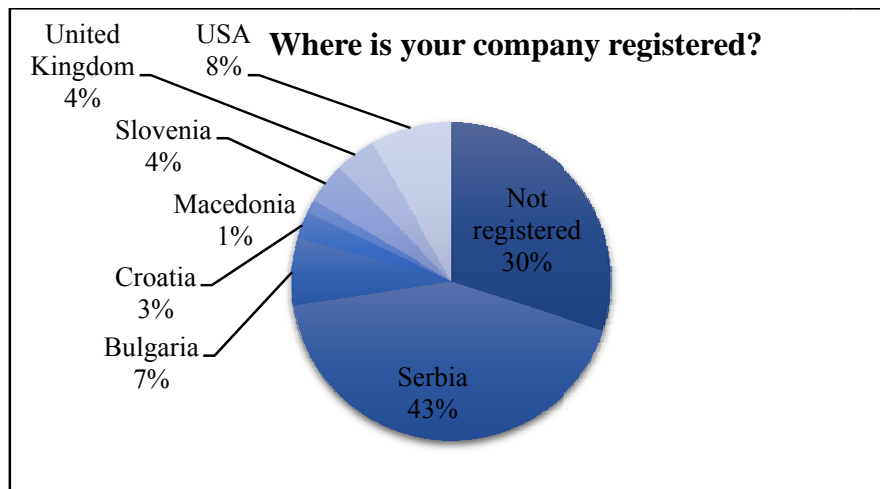


Figure 6: Location of StartUps registration

StartUps reported the following key obstacles for their operations:

- Lack of money (55%) which could also be interpreted in consideration of the fact that developing enterprises are always in need of additional capital, as well as that we are far behind countries in the region in terms a number of investments, as well as the fact that Serbia is placed 129th in the world out of 148 countries as far as accessibility of investment funds is concerned, plus there is the lack of interest on the part of banks to grant loans to new enterprises, as well as the fact that the state is allocating fewer and less funds for grants to young companies;
- Loss of focus (42%), as elsewhere in the world, is a very frequent problem that entrepreneurs have to deal with in their search for the ideal product-market fit;
- Legislative problems, the state, bureaucracy, taxes (37%) can be explained by the fact that we Serbia is ranked 98th in the world based on efficiency of regulatory bodies, 103rd based on laws in place regulating IT technologies, 124th based on judicial independence, and 137th based on efficiency of resolving legal disputes, out of 148 countries;
- Problems with existing investors (20%), as well as those who are not interested in investing in Serbian StartUps;
- Team members quitting (20%);
- Lack of market demand (20%) which certainly presents one of the most difficult problems to solve and a potential reason for closing.

