

# Serbian Project Management Journal

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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 25<sup>th</sup> 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 IN SERBIA – NEW CHALLENGES

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**Abstract:** This paper presents and analyzes the problems related to the development and implementation of project management in Serbia. The general situation regarding the application of project management in Serbia is represented and compared with the situation in the world. As the main challenges in the upcoming period are incitement of education and training in project management and the creation of competent certified project managers.

**Keywords:** Project, Management, Challenges, Opportunities.

### 1. INTRODUCTION

The increasing application of project management both in the world and in our country brings us to the need for the research and analysis of what is new in project management. Particular attention in this research has to be paid to the direction of the development of this specialized management discipline and new problems and challenges. Development and application of project management in the world runs rapidly (Gareis, 2005; Kerzner, 2006; Cleland & Bidanda, 2009). This phenomenon is especially visible in the application of this discipline in all areas of life and work and the increasing demand for project managers. In our country, the need for project managers has increased due to various reasons, primarily under the influence of foreign companies and financial institutions. It is necessary to analyze development and applications of project management as well as problems and challenges we find today in Serbia (Jovanović, 2015; Jovanović, *Projektni menadžment u Srbiji – uspesi i mogućnosti*, 2011; Jovanović, Drobnjaković, Rudić, & Jovanović, 2010; Cleland & Bidanda, 2009).

Despite a long tradition of development and application of project management in Serbia (Jovanović, 2015) and the clear need for it, it seems that the project management and general management are on the margins of society. One would rather say that these disciplines are marginalized and degraded.

Although it is clear that without good managers and good project managers, there is no efficient management and operation. There are many warning examples of public companies and large capital projects. One can often hear very hideous, even offensive words about management and managers from our politicians and various experts, general practitioners, and even some journalists. Even though they constantly talk about the need for faster implementation of capital projects, the government demonstrates obvious ignorance of project managers and project management. Almost no one speaks about the efficient execution of our projects, like if it was the least important thing. In our country, the success is if the project is completed. It seems that it does not matter anymore what was the time and cost of the project at completion.

When the main objective of the project is to be finished, then no one, neither the experts nor the general public, do not ask how much the project would cost, how much the delay increased the costs of the project, not to mention the loss of a profit. Although it is clear that an overtime of project implementation increases the total cost of the project, it is if we have no such problem here. Moreover, no one remembers or does not say that there are management methods and management disciplines which enable faster and more efficient implementation of various projects (capital, infrastructure, information technology, business and social).

## 2. PROJECT MANAGEMENT IN SERBIA AND THE WORLD

Despite its long tradition, development and, in particular, the application of project management in Serbia today is at a low, one would say completely neglected. Except a few institutions and specific groups of enthusiasts, a small number of people, especially those who implement the projects are interested in using and developing project management. A wider audience is almost not familiar with this management discipline, whose options for improving the efficiency of various projects are extremely high. (Jovanović, 2015; Gareis, 2005; Kerzner, 2006)

It is obvious that Serbia lacks knowledge in project management as well as trained project managers who can manage projects and contribute to the efficiency of their implementation. However, it should be noted that before the development of project management knowledge, it is necessary to explain and develop awareness of the need for project management and competent project managers. Although those requirements are clear to those who want to see them, one would say very noticeable, the situation regarding the application of project management in Serbia is unsatisfactory. To that state, among other things, contributes certain groups, above all, some politicians, self-proclaimed experts, analysts, and some journalists, who speak derogatorily about management and project management, thus bringing great harm to certain projects and thereby to the whole country.

In order to talk about linking the efficient implementation of projects in Serbia and the application of project management, especially on the future challenges in the implementation of project management, we will briefly analyze the current situation in the development and application of project management in Serbia and abroad. (Jovanović, *Projektni menadžment u Srbiji – uspehi i mogućnosti*, 2011; Jovanović, Drobñaković, Rudić, & Jovanović, 2010)

On the basis of materials that presented at the annual conference of IPMA and PMI and the analysis of relevant literature (Jovanović, 2015; Gareis, 2005; Kerzner, 2006; Cleland &

Bidanda, 2009) we can draw the following conclusions:

1. There are a large number of national project management associations in the world, and they are continually raising knowledge and application of project management.
2. There is a large number of consulting firms engaged with project management.
3. Two international associations exist and intensively operate in the world - IPMA and PMI.
4. IPMA and PMI held yearly conferences where they present the latest knowledge in project management.
5. Regional conferences on project management are also held.
6. Large number of scientists, consultants and practitioners are working on the development and implementation of project management
7. Some methodologies and approaches are developed (Jovanović, 2015; Gareis, 2005; Kerzner, 2006)
8. Project management is used to manage large, capital projects (Merrow, 2011)
9. Demand for project managers is rapidly growing
10. Training and education have been developed, and there are numerous universities and consulting organizations that deal with education and training.

Based on all the above it can be concluded that the situation regarding the development and implementation of project management in the world is very well. They even mention the massive expansion of project management in the world, which is an important part of the world that is in constant motion (Cleland & Bidanda, 2009).

As for the Serbia, state is quite different:

1. We do not recognize the need for project management, especially in large, capital projects.
2. There is an insufficient use of domestic capacity in project management; we mainly engage foreigners, for which we are not sure that possess the appropriate competencies.

3. Inadequate number of competent project managers in Serbia measured according to the needs
4. Few educational and other organizations engaged in project management, some of the existing is poor.
5. There is the insufficient use of prominent and competent organizations such as YUPMA, Faculty of project and innovation management (PM College) and FON.
6. We need to establish strong project units in administration and government.
7. In project management units, if they are made, work incompetent, mostly party cadres.
8. Bad image of various universities and management faculties who fabricate personnel, contributes to a distorted picture of the managers and project managers
9. There are good examples:
  - o Training - YUPMA and PM College
  - o Education
    - Undergraduate and Master studies - PM College
    - Master studies - FON
  - o International certification of project managers - YUPMA and PM College
  - o Scientific Symposium - YUPMA 2015 - XIX International Symposium

It may be noted that despite mentioned good examples, the situation regarding the development and implementation of project management in Serbia is very unsatisfactory. The main problem is the lack of real knowledge of project management and, consequently, the failure to recognize the need for the application of project management and the creation and hiring of competent project managers. We will have to comply with the standards prevailing in Europe and in the world, where the level of development and application of project management is measured by taking into account the number of certified project managers compared to the overall population.(Cleland & Bidanda, 2009)

### 3. NEW TENDENCIES AND CHALLENGES

The main issues and challenges related to the development and implementation of project management in Serbia are explaining and encouraging the need for project management and the training, education and the creation of competent project managers. In the current situation, explaining and encouraging the need for project management is only possible by introducing an obligation for all those who implement capital and other projects, e.g. entering the relevant provisions of the Law on planning or some of the bylaws.

Sensitization the need for project management creates new challenges in the field of training and education, i.e. in the dissemination of knowledge on project management and the creation of competent project managers. When we talk about training and education in project management, it is necessary, in addition to analysis of the current situation in this field, to indicate some possibilities and tendencies that can be achieved in the future. It is necessary to support and strengthen the existing organizations in this area that have so far constituted the basis for the development of knowledge in project management in Serbia, primarily - YUPMA, PM College and FON, and also to develop and support new ones.

We should not make a difference, which is now evident especially in educational organizations, between state and private organizations, but only between those who are doing well and those who have poor quality. It is necessary that one of the oldest national project management associations in the world - YUPMA get support in various ways: through training that carry out, scientific symposiums, international cooperation and international certification of project managers, as well as through the involvement of this competent association in Serbian large capital projects. Foreign, often unknown consulting firms and individuals should not be given precedence over YUPMA association, which gathers more than 250 competent project managers with international certificate who have worked and continue to work on projects around the world.(Jovanović, 2015)



In addition, it is possible in various ways to support the PM College, FON, and other organizations which in addition to education and training, work hard on the development and implementation of project management in Serbia and worldwide.

When we talk about the challenges in the development and application of project management in Serbia, this phenomenon may, in part, be observed through progress and development in four areas covering certain groups of projects that contain certain features and in that sense require a particular approach or methodology for the application. (Jovanović, 2015) These are the following groups:

1. Investment (capital) projects
2. IT projects
3. Business and social projects
4. EU projects

If we analyze these projects from the standpoint of available specific approach or methodologies and their application in Serbia, we can conclude the following.

For the management of investment projects, there are elaborated and applicable methodologies: PMI methodology, YUPMA, and other methodologies that are available in Serbia. Despite this, the situation regarding the management of investment projects in Serbia and application of available methodologies is very unsatisfactory. Despite individual examples and some half attempts, the situation concerning the application of project management to the management of investment projects in Serbia is far from the satisfactory, or the required level. These problems and challenges could be solved by organized encouraging of demand and through high-quality training and education of project managers through various courses, undergraduate and master studies, certification of project managers and other activities (Jovanović, 2015).

In the world, a central group of projects heavily using project management is IT projects. The most important methodology utilized in this area is PRINCE 2, although other methodologies (PMI, YUPMA) are also adapted to this type of projects. It should be

noted that in the world exists an enormous interest in the use of project management in IT projects, in particular for software development projects, and accordingly, some states are seeking hundreds of project managers.

In Serbia, the application of project management in IT projects is on the margins, and one might say that managers in IT companies do not realize the need and necessity of the implementation of project management to manage IT projects.

Most often software engineers are considered important while project managers, when there is one, are entirely out of place. This situation can be corrected as well as in capital projects, with guided project management training and education of IT companies' managers and employees, in particular by introducing subjects related to project management into IT programs curriculum.

There are also appropriate approaches and methodologies for business and social projects. For this group of projects, one can use modified YUPMA methodology, PMI methodology, some approaches that are based on the project life cycle, and similar. Regarding the application in Serbia, the situation is worse than in capital projects. Since these projects are slightly smaller in scope and cost, it seems that opinion that it is not necessary to use an approach or methodology for managing these projects prevail, although this group also includes some projects that are of great importance for the concerned company.

To effectively manage IT projects, it is necessary to have an appropriate methodology adapted to the specifics of IT projects, and trained personnel able to apply the methodology for managing the particular project. First, we will very briefly consider methodologies used for managing IT projects, in theory and practice. We will briefly analyze the following methodologies (Jovanović, 2012):

- PRINCE 2
- PMI
- IPMA
- YUPMA.

PRINCE2 is an interesting and complex methodology initially formed for IT projects, and later refined and extended to other types of projects. The methodology includes eight basic elements (organization, planning, control, quality, risk, etc.) and eight basic sub-processes (starting, initiating, planning, control, etc.). Given the complexity of the methodology, in order to be adequately implemented, it requires a solid previous experience in project management. Regarding IT projects, one can conclude that it is suitable for this type of projects.

PMI methodology is quite famous, extensive and complex process methodology, which comprises nine sub-processes or functional areas, such as management of scope, time management, cost management, risk management, quality management, etc. This methodology is comprehensive and challenging for the particular application on a particular type of project, since it does not give precise explanations of the application, but only the frame containing the input, process, and output. It can be applied to IT projects, but further development and adaptation is necessary (A Guide to the Project Management Body of Knowledge, PMBoK Guide, 2008).

IPMA methodology is not a process methodology that defines the basic sub-processes of project management, it is rather based on the competencies that project manager must possess to be able to manage a specific project efficiently. These are technical, behavioral and contextual competences of the designated project manager, and IPMA conduct international certification of project managers based on them, thus confirming project manager's ability to manage projects.

YUPMA methodology, developed within the YUPMA association, represents the sublimation of practical work on a number of projects over the last 30 years. The methodology has been applied and tested on a few dozen projects, which YUPMA members implemented in the country and abroad.

The mentioned methodologies are quite simple and easy to use. For IT projects, there

is a suggested methodology for the so-called business projects that could be effectively applied to organizational, consulting, marketing, and similar projects. Within YUPMA, a specific methodology was defined for business projects that are effectively applied to organizational, consulting, marketing, scientific research and other projects. It can also be successfully used for IT projects, of course with certain adaptations especially if it comes to managing multiple projects. This methodology includes the following phases (Jovanović, Upravljanje projektima u IT okruženju, 2015):

1. Decision-making on project realization
2. Assigning Project Manager
3. Define the project team
4. Project objective description
5. Define phases and activities
6. Project implementation planning
7. Planning required resources and funds
8. The distribution of responsibilities on the project
9. Project Risk Management System
10. Project Change Management
11. Monitoring system of the implementation of project
12. Necessary interventions and corrective actions
13. Closing the project
14. Lessons learned and post-project analysis.

The fourth group consists of the so-called EU projects, i.e. projects EU are funding. This group of projects is not different from the previous by structure and characteristics, but according to the methodology used. The EU requires usage of the stipulated methodology called Project cycle for the projects it funds. Thus, through a predetermined obligation, enables implementation of certain project management principles and methods, thereby in this group of projects, the situation regarding the application of project management in Serbia could be assessed as satisfactory.

When we talk about the development and implementation of project management in the



world and Serbia, there is a problem or a challenge for researchers and consultants, concerning the selection and application of the appropriate project management methodology. Although there are some developed methodologies for managing projects successfully used in practice, such as PMI, IPMA, APM, PRINCE 2, YUPMA, there is still no unified position on what methodology is the best and in what situations. A particular problem is the fact that there are different types of projects with different characteristics that hinders the application of a uniform methodology for all kinds of projects, so the choice of methodology remains a challenge and problem to be solved in the future.