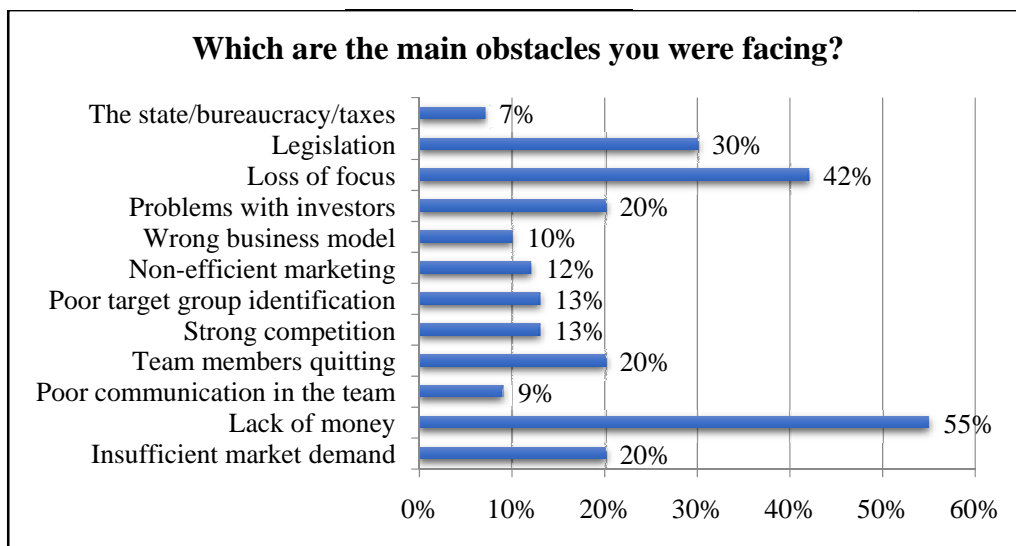


Figure 7: The main obstacles Serbian StartUps face

According to a research conducted by the National Agency for Regional Development (NARD), small and medium-sized enterprises and entrepreneurs cited similar problems, so we can conclude that regulations and lack of funding are certainly the most serious problems standing in the way of Serbian entrepreneurs.

Of all the interviewed StartUps, only two teams sold their companies, one as a result of “lack of motivation”, and the other as a result

of a large investment, which resulted in losing majority ownership.

In the free form answers, the respondents cited as the biggest problems at the present moment lack of money and investors, bad legislation in Serbia, unprepared state, bureaucracy and corruption, small and undeveloped Serbian market, lack of qualified personnel, as well as loss of focus and the absence of Pay-Pal. As a result of some of the above-mentioned problems, nearly 40% of

registered teams opted to register their companies outside of Serbia. In the meantime, the Pay-Pal issue has been resolved, which may lead to the conclusion that operations of Serbian StartUps will be made at least a little easier.

On the other hand, there are many problems the respondents have managed to overcome, such as:

- forming teams, team leadership and communication within the team;
- setting-up projects and problems of technical nature;
- organization of time;
- product launching;
- collection from abroad;
- finding initial partners and investors;
- finding mentors and advisers;
- problems relating to either too little or too many customers;
- insufficient market research;
- communication via social networks and responding to customer feedback;
- customer feedback and adapting the products to their needs;
- creating a brand;
- education of customers;
- being mocked by their surroundings;
- loss of focus.

9. CONCLUSION

The Serbian StartUp scene is only growing and developing. While three years ago there were only 50 StartUps in Serbia, today that number is as high as 200, with a tendency to grow. Domestic StartUps are generally faced with the same problems as StartUps in other countries. However, they have additional aggravating circumstances to deal with, such as very limited access to investment capital, as well as legislation that is not in tune with modern business needs. Loss of motivation and focus, like elsewhere in the world, are the biggest obstacles standing in the way of further development of an idea. Aside from this, dependency on other companies and team members quitting can potentially jeopardize their further development.

The fact that there are no statistically significant differences between various groups of StartUps regarding investments and profit is a strong indicator that everyone is faced

with similar problems and that operating methods and results have similar dynamics.

Encouraging is the fact that ENIF (Enterprise Innovation Fund), a new regional investment fund, will invest a total of 40,000,000.00 EUR, i.e. from 500,000.00 to 3,000,000.00 EUR in individual StartUps over the next five-year, namely in companies from Serbia, Bosnia & Herzegovina, Croatia, Albania, Macedonia and Montenegro, and the first round of investments is expected this summer. (Western Balkan Enterprise Development and Innovation Facility, 2015)

Serbian StartUps should also get better informed on state support programs that include StartUp loans intended for companies such as these, as well as other support programs. In addition to ENIF, there are several other foreign funds that are available to companies from Serbia, and thereby StartUps as well, and that fund should be explored since the biggest problem is the lack of financial resources. Aside from this, the best indicator that Serbian StartUps have great potential can be seen from the GEDI index according to which the skills of StartUp founders are scored 0.84 / 1, which is above the average of former transitional countries members of the European Union.