On solving these issues across the world people are intensively working, so in this context we should mention the use of so-called agile methodologies and agile approach, especially in IT projects (Bjelica, Mitrović, & Todorović, 2014; Obradović, 2014). This approach advocates a special operating mode of project team members in project management. Team members sometimes work slowly and relaxed, without strict procedures and deadlines, and so they go to the end of the project, deliver project piece by piece, accept and introduce the required changes. For IT projects, in particular for software development projects, the constant demand for changes is characteristic, which caused the construction of this approach. This approach, among other things, predicated on the idea of linking change management and project management, i.e. to embed the principles of change management in the process of human resource management and the management of IT projects (Jovanović, 2015). Encouraging further development of new approaches to the organization and management of human resources within the framework of project management is a constant challenge for this discipline, especially explaining the importance of managing the project team in the management of the project or program.

When we talk about big investment projects, we should note that due to the high number of projects that a certain organization should carry at the same time or with a time lag, usage of program management and project

portfolio management are increasing worldwide (Jovanović, 2015; Gareis, 2005; Reiss, 2000). This situation occurs in Serbia, whether at the state level or in individual companies. In our country, the focus turns toward the problem of selection and prioritization of projects, and determining which projects and programs should be implemented, and in which points in time. This is quite a complex problem that requires a real knowledge of certain experts that govern the strategic management and the methods and techniques used for the evaluation and selection of projects. Previously mentioned great ignorance in project management particularly appears in this field. The government and individual companies face the challenge what to do in these situations. The only real recommendation is the proper training and education, which, unfortunately, no one mentions. We need education and training to not only manage individual projects but also for program and project portfolio management.

#### 4. CONCLUSION

Project management in Serbia, after more than 30 years of individual and organized development, remains on the margins of our society. Although every day we talk about unfinished and inefficient projects particularly of ineffective implementation of infrastructure and other capital projects, project management in Serbia is poorly used. It can be concluded that there are several reasons for this situation.

First, there is great ignorance about what is management and project management. Even though project management is taught at our faculties, and Serbian national association YUPMA has been active for more than 29 years now, project management remains unknown to a large part of our public.

Secondly, there is a failure to grasp the need for project management and a project manager, mainly caused by ignorance and incomprehension of the role of project management and project managers have the inefficient implementation of various projects especially the capital ones.

Third, insufficient understanding of the need to regular train and educate on project management, thus reaching the required number of competent project managers who would be engaged in the management of projects in Serbia.

These problems regarding the application of project management and the use of project managers partly derive from a bad image of managers arising from unjustified declaring party cadres for good managers and negative occurrences in some primarily private management and project management colleges and universities.

The above represents main challenges and opportunities for development and larger application of project management in Serbia and probably directions in which, in the future, our association YUPMA together with Faculty of project and innovation management will work.

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## INNOVATION PROJECT MANAGEMENT BETWEEN THE NEWTONIAN PARADIGM AND THE COMPLEXITY PARADIGM

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**Abstract:** Projects have always been guided by the Newtonian paradigm, whose concept promises, instills confidence in the project results, but despite this, there are still many examples of failed projects. On the other side, complexity as a new paradigm of scientific thought, increasingly finding its place in project management (Dodevska&Mihic, 2014) and pretending to modernize knowledge in this field. Identification of the need and the importance of the application of complexity theory in modern project management, to overcome the challenges of managing innovation projects, is the most important motive of this paper. However, this does not necessarily mean rejection of the traditional discipline of project management. On the contrary, this paper strives to find the compromise between the opposing viewpoints of the 'old' paradigm and the 'new' paradigm, in order to achieve better results in the field of innovation project management.

**Keywords:** Complexity paradigm, innovation project, Newtonian paradigm, project management

### 1. INTRODUCTION

Reasons why many projects (especially innovation projects) fail, are hidden in the current regime of project management, that is not by circumstances in which projects are realized. Traditional project management methods stifle innovation (Keegan and Turner, 2002), and confrontation of traditional project management (TPM) with innovation project management (IPM) faces numerous obstacles. On account of high innovation projects failure rate, criticisms are addressed to TPM, which is founded on the Newtonian paradigm.

It seems that theory of complexity, i.e. the complexity paradigm, can offer answers to many existing problems in the context of IPM. Indeed, innovation projects distinguish from conventional projects (Filippov&Mooi, 2010), and because of their specificities, it is especially recommended to take them into the consideration from the complexity theory aspect. However, existing knowledge on this topic is limited, fragmented, insufficiently known to the wider public, and under-used in practice.

In addition to promoting the importance of using complexity theory in modern innovation project management, this paper tends to find the compromise between the two opposing viewpoints (not to necessarily reject the Newtonian viewpoint).

### 2. COMPLEXITY THEORY IN INNOVATION PROJECT MANAGEMENT

The most important and the most represented concept in complexity theory is the concept of complex adaptive systems (CAS), whose fundamental principles are defined by the Santa Fe Institute in the mid-1980's (Dodder & Dare, 2000). CAS operate on "the edge of chaos" and can survive thanks to the innovation ability (Carlisle & McMillan, 2006), because the innovation ability allows adaptation.

Innovation projects can be seen as CAS, because their following specifics:

- Innovation projects have a complex structure, because they include a large number of different elements and connections among them (Baccarini, 1996). In this sense, there is a high

technological complexity, as well as a high organizational complexity (Baccarini, 1996).

- Uncertainty, as an additional dimension of complexity (Williams, 1999), hits innovation projects. The about uncertainty of project goals and methods will be discussed later.
- Looking at innovation projects as CAS, Harkema (2003) highlights the importance of learning, so innovation projects will be able to adapt to the dynamic environment. The dynamic environment is the result of the presence of a large number of stakeholders, whose requirements are changing over time.
- Because of the weak structure of innovation projects, their outcomes cannot be predicted in the long run. Also, it is not possible to predict neither the behavior of CAS.
- Innovation project teams consist of a large number of people (agents) of various professions, while the level of interaction among them is very high.
- It is about creative process that exists on “the edge of chaos”, and “which is inevitably messy: it involves difference, conflict, fantasy, and

emotion” (Stacey, 1996), so situation is “far from agreement, far from certainty” (Zimmerman, 2001). To encourage creative powers, complexity theory challenges the classical conception that consensus is necessary, and underlines the importance of presenting different opinions through debates and dialogs. Creative individuals play an important role in the creative-reflective model of project management (Jaafari, 2003).

It is also possible to perceive organizations as CAS. However, Packendorff (1995) advocates that projects should be treated as temporary organizations. Hence, innovation projects are viewed as CAS in this paper.

### 3. THE OPPOSING VIEWPOINTS OF THE NEWTONIAN PARADIGM AND THE COMPLEXITY PARADIGM IN INNOVATION PROJECT MANAGEMENT

An overview of the opposing viewpoints of the Newtonian paradigm and the paradigm of complexity is presented in Table 1, and it will be discussed from now on in the context of IPM.

**Table 1:** Newtonian Paradigm vs. Complexity Paradigm

Newtonian Paradigm	Complexity Paradigm
Linearity	Nonlinearity
Determinism (certainty)	Uncertainty
Reductionism	Holism
Managing	Self-organizing
Operational aspects	Social aspects

The Newtonian paradigm is based on linearity (causality), which implies the presence of the causal connections. By contrast, the paradigm of complexity involves nonlinearity. Evidence that proportionality between inputs and outputs in the project management system is not always guaranteed, it can simply be seen by engaging human resources on the project and by monitoring of their performance. Namely, the same number of workers for the same time will not always do the same amount of work. This is particularly noticeable in creative (Non routine) activities, and also in jobs where there is an intensive interactive collaboration among project team

members. Simple rules of cause and effect are not always valid in project management systems, where the butterfly effect is present as a major factor of nonlinearity. Namely, the principle of “sensitive dependence on initial conditions” discovered by meteorologist Edward Lorenz (Cooke-Davies et al., 2007) states that small changes in certain phases of projects can significantly affect the outcome. Adding to the butterfly effect are positive (reinforcing) feedback loops as an important characteristic of complex systems, which create the effect of a vicious circle, as Remington & Zolin (2011) stated, and can lead to disruption of the system, or to project

closure. For example, if the problem occurs in communication, the delay and the scarcity of information can increase the primordial problem. This is important for decision-making activities, which in innovation process take place on the following three levels: strategic, between stage, and in-stage decision level (McCarthy et al., 2006). Deterministic planning of all relevant parameters (time, resources, budget) is presented in project management practice. However, the future of projects is uncertain, since projects are implemented in a changing environment. Depending on how well goals and activities are defined at the beginning of the project, there are four different approaches to project management within the so-called project uncertainty matrix (Wysocki&McGary,2003; Sheen, 2013): traditional (objectives and activities are clearly defined), adaptive (goals are clearly defined while activities are uncertain), discovery (goals are not clearly defined while activities are clearly defined), extreme (goals are not clearly defined and activities are uncertain). More uncertain approaches are important for innovation project management, especially if it is about radical innovation, which includes high technological and market uncertainty.

Similarly, Turner & Cochrane (1993) define the so-called matrix of objectives and methods. Depending on how good objectives and methods that are used to reach them are defined, those authors distinguish the following four project types:

- Type 1 (“earth”) – objectives and methods are well defined (e.g. engineering projects);
- Type 2 (“water”) – objectives are well defined, but not the methods for achieving them (e.g. new product development as a kind of innovation projects);
- Type 3 (“fire”) – goals are not well defined while methods are well defined (representatives of this type are software development projects, in which it is extremely difficult to define precisely user requirements, so goals can be well determined only in test phases);

- Type 4 (“air”) – neither objectives nor methods are well defined (this is the important characteristic of research projects as a kind of innovation projects, as well as of projects of organizational changes).

Based on presented divisions, it can be concluded that nature of innovations projects is uncertain, so classic deterministic planning is not effective in that case. In addition to detailed planning, deterministic practice involves measuring of pre-defined parameters, monitoring of their deviations from the planned values, then implementation of “cook-book” answers (Dooley et al., 1995) for elimination or mitigation of identified deviations. Contrary, uncertainty demands experimentation (Paju, 2013), while planning is performed on the go. From the complexity theory perspective, the valid motto is: “Do not predict the future, create the future” (Tasaka, 1999). The Newtonian paradigm is based on reductionism (Dooley et al., 1995). For solving various problems in traditional project management, they need to be disassembled into smaller parts. There is a tendency to observe that parts independently, and to marginalize other parts of the whole. Since project managers face “complex problem solving” (Ahern et al., 2014), for a deeper understanding, and thus solving problems, it is not enough to observe problems in isolations. Simple solutions fail because they are not holistic or creative enough (Jackson, 2003).

In traditional project management practice, the focus is on management and control, which returns systems to the state of equilibrium according to the principle of negative feedback loop (Dooley et al., 1995). In the complexity paradigm, self-organization provides system survival. That means constant system reorganization to help the system to find ways to adapt to the changing factors in the environment. Self-organization takes place spontaneously - there is no classic hierarchy of command and control. There are examples of self-organization in natural systems (e.g. anthill), but also in social systems, like in innovation project team for example. Self-organization is visible above all in the early stages of the innovation process, which is characterized by high creativity and is not subject to conventional management.

Underlining all differences between creativity and innovation, Fitzgibbon (2001) pinpoints that innovation can be divided into several phases that can be operated, while Creativity is mysterious, as phenomenon of black boxes, and as such, is not subject to management. Parallel to self-organization, there is emergence phenomenon that leads to the appearance of real originality. Thus, creativity precedes innovation, while innovation represents commercialized creativity (von Stamm, 2008), and there are obvious differences between these two concepts in terms of management. Traditional project management discipline contained into standards (such as PMBOK Guide), mainly deals with the operational aspects of project management. Social aspects are neglected in the traditional discipline of project management (Gerald et al., 2008), or they are not engaged in an appropriate manner. According to Curlee& Gordon (2011), PMBOK Guide does not offers any practical solution for the management of leadership and cultural differences in geographically dislocated team; while innovation project teams are relatively frequent, keeping in mind the global nature of innovation. TPM is deeply embedded in the engineering tradition, is mainly mechanical by the nature (Keegan and Turner, 2002), and, therefore is not focused on people (Ghobadian&Gallear, 1997). On the other side, people involved in a project, actually theirs thinking, diversity, and interaction, represent the dominant source of complexity that encourages nonlinear management practices and prevents the successful implementation of solid principles. Different types of complexities are visible in the innovation project teams:

- Cognitive complexity and intuitive cognitive style – are related to the way in which people perceive and understand simple or complex, since except complexity of systems

themselves, complexity is also consequence of the way we think about systems (Tsoukas& Hatch, 2001). In attempt to overcome the lack of certain information and lack of previous experience in innovation projects, intuition comes to expression. It represents the important element of improvisation (Leybourne& Sadler-Smith, 2006), precedes the group reflexivity (Elbanna, 2015), while ‘got feeling’ factors are important for identification of early warning signs in projects (Williams et al., 2012).

- Communication complexity and linguistic complexity – both are consequences of the cultural differences that exist between people involved in innovation projects, as well as the presence of various professions in the innovation project teams.
- Social complexity and emotional complexity – require a good governance of social and emotional intelligence of project managers. In addition to technical knowledge, emotional intelligence is crucial for project managers (Obradovic et al., 2013), while leadership role is important in conditions of high project uncertainty (Thomas & Mengel, 2008).