The Government of the Republic of Serbia is aware of the legal hardships, the number of procedures and time required for completing those procedures, and other problems stated by StartUps, as well as small and medium-sized enterprises. If the strategy is implemented through annual Action Plans, it is possible that by 2020 Serbia will be a more attractive country for the start of such businesses and that our StartUps will not be going to Delaware and other countries to avoid having to deal with these problems.

If a healthy StartUp ecosystem will be created in Serbia, with a state that is a strong support and not an obstacle, many of our entrepreneurs could come back to Serbia, taking into consideration that it is a lot cheaper for business development and living. As a result, our young and educated people could stay in Serbia, find employment in these companies and become the initiators of further development and innovation.

In June 2015, the Serbian StartUp Frame received a record investment in the region of 10,000,000.00 EUR, which proves that in spite of all the obstacles, it is possible to develop a profitable business in Serbia, one which attracts investors. To make this possible, entrepreneurs must listen to their customers, keep pace with the times, be initiators of innovation and accordingly develop their companies.

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STRATEGIC MANAGEMENT IN R&D ORGANISATIONS

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Abstract: This paper recognizes and elaborates the need for the development of strategic managing of R&D organisations. It has shown that strategic approach for managing of R&D organization will improve their R&D performance. There is a need to build a comprehensive framework that integrates strategic planning, the implementation of the strategy and control. To improve the performance of R&D organizations, it is significant to establish indicators for assessment and managing. Some common features of all measures that enable efficient management of R&D organisation can be systematized for application in R&D organizations.

Key words: Strategic Management, R&D organisation, Strategic planning, Performance Measurement.

1. INTRODUCTION

For understanding the strategic management the complex approach including the integration between thinking and doing is necessary. The main goal of strategic management is *to prepare a company for future success-* to design and secure the future of the organization (Macmillan & Tampoe, 2000). The importance of strategic management can be seen as developing organization capacity to anticipate changing environment and uncertain future through establishing procedures for achieving objectives (Bracker, J., 1980).

Traditional economic view of strategic management is based on a linear approach to strategic planning that is pretty on- flexible. This understands clearly defined timeframes for the realization of the objectives and strategies with the aim to establish a strategic action plan. The rigidity of this concept could be explained with its formal character and with a fact that financial aspect of strategic planning is often seen as the most important- *planning dictated by numbers* (Pricop, 2012).

Modern theories of strategic management have a wider approach to the subject of the research with the intent to make a balance between theory and practice. Development of

the modern theories is based not only on theoretical knowledge but on practical experience. Beside the fact that the roots of researching strategic management are linked with practice, progress can be seen through the development of the theories that could help the organisation to explain and predict organisational (no) success. Theory can improve practice, but the application of theoretical concept into practice usually isn't simple. (Kenworthy, Verbeke, 2015; Rumelt, Schendal & Treece, 1991).

The increasing tendency of a research and development activities, as well as their expenditures, causes the need for establishing effective management in a research organisation. Efficient R&D organisation management means creating and executing strategies based on a multidimensional and balanced system of measurement of research performance. This is important not only for improving the performance of scientific and research sector but also for improving the performance of the national economy as a whole. One of the key challenges that managers of the research organisation are faced with is the lack of a unique methodology and set of the performance for measuring research and development for managing of R&D organisation.

The specific character of scientific work opens up dilemma about managing R&D organisations. The classical managerial challenge appears - whether to use bottom-up approach or vice versa? Should the research plan be changed in the new direction when spontaneous discovery arises or should it be stuck to the original plan? (Murayama et al., 2015).

The main intention of this work is to highlight the importance of using the strategic approach in managing research organizations to achieve better business performance and competitive advantage on that basis.

2. MANAGING R&D ORGANISATION

Strategic management deals with aspects of the formulation and implementation of the predicted behaviour in new situations. The literature in the field of strategic management underlines six most frequently used elements that are most commonly found in the literature that defines the strategic management. In that context field of strategic management means (Nag el al., 2007):

1. important and urgent initiatives;
2. that are done by managers on behalf of the owner;
3. and relating to using of the available resources;
4. to improve the performance;
5. of organisation;

6. in the environment in which they operate.