#### 4. INNOVATION PROJECT MANAGEMENT BETWEEN THE NEWTONIAN PARADIGM AND THE COMPLEXITY PARADIGM

An overview of the compromise solutions between the opposing viewpoints of the Newtonian paradigm and the paradigm of complexity in the context of IPM, is presented in Table 2.

**Table 2:** Innovation project management between the Newtonian paradigm and the complexity paradigm

Newtonian Paradigm	Complexity Paradigm	Innovation project management between the Newtonian paradigm and the complexity paradigm
Linearity	Nonlinearity	Context respect
Determinism (certainty)	Uncertainty	Bounded planning
Reductionism	Holism	Systems approach
Managing	Self-organizing	Optimal level of management
Operational aspects	Social aspects	Overcoming the dichotomy



Some possible lessons about IPM between the Newtonian paradigm and the paradigm of the complexity are following:

- ✓ **Context respect.** Excessive universality of project management is not justified (Packendorff, 1995), because there is no universal context in which projects are implemented (Bredillet et al., 2015). Traditional methods support linear management practices and do not ensure the success of innovation, which is chaotic by nature. They are not only adequate regarding uncertainty, but also have difficulty to take advantage of possible positive surprises (Paju, 2013). On the other hand, nonlinear practices lead to random outcomes, and degrade the sense of management. Under specific conditions, the linear practices can be applied, while in other circumstances it is not advisable to rely on them. Existing practice shows that universal solutions are not always the best solution, so it is recommended to combine several approaches, in order to overcome their individual deficiencies, as well as to develop individual approaches to problem-solving. It is also desirable to take a cautious stance when existing management tools are using.
- ✓ **Bounded planning.** Traditional approaches to planning are built on the assumption that all possible outcomes and their probabilities can be known in advance (Wiltbank et al., 2006). Due to the lack of certain information, ‘bounded planning’ assumptions, rather than ‘total planning’ assumptions (Ahern et al., 2014), are welcome in IPM. Therefore, adaptive, flexible and agile approaches are increasingly being used in this field. Instead of focusing on the planning (as in the traditional approach), agile project management focuses on the execution (Wyk-Fancher, 2008).
- ✓ **Systems approach.** Isolated problem solving is not always effective, because problems often are not simple. Also, it is not always possible to include all aspects of a complex problem, because the question is what is ‘all’, and do the limits of ‘whole’ we looking at exist (given the infinite of system systems). IPM requires a systemic approach, because it provides the necessary flexibility for managing innovativeness, complexity, and uncertainty (Kapsali, 2011). Especially, risks cannot be regarded separately in a complex project (Kerzner & Belack, 2010).
- ✓ **The optimal level of management.** Creativity cannot be managed in the classic manner, but it is necessary to do that in a certain measure so creativity would be successfully commercialized. The name *fuzzy front end* suggests the impossibility of management. It is about experimental, ambiguous, chaotic, uncertain process (Koen et al., 2002), which has a great influence on the final result of an innovation project. However, this part of the innovation process can be managed, but in the unconventional way. Also, self-organization of project team suggests thinking that all team members can do whatever they want, but it actually comes to the cooperation among them, since they are mutually dependent (Kilpi, 2015). Self-organization is necessary to encourage during the *fuzzy front end*, while during the later phases of innovation process is possible to rely on some elements of the conventional managing ways.
- ✓ **Overcoming the dichotomy** between operational and social aspects, and between “hard” and “soft” in project management (Gustavsson & Hallin, 2014). These authors agile methodologies call “soft”, while the more traditional stage-gate models call “hard”. They associate “hard” methods to closed systems approaches, objectivism, rationality, emotional detachment, etc; while “soft” methods associate to open systems approaches, emotional connectedness, flexibility, adaptability, etc. In project management theory, these terms are completely exclusive,

while in practice they overlap. In this regard, operational and social aspects affecting each other in real life, and usually we deal only with operational aspects.

## 5. DISCUSSION

In the first place, this paper testifies about the importance of considering the complexity theory in modern IPM. After determining the similarity between innovation projects and CAS, IPM between the opposing viewpoints of traditional – the Newtonian paradigm on the one side, and the paradigm of complexity from the other side, was presented. On this occasion, some shortcomings were identified and the limitations of traditional disciplines in IPM, as well as some possibilities to overcome them with the help of some identified elements of the paradigm of complexity.

Based on the previous literature review, further studies of these topics are related to empirical research that should analyze IPM between the Newtonian paradigm and the complexity paradigm. Some possible aims of this research would be to modernize traditional approach of IPM, to obtain benefits from the complexity paradigm application, and to improve the results in IPM. In this study, the independent variables could be: context respect, bounded planning, systems approach, optimal level of management, overcoming the dichotomy between operational and social aspects, while the dependent variable could be achieving better results in the field of IPM.

## 6. CONCLUSION

In comparison to traditional IPM based on the Newtonian paradigm, the advantages of incorporating the complexity paradigm in IPM are significant. In order to achieve better results in the field of IPM, and generally more successful IPM, which today is not in accordance with existing needs, it is advisable to find the optimal balance between the Newtonian paradigm and the complexity paradigm. It will be able to overcome the shortcomings and take to advantage of the 'old' and 'new' regime at the same time, and

the most importantly, it will be useful in practice.

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## MODELLING FACTORS OF OCCUPATIONAL HEALTH AND SAFETY (OH&S) DURING THE INVESTMENT PROJECTS

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**Abstract:** The paper investigates the effect of Occupational Health and Safety (OH&S) factors on the safety of workers during the realization of investment projects. The proposed conceptual model, as well as the four formulated hypotheses were tested on a sample of 177 workers, engaged in performing various activities during the realization of seven investment projects on the territory of Serbia. Statistical data processing was done using SPSS 18.0 and LISREL 8.80 software packages. The hypotheses were tested using SEM methodology. The obtained results confirmed the suggested hypotheses and pointed to the existence of positive correlation among them.

**Keywords:** Investment projects, Occupational Health and Safety (OH&S), safety factors, SEM methodology.

### 1. INTRODUCTION

Investment projects represent investments in fixed assets in various areas of economic and social activity. The domain of these types of projects can be most concisely described as investing in buildings, equipment and staff training (Vuori et al., 2012), while their importance is reflected in the output results, supporting a number of different economic activities likewise contributing to the social objectives of the population. The undoubted significance of investment projects, as well as the scope and complexity of such enterprise, indicate the involvement of a large number of workers by means of various mechanization, machines, equipment and tools. For the reason stated, in most cases, this type of projects represents a set of activities characterized by a high degree of risk and rate of injury of the engaged work force (Sunindijo & Zou, 2013). The statistical data of a large number of world health protection and Occupational Health and Safety (OH&S) institutions, as well as the studies by researchers from different parts of the world (Cigularov et al., 2013; Fang & Wu, 2013; Rubio-Romero et al., 2013; Zou & Sunindijo, 2013), point to numerous incidents and harming of workers during the realizations of investment projects (predominantly construction activities). However, the rate of work injuries and

fatalities is probably even higher having in mind that the minor injuries are customarily not reported (Probst & Estrada, 2010; Sunindijo & Zou, 2013). In such circumstances, besides the low level of the safety of workers, the proposed project goals are being threatened. Every day lost due to a worker's injury additionally increases the expenses of project realization (medical treatment expenses, additional hiring expenses etc.) and directly threatens due dates of the realization of activities. For these reasons engaged work force safety management is preimposed as an imperative in the process of investment projects realization. For that matter, discovering organizational factors influencing OH&S of the project team members is fundamental, which also represents the main aim of the present paper. By the project manager's management of these factors, a higher level of OH&S is achieved, and the course of realization of the planned activities obtains a stable support (Teo et al., 2005; BS OHSAS 18001:2007; Law on Occupational Health and Safety).

### 2. RESEARCH HYPOTHESES AND CONCEPTUAL MODEL

Creating and sustaining the positive safety climate represents the key in attaining satisfactory performances of workers during



the realization of investment projects (Fang & Wu, 2013). The state of OH&S reflects the safety climate which can be regarded as a perception of the employees in the sense of value, attitudes, policies and procedures related to OH&S on projects, as well as inside the organization as a whole. In other words, the employees' awareness of safety issues, their competence, values and attitudes in this field, represent a synonym for the state of OH&S (Zohar, 1980; Basha & Maiti, 2013; Barbaranelli et al., 2015). They are affected by certain factors that are necessary to be recognized and analyzed, in order to make OH&S of workers satisfactory as a result of their full development.

### **2.1. Organizational environment and awareness and competence related to OH&S**

The pressure of production and working tempo along with the existing risks and the ongoing safety climate define the safety behaviour of the employees (Brown et al., 2000; Kwon & Kim, 2013). Setting the production goals above the safety ones frequently results in work injuries. The described situation is especially pronounced during the realization of construction endeavours (Fang & Wu, 2013). In that sense, according to Kwon and Kim, favourable safety characteristics of work environment and the compatibility of safety procedures with the real requirements influence the attitudes and behaviour of the employees, ultimately contributing to the reduction of work injuries (Kwon & Kim, 2013). Thus we suggest:

**Hypothesis H1:** Organizational environment positively affects awareness and competence related to OH&S.

### **2.2. Work place risk and awareness and competence related to OH&S**

Investment projects represent a diverse set of activities characterised by high level of risk and percentage of engaged work force injuring (Zou & Sunindijo, 2013). The statistical data of a large number of world health protection and OH&S institutions, as well as the studies by researchers from

different parts of the world (Cigularov et al., 2013; Fang & Wu, 2013; Rubio-Romero et al., 2013; Zou & Sunindijo) point to numerous incidents and harming of workers during the realizations of investment projects. Thus we suggest:

**Hypothesis H2:** Work place risk perception positively affects awareness and competence related to OH&S.

### **2.3. Safety precautions, management support and safety training and awareness and competence related to OH&S**

Numerous researchers contributed to finding a way to enhance safety climate in industry in general as well as in investment projects specifically. The most frequent attitude is that management plays a key role in creating positive safety climate inside an organization or project (Zou & Sunindijo, 2013; Shen et al., 2015). Managers influence certain behaviours of the employees through their activities, by means of which a change in perceptions and attitudes is ongoing during the course of time, which results in the enhancement of safety climate in an organization, i.e. more favourable safety performances (DeArmond et al., 2011). Huang and his associates underpin in their studies that safety precautions adopted by safety managerial boards, centres for the renewal of work capability, management for the processing of data about accidents and safety training play a key role in forming perceptions of the employees, i.e. creating positive safety climate. Additionally, in this way competence of the employees is enlarged, as well (Huang et al., 2006) Thus we suggest:

**Hypothesis H3:** Safety precautions, management support and safety training positively affect awareness and competence related to OH&S.

### **2.4. Communication and awareness and competence related to OH&S**

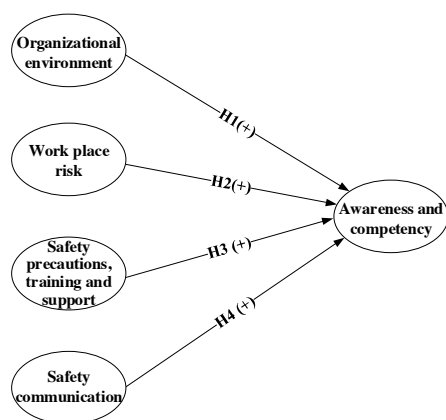
Fang with a group of his colleagues (Fang et al., 2004) conducts empirical research in order to measure safety performances at work place in the field of construction work in China. He begins with the fact that numerous hazards



were detected in this area earlier on. In conclusion, he lists factors significantly affecting OH&S in the mentioned field among which there are safety training, communication regarding safety, meetings related to safety, safety regulations, safety cooperation, management and workers' correlation on safety etc.. According to Cadieux and a group of associates, communication represents a fundamental factor in attaining full workers' safety at a work place. The deficiency of adequate communication in the field of safety results in miscomprehension and disrespect of safety regulations and procedures, which is a frequent cause of work injuries (Cadieux et al., 2006). Thus we suggest:

**Hypothesis H4:** Communication concerning safety positively affects awareness and competence related to OH&S.

Based on 4 proposed hypotheses a conceptual model of positive effects was formulated, as represented in Figure 1.



**Figure 1:** Conceptual model

In the following text, for groups of questions (latent variables) will be used the abbreviations, as follows: OE – Organizational environment; WPR – Work place risk; SPTS – Safety precautions, training and support; SC – Safety communication; AC – Awareness and competency.

### 3. RESEARCH METHODOLOGY

In the current conducted research the data were gathered via questionnaire. The questionnaire represents the modification of the original questionnaire developed by a part of the authors of this paper during the previous research of the same problem of OH&S in production companies (Milijić et al., 2013), based on the available relevant literature (Zohar, 1980; Seo et al., 2004; Zohar & Luria; 2005, Lin et al., 2008). Certain number of questionnaires that can be seen in the literature was developed for the application in a specific economic activity (Glendon & Litherland, 2001). On the other hand, a large number of questionnaires of this type was created to be universally applied, regardless of the type of industry or projects, which was the case with the questionnaire of the present research, as well. The questionnaire form consists of two parts. The first part contains six control questions of demographic type, presented in Table 1. The second part of the questionnaire form comprises twenty-three questions defining the area of OH&S (Table 2).