By this description of research field of strategic management, but taking into account the fundamental characteristics of scientific work, the need for development of various tools for quality management, process improvement and cost assessment of scientific research activities appears. There is a need to build a comprehensive framework that integrates all these tools to make well coordinated and synchronized R&D organizations. Strategic management is the basis for planning, budgeting, execution, control and evaluation of activities of an organization. In the literature, there are different models of strategic management, but the process of efficient system management organization is based on the following processes:

1. Strategic planning with the aim to formulate organisation strategy;
2. Strategy implementation involves a set of activities within the organisation with purpose of strategy realisation;
3. Control of implementation of the strategy and evaluation involves the establishment of mechanisms for recognizing the success of previous actions.



Figure 1: Strategy, strategic planning and strategic management, Source: Mihic, M. (2011), Strategic management of the projects

When we talk about the R&D organisation, this framework should be applied in accordance to the character of R&D activities. It is necessary to develop a model that can integrate the changing environment and the institutional complexity of the R&D organisation.

2.1. Strategic planning

Strategic planning is a process that helps organizations think in detail about their goals that they should define to realize its mission, and to determine the line of action. Good strategic planning usually involves reaching a

consensus on the objectives and priorities of the organization; provides the basis for resource allocation and operational planning, define the starting point of control and helps in the assessment of organizational performance (Mitrovic et al. 2013).

Analysis of the internal and external environment –The characteristic of successful organizations is its open orientation for new stimulation from the business the environment. Whether it is a signal of danger or opportunities, organizations collect and transmit them across the entire organization. The existence and development of the understanding of the outside world – key clients or the major technological development - with ensuring that it remains within the organisational framework is of great importance in building and maintaining a successful organization (Tidd et. al., 1997).

Achieving the high performance in the company represents a mirror of organisational interaction with environment (internal or external). According to Houben, Lenie&Vanhoof (1998), SWOT analysis is the most commonly-used management tool for analyzing internal and external environment. The external environment includes variables outside the organization that could not be affected with organisational activities in the short term. Could be direct (customers, suppliers, customers, creditors, government, etc.) and indirect (economic, socio-cultural, technological, political and legal impacts).The basic principles of strategic management are derived from the organisational need to constantly monitor trends from the external and internal environment to ensure efficient and effective growth (Mihic et al., 2012).

Until the sixties of the last century, the R&D organizations have worked in a relatively stable environment in which the model of R&D activities was mainly based on three elements - government, industry, university – it was appeared to be sufficient for their successful work (Crow & Bozeman, 1987).The environment in which R&D organisations operate has dramatically changed in the recent years. Market arena has become increasingly turbulent and dynamic. The needs of consumers, competitors and

business models have changed more frequently than ever. The application of new knowledge is becoming faster and faster (Lazzarotto et al., 2011). This kind of business environment implies strategic management that should enable the organization to respond quickly even on the weakest signals that may have an impact on its business. Environmental changes are closely linked with the technological intensity of the products. The markets and products that use the advanced technologies will change faster and with a greater intensity of uncertainty, than markets and products lower degree of technological intensity. If the complexity and turbulence of the business environment are grater, the strategic process of decision making is harder (Borch, 1991).

The formulation of the vision, mission, and goals represent a logical set of actions after internal and external business environment analyses. Because of the influence of the development of the business practices, in the literature in the field of management, beside the explanation of goals and managers, the new categories are more and more present: leader, vision and mission. The manager is more oriented to efficiency-know how, while the leader more oriented to effectiveness–know why or why not (Todorovic, 2003).

Successful R&D organization means leadership based on the paradigm way of thinking and refocusing the organization through the articulation of a new vision. Translating vision into reality is closely connected with the definition of the mission and goals of the organization. The mission of organizations can be defined by postulates (Meyer et. al, 1997). Based on these postulates effectiveness of the organization to generate new products lies in (1) the ability to ensure the continuity of the creation of successful new products over a long period; (2) the attractiveness of these products for the market.