#### 3.1. The sample and data collection

The data collection was performed by anonymous survey of 250 employees (23 managers - 9.2% and 227 workers - 90.8%) from Serbia, engaged in performing various activities during the realization of seven investment projects on the territory of Serbia. Out of all the collected questionnaire forms, 177 that were correctly filled in (17 managers' - 9.6%% and 160 workers' - 90.4%) underwent the process of statistical data analysis, representing 70.80 %. The relationship of the size of the sample (177 participants) and the number of questions (23 questions from the survey) amounts to 7.69, which is larger than the recommended 5, proposed by Hair and his associates (Hair et al., 2006). For the gradation of the obtained answers of the participants a five-point Likert scale was used, with 1 to 5 values, with 1 representing the smallest significance (I absolutely disagree with the given statement) and 5 representing the greatest significance (I absolutely agree with the given statement).

**3.2. Demographic parameters of the investigated sample**

Table 1. represents basic demographic characteristics of the investigated sample.

**Table 1:** Demographic characteristics of the sample

Control variables	Category	Frequency	Percentage
Gender	Male	173	97.7
	Female	4	2.3
Age	≤ 29	61	34.5
	30-44	72	40.7
	45-54	31	17.5
	≥ 55	13	7.3
Education	Elementary school	28	15.8
	High school	131	74.0
	Two-year post-College/University	8	4.5
		10	5.6
Work experience	≤ 5	102	57.6
	6-15	58	32.8
	16-25	17	9.6
	≥ 26	0	0
Position on project	Manager	17	9.6
	Worker	160	90.4
Accident involvement	No	84	47.5
	Yes	93	52.5

**4. THE RESULTS OF THE RESEARCH AND DISCUSSION**

**4.1. Descriptive statistics**

Statistical data processing was done using SPSS 18.0 and LISREL 8.80 software packages.

Table 2 shows 23 questions covered by the questionnaire, related to the area of safety management at work places. In the last three columns the main results of descriptive statistics (mean, standard deviation, variance) are presented.

**Table 2:** Questionnaire and the results of descriptive statistics

Groups of questions	Questionnaire items	Mean	Std. dev	Variance
AC	1. I am clear about what my responsibilities are for the workplace safety	4.39	0.731	0.535
	2. I understand the safety rules for my job	4.38	0.804	0.647
	3. I can deal with safety problems at my workplace	4.27	0.906	0.821
	4. I comply with the safety rules all the time	4.18	0.936	0.876
	5. When I am at work, I think safety is the top important thing	4.15	0.985	0.971
SC	1. I am involved with safety issues at work	3.61	1.211	1.466
	2. Co-workers often exchange tips to each other on how to work safely	3.69	1.219	1.486

	3. I often discuss safety issues with my supervisors	3.27	1.174	1.378
	4. I can get safety information from the company	3.80	1.130	1.277
OE	1. Sometimes there is too much work to do without following the safety	3.36	1.125	1.266
	2. Sometimes work pace is too quick to follow the safety procedures	3.43	1.200	1.440
	3. Sometimes I have to depart the safety requirement for the production sake	3.41	1.379	1.903
SPTS	1. Management considers safety is of the same importance as the production	4.20	1.077	1.160
	2. Management takes care of safety problems at my workplace	3.86	1.233	1.520
	3. My job is quite safe	3.68	1.284	1.649
	4. In those dangerous jobs, there are always measures to prevent accidents	3.91	1.169	1.367
	5. I am trained with safety knowledge	4.32	0.996	0.992
	6. Safety training fits my job	4.37	0.802	0.643
WPR	1. Management acts only after accidents have occurred	3.07	1.410	1.989
	2. I am sure it is a matter of time before an accident occurs at my workplace	2.42	1.329	1.767
	3. There are conflicts between production procedures and safety measures	2.56	1.195	1.429
	4. According to your opinion, how high is the level of injuries at your work place?	2.85	1.253	1.569
	5. According to your knowledge, do colleagues doing the same type of work as you do get hurt often?	2.65	1.504	2.263

#### 4.2. Factor analysis

In order to implement the exploratory factor analysis (EFA-Exploratory factor analysis) the adequacy of sampling was investigated (MSAs - Measures of sampling adequacy) using the Kaiser- Meyer- Olkin (KMO) test and Bartlett 's sphericity test. According to the recommendations from the literature (Cerny & Kaiser, 1977; Hair et al., 2006), the minimum acceptable value for the KMO indicator was 0.6, while the level of significance of Bartlett 's the test is  $P \leq 0.05$ .

The obtained results of KMO coefficients and Bartlett's sphericity test by groups of questions amount to: AC (KMO = 0.825 ,  $\chi^2 = 684,178$  ,  $p < 0.000$ ) , SC (KMO = 0.803 ,  $\chi^2 = 438,121$  ,  $p < 0.000$ ) , OE (KMO = 0.753 ,  $\chi^2$

= 371.214 ,  $p < 0.000$ ) , SPTS (KMO = 0.862 ,  $\chi^2 = 551,931$  ,  $p < 0.000$ ) , WPR (KMO = 0.750 ,  $\chi^2 = 349,088$  ,  $p < 0.000$ ) . This indicates that the gathered data are suitable for the application of factor analysis.

We also examined the correlations among all the variables defined in the questionnaire. In the explored sample the majority of correlation coefficients in the matrix meet the eligibility level of 0.05. This points to a significant correlation among all the variables, therefore the application of factor analysis is justified.

EFA analysis was conducted in order to establish one-dimensionality group of questions in the considered model. The PCA analysis was performed (Principal Component

Analysis), which is one of the basic methods in the EFA analysis. 23 questions divided into 5 groups were subjected to PCA analysis. The results of factor analysis (PCA) indicate that the one-dimensionality is confirmed in all the groups of questions posted in the model, because all tested items had been grouped in one factor set with its own value greater than 1.0 (Eigenvalue>1.0). The percentage of variability described by each one-dimensional factor is shown in Table 3. The factor loadings of the variables are in the range of 0.676 to 0.970, which is above the value of 0.6, based on the recommendations in the literature (Molina , 2007). This suggests that the groups of latent variables (AC, SC, OE, SPTS, WPR) can be reliably described using research issues defined therein.

### 4.3. Control model

To test the validity and reliability of the investigated conceptual model a control model was defined on which confirmatory factor analysis was performed (CFA-Confirmatory Factor Analysis). The obtained values are also shown in Table 3.

For the reliability of the control model an indicator of internal consistency is used (Internal consistency). In this paper, the internal consistency was measured based on three indicators: Cronbach's alpha coefficient (Cronbach's Alpha), which shows the average

correlation among all the values on the scale, and ranges between 0 and 1, according to the literature (Kupermintz, 2003); Spearman-Brown's coefficient representing the coefficient of reliability that can be derived from all the possible combinations of the division of questions into two sets (split-half);  $\Omega$  - coefficient, which is calculated based on the results of the factor analysis (Carmines & Zeller, 1979; Nunnally, 1994).

Based on the recommendations given in the literature (Nunnally, 1994), it is underlined that the value for all three coefficients should be greater than 0.7. Based on the results (Table 3) it can be seen that the values for all three coefficients in all five groups of questions are over the recommended values of 0.7, which indicates that there is an internal agreement in questions within all the groups of the control model.

Convergent validity of the control model can be confirmed by the obtained values of CFA analysis. In the last two columns of Table 3, it can be detected that factor loading for most variables is above the recommended value of 0.6. Also all t-values reached an appropriate level of significance (asterisks). Having this in mind we can conclude that the convergent validity was confirmed for all the variables (questions) in the investigated groups.

**Table 3:** Results of EFA and CFA statistics for control model

Groups of questions	Variables	Exploratory Factor Analysis (EFA)		Confirmatory Factor Analysis (CFA)				
		PCA		Reliability			Convergent validity	
		Percentage of explained variance	Factor loading	Cronbach alpha	Spearman-Brown	$\Omega$	Factor loading	t-value
		74.344		0.905	0.850	0.916		
AC	1.		0.894				0.65	14.92 **
	2.		0.909				0.74	16.01 **
	3.		0.905				0.79	14.53 *

	4.	0.881			0.77	13.16 *
	5.	0.704			0.57	08.25 *
		76.187	0.895	0.925	0.897	
<b>SC</b>	1.	0.869			0.93	11.88 *
	2.	0.900			0.92	15.63 *
	3.	0.905			0.91	14.05 *
	4.	0.815			0.84	11.34 *
		85.426	0.911	0.912	0.915	
<b>OE</b>	1.	0.909			0.94	13.41 *
	2.	0.934			0.89	15.29 *
	3.	0.930			0.94	14.98 *
		62.707	0.876	0.892	0.882	
<b>SPTS</b>	1.	0.875			0.97	15.10 *
	2.	0.833			0.93	13.39 *
	3.	0.743			0.83	09.40 *
	4.	0.877			0.92	12.38 *
	5.	0.683			0.63	09.14 *
	6.	0.719			0.51	09.18 *
		77.098	0.686	0.718	0.784	
<b>WPR</b>	1.	0.837			0.89	08.89 *
	2.	0.676			0.62	05.19 *
	3.	0.851			0.86	09.40 *
	4.	0.905			0.81	13.37 *
	5.	0.970			0.84	15.90 *

Note: Statistical significance \*  $p < 0.10$ ; \*\*  $p < 0.05$

Table 4. presents correlation values among the groups of questions defined by the control model.

**Table 4:** Correlation matrix of latent variables

Groups of questions	OE	WPR	SPTS	SC	AC
OE	1				
WPR	0.39*	1			
SPTS	0.47*	0.87**	1		
SC	0.47*	0.77**	0.87**	1	
AC	0.33*	0.67**	0.78**	0.84**	1

Note: Statistical significance \*  $p < 0.10$ ; \*\*  $p < 0.05$

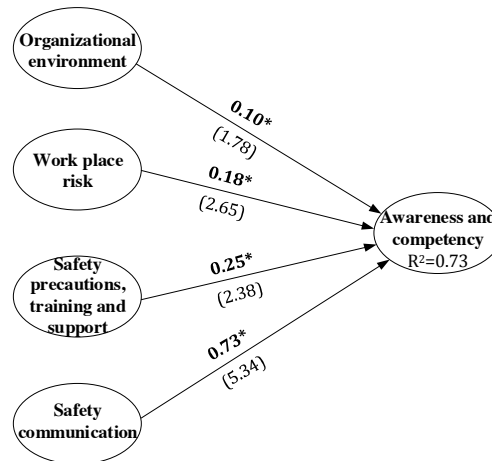
**4.4. Structural model**

After the confirmation of the validity of the control model, the testing of the structural model ensued, which is shown in Figure 2. Through the application of the software package LISREL 8.80 path model analysis was performed (Path Model Analysis) in accordance with the conceptual model.

The values of regression coefficients are shown above the arrows ( $\beta$  - path coefficient), explaining the strength of the relationship between the dependent and independent variables and refer to the influence of "Organizational environment", "Workplace risk", "Safety measures, management training and support" and "Communication regarding safety." The level of statistical significance is represented by asterisks above the regression coefficients, and below the arrows (in parentheses) the values of t -test are provided. The coefficient of determination ( $R^2$ ) is displayed on the graphic symbol of the dependent variable "Awareness and competence of OH&S." The coefficient of determination depicts the participation of explained variance in total, i.e. to what extent the variations of dependent variable were explained by predictor variables.

Based on the values of the regression coefficients, the path analysis method confirmed all four hypotheses H1 ( $\beta = 0.10$ ), H2 ( $\beta = 0.18$ ), H3 ( $\beta = 0.25$ ) and H4 ( $\beta = 0.75$ ). In other words, this means that by increasing the awareness of workers about the conditions of the organizational environment; risks of the very work place; safety measures,

the indispensable need for quality training and management support; communication regarding safety, the awareness and competence of the workers concerning general safety is increased, as well.



**Figure 2:** Structural model

Squared Multiple Correlations ( $R^2$ ) represents the index of the proportion of variance of the endogenous variable, which is calculated by exogenous or predictor variables. The higher the value of the coefficient of determination, the greater is the explanatory power of the structural model, as well as the better (stronger) is the prediction of the dependent variable. The coefficient of determination in this study indicates that the effects of latent predictors "Organizational environment", "Work place risk", "Safety measures, management training and support" and "Communication regarding safety" on the latent endogenous variable "Awareness and



competence of safety at work" can be explained by 73% of variance.

Goodness-of-fit measures of the structural model are shown in Table 5, where the recommended values are given, too. RMSE indicator is based on an approximate error occurring due to the expected degree of freedom in the population. The lower the

value of the indicator, the higher the coincidence (the model fits the input data better). Eligible correspondence is under 0.08, while some authors consider values less than 0.10 acceptable (Molina et al., 2007). In the investigated model, RMSE indicator has a value of 0.09 which indicates an acceptable matching.