In R&D organisation, it is important that there is an along-lasting commitment for the project implementation, as opposite to short-term profitability. Due to the uncertainty of the profit generation based on R&D activities, profit targets should be replaced in the short-term with long-term goals that are closely connected with doing R&D activities.

Successful management requires that organizations should be prepared for risk, as well as to accept failures an opportunity for learning and development. That does not mean that unnecessary risks should be taken, but to reduce innovation uncertainty through strategic action. The uncertainty and complexity of conducting research work mean that many inventions can stay unrealised. The success of an innovation is determined by projects success. The competition rules for success of research programmes can be as follows (Gross et al., 1964):

1. The organisation goals elaborated in details;
2. Understanding the goals of the organization by employees who perform research and development in the organization. Researcher's goals should be in the line of the interest for the organization. Misunderstanding of this fact often leads to the misuse of funds intended for research and development;
3. The implementation of intensive market research to identify the needs and opportunities for the organisation interest;
4. Carefully and in details definition and elaboration of precise research goals that are based on the previous findings;
5. The existence of the appropriate department for monitoring and testing of early stages of product development to establish further development potential;
6. Establishment of the research programs within the area that is of interest for the organization.

In modern conditions of doing business where technologies and markets are in continually changing, it is very hard to choose the product and service that would be competitive. In this sense, many of the standard marketing techniques can be applied, but the others can be useful too, such as quality management system.

The definition of the organisational strategy is in the domain of top management and reflects the general objectives of the organization- the way on which the organization responds to the

influences from the environment over time. The strategy, itself, has a relative character. Something that is for some organizations a strategic advantage or ability, for others can be a threat or a weak point (Pricop, 2012; Radosevich, 1974).

According to Pricop (2012) if the relative character of the strategy is excluded, the strategy application can be viewed from four main aspects: (1) the characteristics of the market: in terms of supply and demand, the structure and dynamics of the market; (2) the characteristics of the sector: the basic nature of the sector, as well as the phase of the life cycle that determines the initiation or abandonment of some strategic options; (3) the potential of the company: the organisational design, financial capacity and market position; (4) the strategic behaviour: the analysis of the past and the future of strategic options that were applied in the company, the dependence of the sectorstrategy.

The strategy of the R&D organizations today depends on the new form of competitiveness that is based on the introduction of new products and processes. Detailed analysis of different case studies has shown that companies that are internationally competitive have the cheapest production inputs, but have the capacity to continuously improve and innovate (Porter, 1995).

In the case of a change of existing technologies and their introducing into new markets, the key task is the new market segmentation with aim to identify the new potential technology applications. In the case of the application of new technologies to existing markets, the key task is to identify the extent to which new technology has the advantage over existing solutions. As well as the identification of the target groups of users, based on behavioural characteristics.

The strategy provides the general direction of actions of the company and affects the decision about the way how to achieve the objectives of the company, after analysis of the business environment and the existing resources of the company activation. It is necessary to select the most profitable projects that contribute to the value-added growing

trend of the company with minimal cost and risk. Beside of clear definition of the general strategy of the company, it is necessary to

determine the functional strategies of companies to create a core competence of selected company (Table 1).

Table 1: The key competencies of business functions in two strategy options. Sources: Petković, M., Janičijević, N., Bogičević-Milekić, B., (2008), *Organizacija*, adapted to Jones, G., (2004) *Organisational Theory and Design*, New York: Addison-Wesley.

<i>Business Function</i>	<i>Strategy based on costs</i>	<i>Strategy of differentiation</i>
Production	Improving productivity	The development of flexible production capabilities
Human Resources Management	Reduction of fluctuation	Attracting and training highly qualified specialists and workers
Sales and Marketing	Increasing demand and sales	Targeting a group of customers. Adapting products to customers
Research and development	Improving the efficiency of production	Creating new products and improving the quality of existing ones.
Management of materials	Decreasing the cost of the material through just in time system and using IT managing options.	Providing the highest quality of inputs through long-lasting collaboration with suppliers.