**Table 5:** Summary of FIT Values (Structural model)

Fit indicators	Values of Fit indicators (Structural model)	Recommended values
Chi-Square ( $\chi^2$ )	917.26	-
Degree of freedom (d.f.)	320	-
Relative Chi-Square ( $\chi^2/d.f.$ )	2.87	< 3.0
Root Mean Square Error of	0.09	< 0.08 – 0.10
Goodness-of-Fit Index (GFI)	0.79	> 0.8
Adjusted Goodness-of-Fit Index	0.81	> 0.9
Comparative Fit Index (CFI)	0.92	> 0.9
Incremental Fit Index (IFI)	0.92	> 0.9
Normed Fit Index (NFI)	0.90	> 0.9
Non-Normed Fit Index (NNFI)	0.91	> 0.9
Relative Fit Index (RFI)	0.89	> 0.9

The index of fitting values (GFI) determines to what extent the model is more applicable compared to the situation when there is no general model. These indicators are moving in the interval [0,1], where 0 means bad and 1 means perfect matching. In the considered model GFI indicator shows good matching control model (GFI = 0.79) and together with RMSE = 0.09, it may be concluded that there is an absolute model matching.

The structural model shows solid increase in consistency, based on the value of indicators AGFI = 0.81 ; CFI = 0.92; IFI = 0.92; NFI = 0.90; NNFI = 0.91 = 0.89 and RFI .

The frugality of the structural model is discussed based on the average Chi - square value ( $\chi^2/d.f.$ ). In order to ensure the fitting of data and to make the data representative , it is necessary that this value be greater than 1 and

less than 3. For the explored model this value is  $\chi^2/d.f. = 2.87$ .

Comparing measures of fit of the structural model with recommended values the final conclusion can be reached regarding the proved acceptability of the proposed conceptual model.

**5. CONCLUSION**

Investment projects represent complex sets of activities with large engagement of all types of resources, with work force among them. Due to their complexity this sort of projects produces extremely high level of work place injuries, which was the incentive for our very research. Statistical analysis of data gathered via questionnaire for the employees on the realization of investment projects indicates significant conclusions. The state of OH&S on investment projects can be reliably

described by 23 questions (variables), arranged in five groups (latent variables). The examined control and structural models show satisfactory congruity and validity, i.e. they fit initial data well. By testing hypotheses proposed based on the conceptual model, i.e. by their confirmation, OH&S factors are indicated, affecting opinions, attitudes and beliefs of workers related to OH&S. Organizational environment, work place risk, safety measures, management training and support, as well as the communication regarding OH&S positively influence the perception of workers in the field in question, which reflects the state of OH&S during the realization of investment projects. Finally, the formulated structural model with its elements, project managers, may serve as an additional tool for taking adequate actions in order to enhance workers' safety.

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## THEORETICAL FRAMEWORK OF INTEGRATED STRATEGIC PERFORMANCE MANAGEMENT SYSTEM

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**Abstract:** The aim of this paper is to present a conceptual model of the integrated strategic performance management system. This model is conceptual framework designed as a result of research that shows significant benefits of integrated application of strategic management and performance management in organizations. The framework consists of five steps: establishing a planning system, establishing of performance measurement system, establishing an accountability system, establishing of the knowledge management system and establishing a performance improvement system. Presented conceptual framework can be implemented in both private and public sector organizations.

**Keywords:** Performance management, strategic management, performance measurement, performance improvement, accountability.

### 1. PERFORMANCE MANAGEMENT

Performance management doctrine dates back to 1950s and basic principles of Management by Objective outlined by Peter Drucker in *The Practice of Management*. The standing point of this theory is that management should be focused on attaining results by setting objectives and measuring performances (Drucker, 1954). This ultimately should lead to the shift in managers focus from activities to results. This theory was considered by many as an original management text.

The ideas that Drucker set out in his book resulted as basis for developing theory of performance management but it reached a tipping point of adoption with the publication of *Relevance Lost* by Johnson and Kaplan in 1987 (Manville & Broad, 2013). Today researchers in areas as diverse as strategy management, operations management, human resources, organisational behaviour, information systems, marketing, and management accounting and control are contributing to the field of performance measurement (Neely, 2002) (Franco-Santos, et al., 2007). The idea of managing organizational performance is widely accepted and adopted all over the world, and it is represented in both the private sector and the public sector.

Performance Management represents a widely applied concept that helps organizations to upgrade their management systems and become more efficient. It enhances operational excellence, strategic compliance, put pressure on results and quality, but also on long-term organizational sustainability and development. Performance management is in close relationship with the concept of organizational development.

Cokins (2004) defines performance management (PM) as the process of managing the execution of an organization's strategy and translating plans into results. It is an umbrella concept that integrates related business improvement methodologies with technology, overcoming the disadvantages of individual application and advocates their orchestrated application (Cokins, 2004).

Performance management is "a comprehensive management process with the ultimate goal to achieve sustainable organizational performance by focus on continuous improvement, by ensuring that its employee understands the strategy and activities that need to be done to meet stakeholder needs" (Verweire & Van den Berghe, 2004).

The performance improvement is a result-driven perspective to work, the workplace, and the worker and being proficient in both management and performance improvement is essential for personal and organizational effectiveness (Hale, 2004). Further, it is noticed that performance management is sometimes confused with human resources systems, performance appraisals, and evaluation, although it is much more encompassing (Cokins, 2004). But still it is essential to understand that good people make the business successful (Schwartz, 1999). Performance management should be part of the culture of an organization, and the key to success is the communication between employee and manager (Schwartz, 1999).

Looking from the perspective of control systems Otley (1999) describes the performance management system as a comprehensive control system that exceeds the limits of "performance for the sake of performance management." Further, the same author states that the performance management system covers a wide set of practices of management control. These practices include setting goals, developing strategies and plans for achieving the goals and performance measurement. But also performance evaluation of managers, the identification of compensation for managers and process information flow that enables organizations to learn and adapt to the situation (Otley, 1999).

Risently, Ferreira & Otley (2009) noticed that the term performance management system is used to describe the holistic nature of the system of management control, which is reflected in all the systems used by the organization for planning, analysis, measurement, reward and wide performance management.

Different definitions of the performance management concept as well as the existence of different methodologies indicate that there is more than one way to manage performances. Performance management system differs from organization to organization, from the private to the public sector. There is a significant scientific consensus that the successful management requires formal procedures and integrated

performance management system. The term performance management is now commonly used to describe a set of managerial activities for monitoring, measuring and adjusting organizational and individual performance through a variety of management methodologies, pointing out that performance management integrates the management of organizational and individual performance.

## **2. STRATEGIC MANAGEMENT AND PERFORMANCE MANAGEMENT**

The hypothesis that strategic content is key determinant of organizational performance is a basic assumption of the theory of management (Boyne & Gould-Williams, 2003; Poister, 2010; Bryson, 2004; Meier, et al., 2011; Morgan & Strong, 2003). If performance management is the process of setting organizational goals and managing to achieve those goals and desired outcomes, strategic management can be described as performance management at a strategic level (Poister, 2010). From a strategic control perspective, performance management system provides the operational methods for cascading down performance metrics and provides information necessary to challenge the content and validity of the strategy (Gates, 1999; Ittner, Larcker, & Randall, 2003). From the organisational development perspective, concepts of strategic management and performance management are perceived as inseparable part of the organization's management system and their relationship is a prerequisite for the overall development of the organization.

In this research paper, it is presumed that the integration of these two concepts could bring significant benefits to the improvement of the organisational management system. First, because of strategic perspective all processes and activities are aligned with the long-term interests of the organization (Radovic & Pejic, 2014). Second, performance measurement instructs the pressure to achieve results in the way that increases the chances of the organization to achieve the desired results. Further, this integration enables orientation to long-term development rather than short-term operational excellence. Finally, it improves communication and coordination. With strategic direction cascaded to the operational

performance actions and measures all employees understand the way they contribute to achieving long-term goals of the organization.

Considering benefits, conceptual framework for establishing an integrated model of the strategic performance management system is developed. The framework is presented in brief mode, and it is yet to be implemented and tested. But still it discloses the theoretical framework that can be further analysed and discussed.

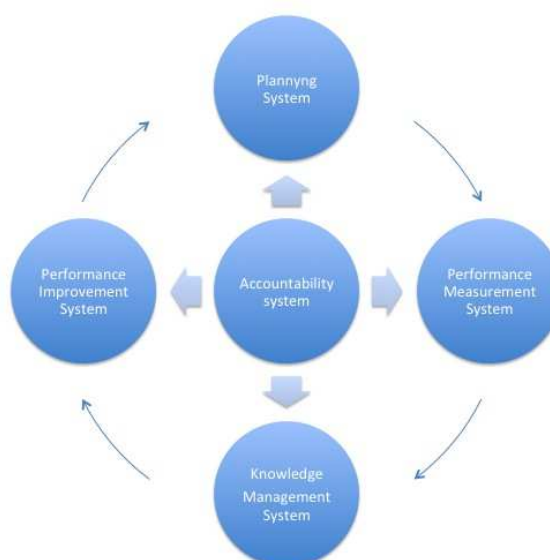
### 3. INTEGRATED MODEL OF STRATEGIC PERFORMANCE MANAGEMENT

Comparative analysis of different performance management systems provided

by (Paladino, 2011; Kaplan & Norton, 2008; Verweire & Van den Berghe, 2004) showed that systems were designed based on PDCA (Plan-Do-Check-Act) methodology.

Considering this and other characteristics of models analysed in performance management literature the process of five phases is proposed for establishing integrated strategic performance management system:

- Establishing planning system
- Establishing performance measurement system
- Establishing accountability system
- Establishing knowledge management system
- Establishing performance improvement system.



**Figure 1:** Integrated Model of Strategic Performance Management

A detailed description of every step of presented conceptual framework for establishing an integrated system of strategic performance management is presented below.

#### 3.1. Performance planning system

The first step of establishing integrated strategic performance management system is to establish planning system that integrates important planning system elements from

strategic to the operational level, including all key processes. The planning system should provide continuous and systematic process to plan organization's future and tools to measure progress and levels of success. Also, the planning system should unify the management and employees through a common understanding of organization strategy and provide them with necessary procedures and tools to achieve desired future. Leadership and communications are



prerequisite requirements for successful integration of planning process from strategic to the operational level.

A proposed planning system requires setting up strategic direction of the organization and translating this direction into a short-term performance plans to provide operational directions for organization units and individuals' actions. Key features of this process should be feedback, flexibility, and contingency. An integral part of the process of setting strategic directions is defining following elements:

- Mission, vision, and values,
- Corporate strategy and
- Business strategy

After setting the strategic direction, follows the process of translating strategic direction into operational plans. The first step is a translation of strategic tasks into initiatives and projects. Usually, the recommended methodology for this process considers developing plans, also called programs, for three to five-year period. Programs are consisted of a list of initiatives, program activities, and projects needed for implementation. These middle term planning documents are considered as strategy implementation tools.

The second step is creating a yearly cycle by creating yearly performance plans. These plans outline organizational and individual commitment to achieving specific results against the goals, objectives, and strategies of the organizational strategic plan, disclosed in programs and projects, for the resources requested in the budget (Jovanovic, 2007).

### 3.2. Performance measurement system

The important pillar of the strategic performance management system is establishing performance measurement system. Bititci et al. (1997) noted that performance measurement system enables organizations to achieve and maintain performance at a high level, with critical importance to the effective and efficient functioning of the performance management system. At first, the primary role of performance measurement system was to

enable control, support decision-making process, introduce standards for benchmarking, enable evaluation and appraisal system for employees, but also to enable and structure communication between all the organizational units as well as to provide reporting infrastructure (McGee, 1992; Forza & Salvador, 2000; Todorovic et al. 2013). In contemporary literature, there are a new theoretical considerations. The role of performance measurement system is to translate business strategies into deliverable results (Gates, 1999). The focus shifts from activities to results, linking the organizational goals with results and enabling the continuity in feedback on strategy implementation.

Integrated performance management system, as proposed in this paper should enable strategic control, evaluation, but also motivation for employees and improvement in the areas important to the organisation. Keeping this in mind performance measures needs to be integrated in two directions: vertically to focus employees' actions on the strategic direction and horizontally to align all process. There are many conceptual frameworks developed to help organizations to choose the performance measures and develop measurement system. The most popular one is Balance Scorecard developed by Robert Kaplan and David Norton in 1992. A good set of performance measures should allow managers to identify operational strengths and weaknesses, target areas for improvement and identify improvement when it happens (Ammons, 2007). The most frequently used performance metrics are financial performance measures, but the measurement systems based mainly on financial performance measures are often considered as short sighted. For many reasons, the financial performance measures cannot provide a long-term prognosis of success. To overcome this weakness, the measurement system should be based on both financial and non-financial measures. A literature review is plentiful of the different classification of performance measures, conceptual frameworks and tools for its identification. To identify the right set of performance measures that could support strategic decision making the following criteria should be fulfilled:

- Prospectiveness and relativity of the measures
- Balance between financial and non-financial measures
- Measures should provide information and have proactivity dimension
- Measures should be verifiable, relevant and easy to understand.
- Accountability system should be supported by the monitoring system, collecting and analyzing data, reporting to the management and evaluation of the results to determine what corrective actions need to be taken to improve performances.

To establish the system of performance measurement, it is important to develop a process that will enable the integration process. In this context process of performance, measurement should consist of following five steps:

- Monitoring and recording of the actual performance,
- Reporting on the performance,
- Comparison with the standards or objectives and reporting on the difference,
- For negative variance trigger corrective action,
- Recording of lessons learned.

To support this process organization needs appropriate software and trained staff. Usually, this is a long-term process of development of organizational capacities.