When we talk about of gaining a competitive advantage based on R&D activity, the strategy of differentiation based on technological innovation is mainly implemented. The strategy based on leadership in costs, can be also applied if there is the need for increasing the efficiency of technology. Changes in technology as well as market demands encourage the R&D organizations in their trying to implement different strategies depending on sources that are mobilized, the general attitude of management and ultimately incentive circumstances (Freeman, 1982).

2.2. Implementation of the strategy

The implementation of the strategy of the company means the process of "reviving" of the strategy. In front of the manager of the R&D organization is the challenging task-how to integrate the R&D strategy into an overall strategy of the company. Implementation of the strategy of the R&D organization depends on:

1. *Availability of R&D funding.* Conducting of R&D activities often involves investing significant financial resources, especially for basic research, and the results of that work are often uncertain and effects of the investments at the moment of creating a strategy are non-

measurable. Financing of R&D activities should be not only through its own resources, but also from other sources. The most often, the other sources are from government funds, which imply that conducting R&D activities should be in the line with the interests of the government or the national R&D strategy and its development priorities. There are opinions that the R&D motives depends on sources of funding-whether the financier is from the private or public sector (Schott, 1978). The question is to what extent R&D organizations should be dependent on government (if the government provides the funds), and to what extent should be guided by the requirements of the market.

2. *Knowledge factors*, which are the main resource of R&D organisations. Knowledge is considered as a key production factor in post-industrial society and represents a source of organisation s sustainable competitive advantage. This constantly means obtaining information about the technology development and the ability to react to changes in technology by the market. Knowledge management in R&D

organizations should be designed to foster collaborative links between industry, government, and research organizations and the creation of an efficient national innovation system. Beside knowledge, for the establishment of the key competencies of an organization also are important material factors-cash resources, the establishment of adequate R&D infrastructure, power and influence (Wijnhoven, 2003).

3. *Market factors* that cause creation of new products and processes. The results of R&D work should be valorised at the market. When we talk about the market demands, innovation can be new to the market, but can be new for the organisation itself. In any case, the result of R&D work should be understood not only as a realization of research efforts within the R&D

organizations but also as a process of creating innovations that are competitive in the market.

It is not easy to provide that performing R&D activities to be guided by market demands. Despite the fact that a large number of new products are developed in line with market demand, R&D organizations cannot respond successfully to consumer demand if there is no capacity to do so (Hauser, 1998). Besides focusing on providing financial funds for the successful conducting of R&D activities, an effective system for the implementation of the strategy on the level of R&D organizations should be provided. Can the organizational design support the implementation of the strategy? All organizational design elements must be synchronized to achieve implementation of the strategy of the organization that creates innovation (Table 2).

Table 2: The components of the innovative organisational design. Source: Adapted according to Tidd, J., Besant, J., Pavitt, K., (1997), “Managing Innovation”, (str. 307) Wiley&Sons Ltd.

Component	Description
The organisational learning	The organisational processes that enable the unobstructed flow of learning to set up efficient knowledge management.
Efficient team work	The team selection and their mobilisation to solve problems. It requires investment for the selection and formation of teams.
Innovative leadership	Leader should combine different types of managing in order to define and accept the organisation goals. Broad strategic view and top management commitment.
Organisational culture	A positive approach to creative ideas that is further enhanced with remuneration system. The culture of winners.
Professional development	Long-term commitment to education to ensure a high level of competence and skills.
High dedication to innovation	Dedication to permanent improvement of the organisation.
Organisational structure	The organisation concept that provides a high level of creativity. Find the optimal balance between the organic and the mechanical model.
Broad communication	Communication - within the organizations and with the outside world. Communications within organisation are going in three directions, up and down and to the side. With outside world-with all innovation stakeholders.

2.3. Control of R&D strategy implementation and evaluation

To assess whether the previous processes were successfully implemented, it is necessary to conduct control activities. Control activities provide inside into efficiency of strategy

implementation by identifying the differences between planned and actual action. Control and audit are designed with the aim to consider the strategy implementation, to quantify and qualify the results, and to identify a set of corrective actions.

The literature has suggested a large number of systems for measuring of the efficiency of scientific research. However, no system is perfect enough to be able to be universally accepted. Common for all models is developing a system for measuring the performance of scientific research which will allow a comprehensive understanding of the technological and commercial efficiency of R&D organizations (Meyer et al., 1997). For the most number of R&D organisation, the faster and faster technological development means long-term success that is depended on the continued development of new products and ongoing application of new production methods. These prerequisites of continuous corporate development are not visible in standard indicators of growth such as market share and profits (Narin&Elliot, 1987). In many ways, it can be assessed whether R&D activities are managed well. Hauser (1998) systematized common features of all measures that enable efficient management of R&D organisation as follows depending on the type of research (Hauser, 1998)

1. Market-outcome metrics-should be used in the case of the applied engineering projects that have relatively predictable and fast returns. Funding of these projects should be sub-financed to adjust to short-terms and risk preferences. In ideal case, this subvention should vary depending on the project and business units.
2. *For programs of development*, which are riskier regarding money return market-outcome metrics are less applicable in order to avoid the situation that programs with high-profit potential to be missed. For such projects beside the market-outcome metrics (to a lesser extent) effort-indicators (to a greater extent) should be used, such as publications, citations, patents, and reviews. On this way, managers and researchers have an incentive to choose the right programs and allocate adequate volume of scientific, engineering and process efforts.
3. Basic research is more distanced from the market and therefore, their evaluation is the huge problem for

managers of R&D organisations. They, in a large extent, rely on estimates of managers of scientific units and researchers by themselves, which are often based only on the ideas that have emerged within the organization. A system of incentives and evaluation should be provided for consideration and acceptance of ideas that come from outside the organization.

Evaluation of R&D performance should take into account the specific character of the R&D activities. A good practice of evaluation of R&D activities should be developed (Boffo et al., 1999). Evaluation should take into consideration all aspects of the relevant to this kind of activities.

3. R&D PERFORMANCE MEASUREMENT

The increasing of investment in R&D activities is influenced on growing competitiveness of the organisation on the technology development. It has caused an increasing interest in measuring of the performance of R&D work, whether it comes from managers, or from potential investors. One of the major difficulties in the evaluation of R&D activity is its strict separation in the process of evaluation from activities related to product development (Nixon, 1998). Managers of R&D organizations are faced with a complex decision how to motivate the researchers: whether it should be designated a strong incentive system based on measurements of the performance of researchers, or should be allowed researchers to build its reputation dependently (Lacetera&Zirulia, 2012).

In R&D organizations, there is a problem of separation of R&D from the other technology activities. In practice, the identification of R&D activities is facilitated by using rules of thumb. Institutions or organizational units or companies that are conducting R&D activities, often perform other activities that are not closely connected to the R&D activities (e.g. scientific and technical information, testing, quality control, various analyzes). To the extent to which these activities are conducted in the interests of

research and development should also be included in measuring of the performance of research and development. But, if these activities were undertaken in the interest of other needs, rather than research and development needs, must be excluded from the evaluation of the impact of research and development (Freeman, 2005).

Over the time, in the literature, the different models have been developed for measuring the scientific performance of the organisation. Quantitative indicators of the technological intensity of the organizations represent an important appendix to the financial and economic indicators for competitiveness assessment of the organisation, decision-making about investment and organizational planning and management (Narin&Elliot, 1987).

As the performing of R&D activities is more and more expensive and riskier, measurement of their performance and contribution to overall profit of organisation is becoming more and more important. The measurement of the R&D organisation performance is not only based on the assessment of research and development activities, but also includes support activities, market analysis, and human resources, laboratories and know-how, which may be concentrated in R&D department as well as within the entire R&D organization.