### 3.3. Accountability system

Accountability system forms the cornerstone of the integrated strategic performance management system. It is presumed that accountability system enables and motivates desired organizational behavior and ultimately improves performances. Accountability system should be outcome oriented and supported by reporting and rewarding system. Accountability should be established during every step of the performance management process:

- For every performance expectation defined in planning documents, roles and responsibilities should be identified.
- Based on assigned responsibility, actions, time, cost and resources needed to achieve these, performance expectations should be planned, as well as consequences for lack of them.

Some of the tools that can be used to establish accountability framework are strategy plans, annual performance plans, performance agreements and contracts, accountability reports, performance reviews, etc. Still for the successful establishment of an accountability environment two necessary requirements are leadership and ownership of actions by individuals and groups.

### 3.4. Knowledge management system

Establishing a system of reporting on performance provides insight into the actual performance of the organization by providing real and reliable information. The main role of the reporting system is to monitor and assess the performance and support the decision-making process. Hence, the role of the reporting system in an integrated system of strategic performance management is to support the process of managing the collection, analysis and evaluation of performance data and creating relevant reports. Also, a modern system of reporting should be integrated with the processes of knowledge management in the organization (Todorovic et al. 2015). Integration with knowledge management system will allow the creation of organizational knowledge and increasing the capacity of the organization.

The process of reporting and analysis consists of the following activities:

- Collecting performance data
- Analysis and evaluation of performance data
- Reporting on performance.

The purpose of data collection is to provide a basis for analysis, in other words, to transform data into information needed by decision makers. The collection of data must be focused, flexible, simple and aligned with the organizations' needs. One of the basic tools used to make this process is the data

collection plan. This plan is essential to data collection; it supports the overall objectives of the performance management system and provides details that support the decision-making process. The integrity of performance measurement depends on the quality of the collected data.

On the other side, knowledge management system has a significant impact on improving the performance of the organization (Ahn & Chang, 2004; Al Mashari, Zairi, & AlAthari 2002; Choi Poon, & Davis, 2008; Fugate, Stank, & Mentzer, 2009; Syed-Ikhsan & Rowland, 2004). Furthermore, establishing a knowledge management system requires the definition of the process of knowledge management, the necessary data, tools, and organization. Expert systems are just one of the tools that have long been applied in both private and public sector organizations. However, although there are numerous studies on the subject of the possibility of applying the concept of knowledge management, the costs are mainly those that slow more frequent application. It is, therefore, necessary to further investigate the possibility of applying this concept in an economical way in a greater number of organizations.

### **3.5. Performance improvement system**

The fifth step of the conceptual framework for establishing an integrated system of strategic performance management is to establish a system for performance improvements. The basic characteristics of this system should be a formality, flexibility and integration of processes/systems. One of the possible formal ways to commit individuals and organizational units to make efforts in improving the performance is to include such tasks in job descriptions, procedures, guidelines, and other tools. Further, it is recommended to develop the motivation system that will provide a high commitment of employees to improving the performance. Paladino (2011), for example, recommends the performance improvement by focusing on improving the intelligence system on clients and competition and improving business processes. For these purposes, Paladino (2011) recommends the application of methodology Six Sigma and Lean methods. A key prerequisite for the success of establishing

a system for improving performance is analysis and learning about the causes of the current level of performance. In this step, it is necessary to define the next step and define the necessary actions that will in the future improve existing performance. On the other hand, the output from this system must be input into the planning system. If the system creates a closed circle of action and reaction, the system of integrated strategic performance management has the opportunity to contribute significantly to a better functioning of the system.

## **4. CONCLUSION**

The paper presents an integrated model of the strategic performance management system. This model is conceptual framework designed as a result of research that shows significant benefits of integrated application of both strategic management and performance management. Presented conceptual framework can be implemented in both private and public sector organizations. □

There is no one universally applicable definition for the performance management system. However, the definition which corresponds to the conceptual framework defined in this paper is based on the claim that performance management is umbrella concept that includes the application of different methodologies, techniques and tools to create the pressure to achieve results and constant improvement of the performance of the organization. On the other side, the relationship between performance management and strategic management has shown not only that the concepts can be applied jointly but also complement each other, allowing organizations to strategic and operational excellence.

The importance of this concept is in the formal definition of planning and measurement system, but also accountability system, knowledge management system and system for performance improvement. Altogether this management model on the systematic way can contribute to the strategic development and its long-term sustainability of the organisation.

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## MEGAPROJECT MANAGEMENT IN CONSTRUCTION INDUSTRY

Strahinja Zindović

**Abstract:** In modern construction industry, cities, states, and even entire regions, their infrastructure needs and problems are solving more often by building megaprojects. These unique construction undertakings are characterized by exceptional complexity, high cost and long duration. When delivered in the right way, megaprojects bring many benefits, significantly alter and improve the environment, and generally improve the quality of life of the users of their results. However, the realization of megaprojects carries great risks and slightest deviation can lead to unforeseeable consequences. It is very important to manage properly them and keep them under control from the beginning to the end.

**Keywords:** Megaproject, construction industry, project management.

### 1. INTRODUCTION

Megaprojects are complex undertakings which, depending on the level of complexity, can be treated as projects or programs (Merrow, 2011). Megaprojects are characterized by the size, duration, uncertainty, ambiguity, complex integration and significant external and political influences. Usually, the term megaproject is used for any project whose value exceeds \$ 1 billion and with duration of 3 to 15 years (Greiman, 2013). Reiss (2000) considers megaprojects as programs and defines them as a type of program that includes managing a portfolio of projects focused on one goal. Program management, in this case, refers to a large project consisting of a very large number of components or smaller projects. In this case, the program manager coordinates the work of individual project managers who are responsible for their work. This kind of program has its own end (Reiss, 2004).

Construction megaprojects represent temporary efforts undertaken to create specific structures or objects, whose purpose is defined by their final owners. The realization of construction megaprojects must take into account the effects of geographical location, natural conditions, physical limitations, applied materials, political consequences, cultural perspective and multinational stakeholders. They can be

considered as one of the most complex projects that the human race has ever built (Nielsen, Governance of the Megaproject, 2013).

Galloway and Reilly (2013) suggest that most construction megaprojects, if not all, are defined by the following attributes:

- Their budget exceeds the cost of 1 billion US dollars;
- Realization time takes several years;
- Designers, engineers, contractors and suppliers on a multinational level are included;
- Specialized labor force is counted in the thousands;
- Ownership and/or the consortium financing;
- The technical complexity;
- Political risks and consequences;
- Sociological risks and consequences (Galloway & Reilly, 2013).

Frick (2008) for the characteristics of the megaprojects uses the term "Six Cs":

- Colossal
- Captivating
- Costly
- Controversial
- Complex
- Laden with control (Frick, 2008).

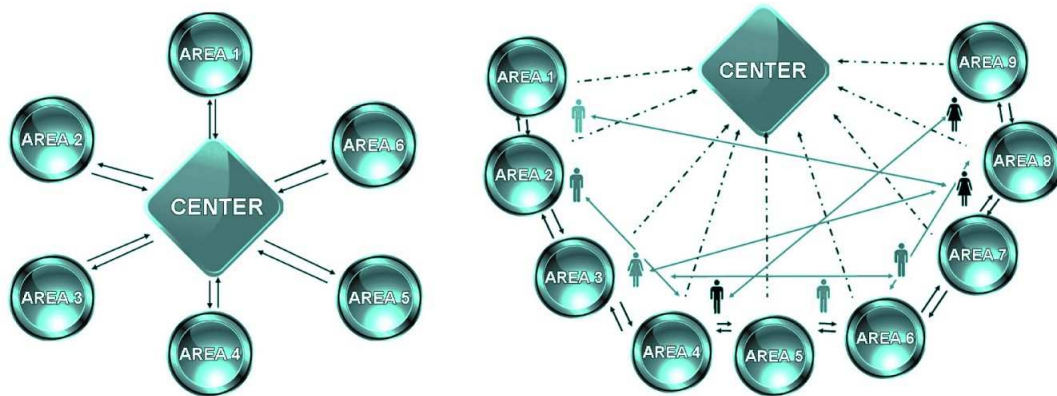


### 1.1. Megaproject management organization

Merrow (2011) says that for the most part of the megaprojects are managed in a similar way as the smaller projects, with additional modifications. The organization and its structure is the most affected by the complexity. He distinguishes three basic models of the organization for managing megaprojects: Classic model, hub and satellite model and "organic" model.

If projects are huge in scale and cost, and simple in structure, there's no reason to not use

the classic organizational models of project management - functional, project and matrix models. Method of designing organizational structure that is based on establishing a functional form is the classical method that is very often used in designing organizations, while methods, which are based on establishing the project and matrix organizational forms, are modern methods that respect the complexity and dynamism of modern systems and projects and provide more efficient management and better overall results (Jovanović, 2010). In this case,



**Figure 1:** Hub and satellite model (left) and Organic model (right) (Merrow, 2011)

The megaproject is managed as any other project, with all the methods and techniques of project management. The advantages of this model are simplicity, clear lines of authority, easy communication and quick decision-making. However, if there are three or more project teams, project management method becomes more complicated, and the job becomes too large for the classic project leadership. Often organizations for managing megaprojects are initially organized in a classical way, but over time, as the workload increases, they are transformed into one of following two models.

When work on the project includes three or more teams, with different scope and volume of work, the project is considered as a project of medium complexity. Control systems are starting to break under the weight of management interface and a large number of decisions that the project manager has to make. It requires a change in the model of organization. **Hub and satellites model**

represents a model in which in the center (hub) is project leadership responsible for planning, contracting and controlled. Also, in the center are made decisions regarding recruitment, training and logistics. "Satellites" are separate areas that are managed by separate teams, all of which correspond to the "center". The "satellites" make decisions solely related to the field to which they belong, and which have no impact on other areas. Additionally, through this model, it can be much easier to manage if certain parts of the project take place in different locations. That way, each "satellite" represents a smaller project. However, there are some problems with this model of organization. Every boundary between areas which belong to the "satellites" must be clearly underlined and it has to be clear where exactly one area ends and the other begins. Also, when the number of decisions that have to be taken from "the center" increases, the whole system tends to slow down. This model of organization is most commonly used with complex megaprojects. But as the complexity increases, there is a

possibility that the system will collapse. When complexity exceeds this model, it is better to use the "Organic" model.

**Organic model** aims to maximize the number of decisions made at the team level. This is achieved by encouraging interaction between the teams in certain areas, as well as their interaction with the environment. This model is called "organic" because it mimics the development and functioning of the organism. Center (brain) develops a framework master plan and distributes it to all teams for execution. Risks and changes are mostly managed at the team level. Each team has one person responsible for communication with the center and other teams.

Managers are used for integration and coordination of all the events that occur in each of the teams and meet regularly. This model was created so that, instead of adapting the problems to the organization, the organization is adapted to the problems. The problem in this kind of organization may be inexperienced people, which can complicate the process of integration. Experienced managers for integration are very difficult to find and this may represent a challenge in the process of recruitment. Also, such an organization must be very well incorporated, otherwise it can cause serious delays.

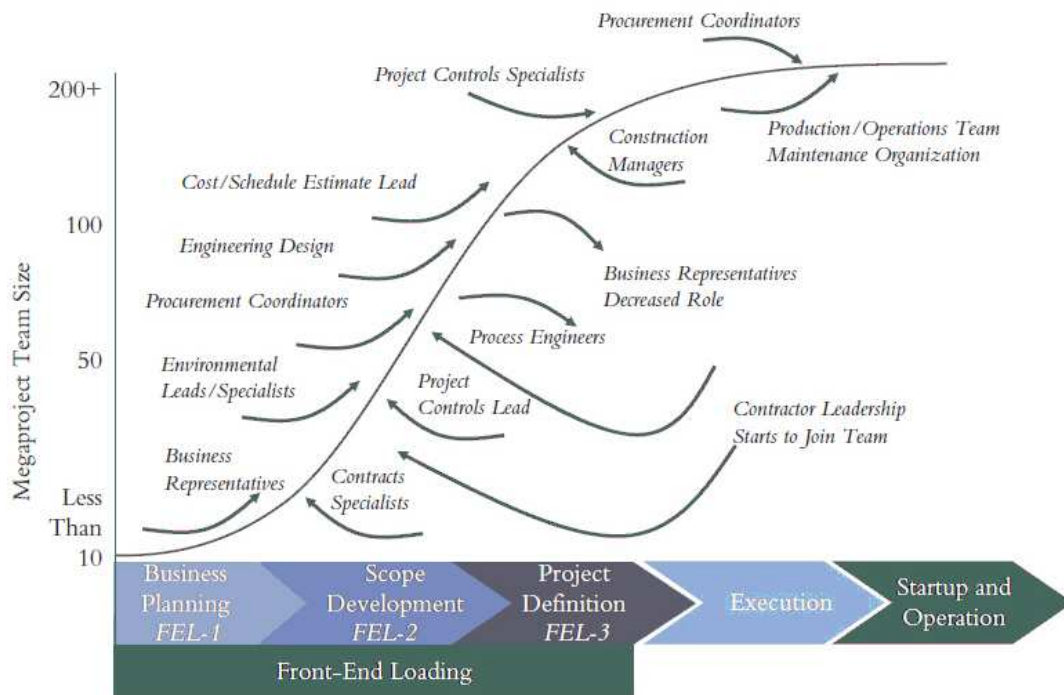
The same author says that the great complexity of megaprojects can overcome all the principles of project management. In such cases, it is better to apply principles of **program management** by dividing the megaproject on multiple projects, each of which has its own time of realization. Sometimes, mostly to save funds, megaproject can be divided into several smaller projects and run separately, in a very long period of time. Applying this concept do not need to represent an alternative to the concept of project management, but must be used when the work is programmatic in nature only (Morrow, 2011).

## 1.2. Key roles in megaproject management

Key stakeholders in the management of megaprojects can be divided into direct and indirect. Direct are most commonly consumers, investors, sponsors, managers and their teams, contractors, subcontractors, suppliers and business partners (PMI, 2008). Indirect stakeholders are not directly involved in the project, but can have a significant impact. They can be external investors, special interest groups, regulatory agencies and bodies, the general public, trade unions, public administration, media (Nielsen, Governance of the Megaproject, 2013).

The same author says that the way to manage the megaproject is determined by the higher level of corporate management and the board of directors when it comes to private investment, or at the level of the competent government administration when it comes to public investment. Senior management, directors or state officials should provide the necessary systems, processes and management structure so that information travels from top to bottom and vice versa through the organization. This contributes to making clear decisions at the appropriate level within the megaproject. The complexity of the megaproject will determine whether it will be managed as a project or program, and based on that will be established key roles in its implementation. Crumm (2013) identifies the following key roles in megaproject team:

- Overall Project Leader;
- Project Control Leader;
- Project Procurement Leader;
- Project Traffic Manager;
- Project Construction Leader;
- Home Office Project Manager;
- Modularization or Heavy Lift Expert;
- Site Procurement and Subcontracting Leader;
- Human Resources and Business Manager;
- Local Labor and HR Attorneys (Crumm, 2013).



**Figure 2:** The project team changes as the project progresses (Merrow, 2011)

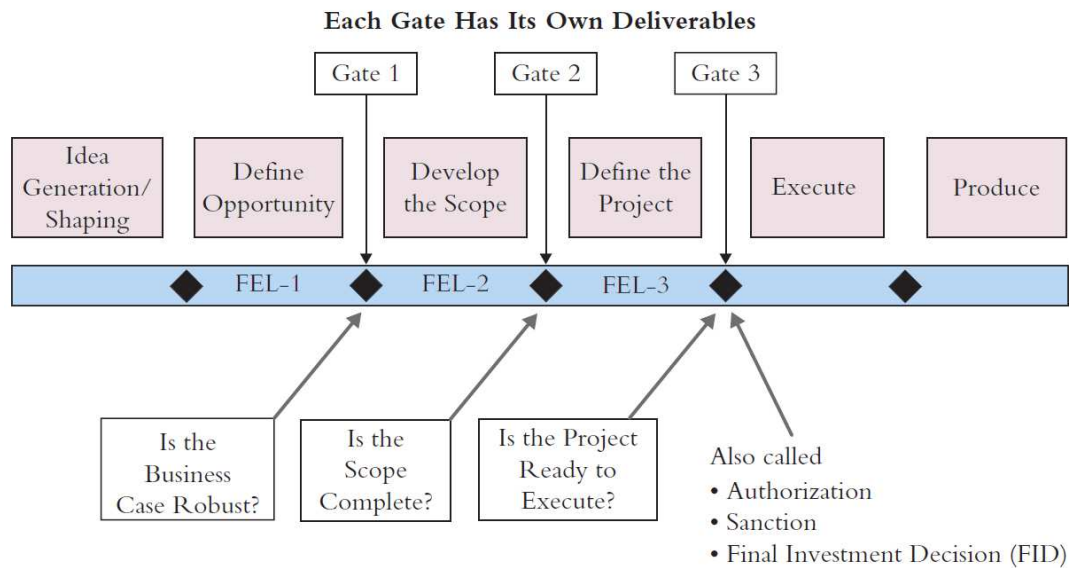
### 1.3. Megaproject management process

Whether megaproject is seen as a project or program, management process must go through the basic stages: initiation (conception), planning, implementation and closure. Key elements are time, resources and costs. However, given the cost and complexity of megaprojects, as well as a great impact on the environment in which they run, special attention should be paid to several sub-phases, which are an integral part of the above-mentioned basic phases.

#### 1.3.1. "Front-end" planning

Merrow (2011) says that the megaproject is fragile by nature, and that any minor deviation could lead to unforeseeable consequences, and that the smallest things are important. Therefore, the "Front-end" planning is a key process that must first be implemented. This work is divided into stages, with a pause for evaluation and decision on whether to proceed further. Estimations must include economic/business and technical aspects of the project. This author proposes a model of "Front-end" planning, which consists of three

phases, with three outputs for each of them to make the assessment. He states that the most common mistake that companies make is that this process is viewed as a process that needs to meet the engineering aspect, and, on the contrary, it serves to fulfill the business purpose. The process is initially focused on business, but later it focuses on the technical and engineering aspects. In this format, which consists of three phases, the first output is the result in the review and assessment of the business case for a megaproject. Cost estimation in this phase comes down more to guesswork because it has not been defined the true scope of the project. Most often this first estimate is much lower than it would be later revealed. The second phase includes developing the scope of the project and in it defines all the elements of which the project is composed - on-site and off, all the facilities, infrastructures, the development environment - everything must be included. After this comes a third phase, which refers to the development of clear plans for implementation of the project. Everything that was preliminary in the first two phases now becomes definitely - final. Finally, the precise plan is made through which project will be executed (Merrow, 2011).



**Figure 3:** “Front-end” planning (Merrow, 2011)

### 1.3.2. Design management

One of the most critical items in the development of megaprojects is the engineering design that is made prior to construction work at the site. When the engineering design process is well composed with construction and contracting elements, the final result provides savings of time and money, and above all, high-quality project. (Warne, 2013).

De Bruijn and Leijten (2008) say that in terms of technical complexity, it is easier to manage mega project if:

- Project is robust (overdesigned);
- Proven technology is used;
- Project is divisible;
- There is loose coupling;
- There is fallback option;
- Project is monofunctional;
- Implementation is incremental (Brujin & Leijten, 2008).

It is commonly thought that the design process is performed only before the construction process. On the contrary, the design elements are incorporated into the development of the project since its very beginning (Warne, 2013). Warne (2013) defines three common phases of design that occur during the life cycle of megaprojects:

- **Planning and environmental-preliminary engineering** is the first phase of the designing process during which it is necessary to perform all the actions that precede the final engineering and project implementation. Depending on the structure and function of the project, this phase includes a number of processes of planning and preparation in accordance with the limitations of the environment in which construction will be carried out and, later, the exploitation of project outcomes.
- **Final design** represents engineering design through which are made all the necessary plans and specifications for the construction of megaprojects. The final design takes a relatively short time compared to the time of execution of megaprojects.
- **Postdesign service** is a phase in the period of project execution when the contractor leaves some designers for problems that might subsequently arise. These designers must be very familiar with the project, must have access to colleagues who have worked on the design and left the project, and must provide technical support services on site (Warne, 2013).

### 1.3.3. Procurement and construction management

Even if planning, design and financing processes are done right, without well-executed construction work on site and completion of the procurement processes, the project will be unsuccessful. For the successful project, it is necessary to make a plan of execution. The development of this plan is the responsibility of managers for procurement and construction control. Such plan must be developed before work on the site begins and must contain all information necessary for the performance - work sequences, selection of construction, procurement processes, applied materials, contracts and sub-contracts, the duration of the staff involvement, etc. When this plan is made, it cannot be changed, only monitored with the implementation of the necessary changes made in the process of execution. This plan is mainly produced by the main contractor, and depending on the contract, it is implemented through relationships with subcontractors and suppliers. The procurement process is one of the most important processes in the megaproject realization. The implementation plan must be provided for all of the materials and systems that will later be embedded. The system of procurement for these components varies from project to project and often contains a large number of materials. Management needs to find suppliers with which contracts must be concluded before the start of construction. Since the megaprojects are often realized in foreign countries, or even several countries, management must first research the market and find suppliers who will deliver quality products at the right time. Often the design incorporates materials that are typical for the area of construction and for which there should not be a delay in procurement. Also, the practice is to engage in surveillance of local companies that know better the situation on the market. On the construction site, it is necessary to perform control of costs, schedules and progress of the whole megaproject. After completion of construction, it is necessary to obtain the warranty on completed works and installed materials. Also, after the commissioning of the constructed facility, while guarantees apply, it is necessary to monitor the functioning of the building and the prevention and remediation of problems if they occur (Crumm, 2013).

### 1.3.4. Risk management

Talking about megaprojects, from any perspective, leads to the fact that the biggest challenge is to overcome enormous risks that occur. If we take into account the basic characteristics of the megaprojects such as extra-long period of construction, global nature of the procurement, the political changes during the period of implementation, the complexity of managing a large number of contractors and thousands of workers and expanded stakeholder base, it becomes clear that great attention should be paid to risk management (Toljaga-Nikolić, Todorović, & Bjelica, 2014). Risk management is a key priority and the primary focus of most investors, owners, contractors, suppliers and geopolitical entities involved in the implementation of megaprojects (Nielsen & Dignum, The Importance of Risk Management, 2013). With growing global need for large infrastructure projects, the potential benefits of managing these risks in an effective and systematic way are enormous, with the result of improved performance in terms of cost and time spent. (Little, 2013).

Most authors agree that risk management consists of four phases: identification, quantification, response to risk and monitoring and control. Reilly (2013) defines more detailed stages of risk management: risk management planning, risk identification, qualitative risk analysis, quantitative risk analysis, response to risk and monitoring and risk control (Reilly, 2013).

Nielsen and Dignum (2013) say that the megaproject risks can be divided into internal and external. Internal risks related to the realization of the projects are operational risks, technological risks, financial risks and risks of purchasing and contracting. External risks related to the project context are political risks, environmental risks, social and cultural risks and economic risks.

When it comes to large international projects, the occurrence of the risk may be influenced by the language barrier, cultural differences, their geographical distribution, large differences in the skills of the workforce and their availability, political instability, unknown flora and fauna, unusual criminal laws, uncertainties regarding weather conditions, unknown geological



structure of the soil, the possibility of double taxation (when running in several countries), exchange rate fluctuations, corruption, dissatisfaction of the local population, etc. (Hinchey, 2013).

On the issue of risk possession, the best solution is that the responsibility falls on the risk management team, which is part of the main megaproject team. They are focused on the risk management process and they fully monitor and coordinate all identified risks and are responsible for the implementation and constant adjustment of the Risk Management Plan (Nielsen & Dignum, The Importance of Risk Management, 2013).

#### **1.4. Megaproject financing**

One of the most important items in the realization of megaprojects is their funding. Given the very high cost of these projects, the provision of financial resources and financing is a task that must be approached with care. Hughes (2013) says that there are various options in choosing a method of financing the megaprojects. It can be public, private or a combination of public and private (Hughes, 2013).

##### **1.4.1. Public financing**

The simplest form of public financing of megaprojects is a simple model - DBB design-bid-build. In this model government agencies hire engineers to design a project, and select the contractor. When the facility is built, it is given to the public agency that funded the project on the use and maintenance, often with a guarantee period of several years. To overcome challenges of this model, integrated model DB - design-build is developed.

This model is most widely used in the private sector. This model is also called EPC model - engineering, procurement, construction. Within this model a complete process of design and construction is executed by a single business entity chosen by a government agency, often for an agreed price, and all the risks are transferred to it (Hughes, 2013).

##### **1.4.2. Private financing**

For privately funded megaprojects, as well as in public, there is a great struggle for funding. The problem with private funding is that the investment is heavy in the beginning, while the return on investment is expected after a period of 10, 20 and even 50 years (Tucker, 2013). Bates (2013) says that in private financing of megaprojects are usually used the following three models, as well as their numerous variants:

- The general contractor model;
- Turnkey model;
- A hybrid approach with multiple prime contractors (Bates Jr., 2013).

##### **1.4.3. Public-private partnership**

When government agencies decide to conduct a major undertaking, but have limited resources and potential capital debts present, it is possible that they entrust the design, construction and financing of that undertaking to an entity in the private sector. This method is the basis for a public-private partnership (Hughes, 2013).

The public-private partnership is a contractual agreement between the public and private sector, where the private sector, in exchange for compensation, agrees to implement an infrastructure project and the service that it provides. The private sector usually agrees to design, build, finance, operate and/or maintain that infrastructure (Little, 2013).

Public-private partnership can be achieved through the following models:

- Design-Build, DB;
- Operation&Maintenance Contract, O&M;
- Design-Build-Finance-Operate, DBFO;
- Build-Own-Operate, BOO;
- Build-Own-Operate-Transfer, BOOT;
- Buy-Build-Operate, BBO;
- Financing;
- Concession.



### 1.5. Challenges in megaproject management

Galloway and Reilly (2013) say that there is, from their experience, the six key challenges in managing mega projects:

- **Ricochet effect** - This effect occurs when disturbances are unpredictable and illogical, in unrelated activities, thereby provoking unintended consequences and affect the whole process of implementation of megaprojects. This effect has a great influence on key megaproject limitations - costs and time.
- **Controlling expectations of stakeholders who do not directly participate in the megaproject** - As already mentioned above indirect stakeholders can be external investors, special interest groups, regulatory agencies and bodies, the general public, labor unions, government, the media and others. With these stakeholders, success of megaproject is estimated directly - either it did or did not meet their expectations. There are three primary types of these expectations: the final price of the megaproject, the end time of its realization and the fulfillment of initial intentions of the megaproject. It must be properly presented to indirect stakeholders that even with the best-managed projects things can go wrong and that determination of time and cost is a major challenge in managing megaprojects.
- **Controlling the cultural differences** - Even though in megaproject control the key elements are time, cost and quality, the knowledge in dealing with people, organization and communication are also important. However, cultural differences affect the way in which this knowledge is applied worldwide. Because megaprojects are implemented in multicultural societies special attention must be paid to the coordination and control of the cultural differences between certain interest groups.
- **Controlling costs creep** - One of the two critical elements in managing megaprojects is budget, both from a management perspective and from the perspective of indirect stakeholders. Predicted and final price of a megaproject represent the most

prominent fact that identifies its performance. To avoid the difference between these two prices, it is very important to establish good systems to control costs at the very beginning.