By the most commonly used approaches for measuring performances in literature- "balanced scorecard", the operational model has developed that defines the performance indicators of R&D work related to input, process, and output (Lazzarotti et al.) which is shown in Table 3

Table 3: Indicators and measures for R&D performance. Source: Lazzarotti, V., Manzini, R., Mari, L. (2011). A model for R&D performance measurement, *Int. J. Production Economics* 134 (2011) 212–223.

Performance perspectives	Type of indicators	Indicators of performance
Financial	Input	R&D annual spending
		Annual spending for other innovation activities
	Process	The cost of projected that are finished
	Output	Revenue of innovation project realisation
Cost reduction caused of R&D projects success		
Customer	Input	Annual spending for market research in order to determine the need for concrete R&D
		Annual spending for technological innovation promotion
	Process	The project share in which customers are operatively involved
	Output	The time needed for technological innovation realization on the market
Innovation and leaning	Input	The expenditures for the training of the employees that develop innovation
		The share of employees with relevant scientific knowledge dedicated to technological development
	Process	Time spent for analysis of unsuccessful R&D projects
		Number of ongoing technological innovation projects
	Output	Number of scientific publications
		Number of patents registered
A number of technological innovation (products, service and process).		
Internal business	Input	Number of employees dedicated to R&D
	Process	The further potential of innovation projects
		The cost of abandoned projects
	Output	Number of projects that have respected time frame
		Average delay of finishing of technological innovation projects
		Number of project within the predicted budget
		Number of projects that they achieve the goals
		Number of abandoned projects
The share with low performances as results of lack of funding		
The share with low performances as results of lack of competences		
Networking	Input	Number of employees that are dedicated to creating external links for

		conducting R&D activities
		The share of the time that are dedicated for managing external links for conducting R&D activities
	Process	The average costs of networking
		Number of projects that has operated through cooperation with other innovation stakeholders.
	Output	Number of contracts about cooperation for conducting R&D activities
		Number of licenses and their value
		Number of scientific publications as a result of cooperation for conducting R&D activities
		Number of patents registered as a result of cooperation for conducting R&D activities
		Number of technological innovation (products, service and process) as a result of cooperation for conducting R&D activities

Making decisions that will improve the performance of an organization requires a careful analysis of all key performance indicators, their quantification and their degree of compliance with the overall objectives of the organization. Having this in the mind, the balanced scorecard is a methodological means for creating a framework for "translating strategy into action" by taking a look from different perspectives (Chalmeta&Palomar, 2011).

During the analyzing of R&D performances, the success of the organization should be viewed through the assessment of the quality of links of the organisation with other innovation stakeholders. To achieve competitiveness, not only of the organization by itself but the economy and overall society, it is necessary to ensure the permanent training and development-the existence of an innovative society (Tidd et. al., 1997).

4. CONCLUSION

Managers of R&D organizations should use the strategic approach for managing. Bearing in mind the peculiarity of scientific research, successful manager of R&D organization should balances effectively between profit and research dimension of organisation to achieve synergy effects. It requires specially trained managers who must be able to identify who will be responsible for developing strategic plans, and who will be responsible for the implementation of each of the components of the strategic plan. Researchers should be included into consideration, debate and the determining of the strategy (Valentine, P., E., 1988).

The specific character of the formulation of strategy for the research organizations is derived from the complexity and intertwining of influences of government and government institutions and market influences as well as from the perception of knowledge as a basic resource for carrying out R&D activity.

To improve the performance of R&D organizations, it is significant the establishment of indicators for assessment and management. Some common features of all measures that enable efficient management of R&D organisation can be systematized through the establishment of indicators and performance measures of R&D work by the development of an operational model "balanced scorecard" that can be applied in R&D organizations.

This work underlines the need for development of a framework for a strategic approach for managing R&D organisations.

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