- **Controlling schedule creep** - Another critical element in managing megaprojects is the time of their realization. As with costs, the problem arises in expectations, indirect stakeholders. The mistake that direct stakeholders usually make is the publication of the date of completion, allowing any excess face harsh criticism and condemnation of all interested parties. In this way success of megaproject is easily measured: is the project completed by the promised date? To avoid serious exceeding scheduled time, limits established by the scope of the project should be determined in a clear and precise manner.
- **Controlling information overload** - One of the features of the megaprojects is a large amount of information which has to be exchanged on a daily basis between the direct stakeholders, that information becomes itself an obstacle to effective and efficient control of costs and timing. The most important elements of a successful control of documents and information are adequate and trained staff, professionally organized document control procedures adapted to the structure and organization of the mega project, computerized monitoring of the distribution of documents, as well as backing up the system, notification system that sounds when a document has not reached the desired place, and centralized and computerized storage of documents (Galloway & Reilly, 2013).

### 1.6. Megaproject management concept of the netlipse organization

Netlipse is an organization founded for the dissemination of knowledge on the management and organization of large infrastructure projects in Europe (Network for the dissemination of knowledge on the management and organization of Large Infrastructure Projects in Europe). NETLIPSE began as a two-year research program that lasted from 2006 to 2008. It has launched a network between government authorities,

universities, research institutes, design organizations and private consulting companies. After completing the program, the Agency for the Trans-European Transport Network (TEN-T EA) has decided to continue and expand NETLIPSE initiative through the development of tools and training programs. The basic aim of the NETLIPSE organization is a knowledge organization about the management and organization of large infrastructure projects, and through its work, there has been an attempt to obtain answers to some of the following questions:

- How to organize a better planning process in procurement phases?
- How to become a better client?
- How to implement and organize ambitions in transport infrastructure to retain the value of money, with lower costs of financing, satisfactory quality, control, risk management and requirements of stakeholders?
- How to learn from successful projects (realized in the limits of time, budget and quality) and less successful projects (analysis of problems and implemented solutions)?

Based on 15 major infrastructure projects and lessons learned and practices, NETLIPSE developed the concept of management of these projects and divided it into eight important topics:

### **Objectives and scope**

Objectives of infrastructure projects are usually defined as the benefits of project stakeholders, society and the environment as a whole while the scope represent a physical infrastructure that needs to be achieved through time-frame. The scope is often defined in the planning stage. Defining goals has to be done in interaction with stakeholders, with certain variations because sometimes external and internal changes can bring on changes in the objectives.

### **Stakeholders**

Studies have shown that all design organizations particularly valued the participation of stakeholders in the project. It is

important to categorize them (government, private companies, non-governmental organizations, etc.). There are seven essential actions that need to be done in terms of participation of stakeholders:

- 1) The involvement of the operational and engineering experts in the field from which it is implemented;
- 2) The involvement of local stakeholders;
- 3) Maintaining communication throughout the project;
- 4) Reaching consensus with all stakeholders before tendering and contracting;
- 5) Allowing political branches supervision of the project;
- 6) Formalizing all responsibilities to clients/sponsors;
- 7) Project branding.

### **Financial management**

Large infrastructure projects are expensive and can be funded in different ways. In order to do a good financial plan, it is necessary, first of all, to do the proper calculations of financial income and expenses. Next, we need to investigate and find the right financing model (public, private etc.). It is very important that the project and its financing are transparent so that all stakeholders have a clear insight into the progress of the project. During the project execution, it is necessary to perform cost controls and compliances with the budget.

### **Organization and management**

Organization that implements the project can never operate with complete autonomy. It is always accountable to external parties: clients, sponsors, local communities, political bodies, etc. These parties often make various pressures to direct participants during the project execution. In order to smoothly perform its part of the work, project organization must find a way that will control these pressures. First of all, it is necessary to define clearly roles and responsibilities in the project for all the parties: clients, sponsors, performers, etc. Accordingly agreements and contracts should be developed for certain parties that will give them the share of ownership of the project. Next, models and communication structures have to be created for reporting and decision-making from top management to bottom. Due to the constant

external and internal changes that occur during the implementation of major projects, it is necessary to establish such an organization that can quickly adapt. Change management is one of the most important segments of the good organization for project management that are large in scope and duration. Given the number of participants in the projects and a large number of workers who are involved in the process of implementation, it is important to invest in human resources management and control of all aspects of this field.

### **Risks and opportunities**

Risk management should not be a separate activity, but an important part of the usual routine management. The practice has shown that risk management should be dealt by independent groups, so managers and employees could not have all the information about the risks because they tend to keep them to themselves. Risk Manager with his team should be independent of the other teams and departments. Focus on the risks can cause a negative atmosphere and because of that the uncertainty should be seen as an opportunity, not just a threat, which can create new energy in the organization. Risk analysis should be shared with all stakeholders before the tender in order to be aware of all the adverse events that can occur when the process of implementation begins. Potential risks should be categorized and ranked, and after that database should be created for easier and constant accessibility to all information on the risks.

### **Contracting**

Contracting is a vital aspect of large infrastructure projects. Organizations that implement the projects create contracts and agreements with private contractors on price, quality and execution of construction projects at the same time striving to minimize costs through innovative ways of contracting which are integrating design, construction, financing and/or maintenance and management. There are numerous models of good practice and lessons learned, and each could be applied depending on the circumstances. The successful model of contracting and funding for one project does not mean it will be successful for other. Therefore, management must consider all good internal and external influences to find the right model

for their project. The contracting process should be managed by managers with expertise in the field of contracting, who are trained to carry out the negotiations and to conclude contracts with contractors. Finally, successful contracting is necessary to have a good relationship between the parties, built on trust and mutual assistance.

### **Legal consents**

Project management team must be familiar with all the legal issues that may be related to the project, and the project must be kept in a legal framework. It is necessary to develop a clear outline of procedures that are in line with the current legal restrictions, and they need to be updated with each change in legal regulations. Large infrastructure projects often take a long time, so there are political and legal changes. It is essential that the management of the project is up to date with all the changes and in accordance to them reacts to avoid delays and problems in implementation. In that matter, they should have help by the experts in legal issues, which are also members of the team.

### **Knowledge and technology**

Projects can be realized through the use of existing or new technologies. When existing technologies are used, they must be operated with the knowledge and experience of the already implemented projects. With new technologies, vigilance and developing methods are required for risks limitation and implementation of new knowledge. It is crucial to share knowledge with all participants in the project, as well as other organizations (Hertogh, Baker, Staal-Ong, & Westerveld, 2008).

#### **1.7. Megaproject management concept of the KPMG**

KPMG is a Swiss multinational company founded in 1987, organized as an international cooperative based in Amstelveen in the Netherlands. According to data from 2013, the company at the global level, had more than 155,000 employees in offices in 156 countries worldwide, with revenue of over 23 billion US dollars per year. The focus of the company's business is in audit, and tax and advisory services. In the area of auditing, it is one of the four largest companies in the world along with

Deloitte, EY and PwC. When it comes to consulting services, the company is engaged in various areas - the car industry, banking, construction, engineering, energy, media, infrastructure, health, etc. In the field of civil engineering, through its numerous experts, it has participated in some megaprojects around the world in a consultant role, working with the government and the private sector. Based on the gained experiences and lessons learned from a number of derivative megaprojects, the company established a concept for successfully managing megaprojects (KPMG, 2013). The following areas constitute this concept:

### **Early planning and organizing**

Planning and organizing construction project sets the basis for everything that will happen when the project gets the "green light" by investors. During the planning and organizing phase, the course of the project is set, and course corrections are made. After manpower, materials and equipment are included, planning flexibility disappears.

The first step in planning is the early drafting of the project team. The best solution is to draw up a core team that will monitor the project through all the stages and provide accountability and transparency. The main team should consist of: project director, manager of engineering, procurement manager, construction manager and managers for commissioning the facility.

The next step is choosing the right strategies for the project. Once a project moves from the level of setting strategy to level of feasibility assessment, it is necessary to determine the manner and method of implementation of the project. Strategy implementation can vary from the full involvement of an investor to the fact that everything relies entirely on the main contractor (turnkey). There are four different strategies for the realization of the project:

- 1) Traditional (e.g. *design-bid-build*);
- 2) Collaborative (e.g. *construction management at risk*);
- 3) Integrative;
- 4) Partnership.

The next step is the development of a realistic estimation. The project team should deal in a more realistic way with the estimation related to the successful completion of the project. The result of the assessment must be plus or minus 15 to 20% accuracy, within which will move all future work on the project.

One of the key aspects of managing construction megaproject is risk management. Risk management refers to the identification of risks, both internal and external, until the completion of the project. Project risks can be technical, related to the scope of the project, related to the schedule of costs, related to human resources, legal and regulatory, safety, security, political, etc. Early planning and risk identification are essential to the accurate planning of time and cost. Risk must be managed throughout the project life cycle. Without proper risk planning, identification, analysis and monitoring, it is certain that the significant problems will appear.

Each corporate megaproject must have strong support from top management to be successful. Once all the segments of planning (framework budget, time schedule, the cash flow models, financial analysis, financing models, etc.) are completed, the craft of a document is required, which will then go to further revision. In addition, the most important thing is that the project complies with the current strategic objectives of the company and stakeholders.

To make the process of managing megaproject successful, it is necessary to develop specific systems, processes and procedures that will constitute the framework of this process. They should be designed in such a way that they are mutually consistent and responsive to the specific needs and conditions of the megaproject.

The important segment of the planning and organization is the determination of roles and responsibilities of project team members and other participants in the project. Each participant should have a list of their responsibilities. Also, they should be involved in the line of command and reporting and be familiar with all the procedures in the project.

To improve cooperation between frequent staff meetings should be organized. Meetings should be regularly held, weekly and monthly. The meetings should be attended by representatives of all functional areas (engineering, design, procurement, etc.). Also, it is necessary to organize regular meetings with contractors, subcontractors, suppliers and other participants in the project, which should have open access to the project team members if they run into problems.

### **Stakeholder communication and project controls integration**

Successfully managing communication with stakeholders means that they are given the right to vote, to allow them to participate in the governance process and to allow them to contribute to the overall success of the project.

To successfully manage the communication with stakeholders, it is necessary to develop a communication plan. First, identify all project stakeholders, internal and external, direct and indirect. Each communication plan should be distinguished: specific events for reporting, the level of participation, frequency of communication, communication format and the process of obtaining feedback from stakeholders.

Stakeholders need to get information such as: projected budget variance, the variance of the schedule, the progress of key events, contract status, cost and time efficiency index, the degree of completion of the project, etc. During the implementation of megaprojects, stakeholders should receive a report on a daily, weekly, monthly basis, as well as ad hoc. The most common stakeholders that have to be notified are top management, project sponsor and representatives of local communities.

To keep project realization under control, it is necessary to develop control systems that have to be implemented throughout the project realization. It would be best if these systems are computerized, with the specially developed IT system.

The key of integrated project management is the decomposition of key tasks in the project over the WBS techniques. The components of the project such as the scope, resources, budget,

responsibilities, etc. are defined hierarchically in this way and divided into smaller elements in scale, which makes them easier to manage and control.

The next thing needed is a framework plan. It is being developed in two phases: activity planning activities and scheduling. Activity planning includes creating the WBS and creating an appropriate network diagrams, with all the necessary elements. With scheduling, the earliest and latest start and end of each activity have to be determined. The framework plan is updated on a monthly basis with taking into consideration the real progress of each activity. In order to determine the budget of the project, it is necessary to estimate the costs.

It is done in 4 phases: the concept phase, which is based on the initial scope of the project, the phase of feasibility studies, when the design is already 20 to 40% complete, the detailed design phase, when the project design is 60 to 75% complete, and phase of documents for execution, when all the documents are developed and approved by investors. When cost estimates are made, the provisional budget can be obtained, which will be regularly monitored on a monthly basis and which will be modified if necessary.

Another important segment of control is change management. It is necessary to develop systems and mechanisms for monitoring these changes, as well as procedures for the implementation of changes through pre-defined documents.

Risk management should also develop monitoring systems and database. Risk managers through various simulations determine the potential risk and thus determine the level of safety of realization of the project and its segments. Risks are monitored on a regular basis, and the analysis of new risks is made on a quarterly or monthly basis.

The project team must monitor the implementation of the project. The most commonly used method for monitoring is EVM – Earned Value Method. If the results have a negative tendency, manager reports to internal and external stakeholders and, in cooperation with them, he develops action plans to keep the project back on track.



### **Continuous improvement of chances for project success**

One of the ways to encourage continuous improvement is that the team conducts a series of self-assessment of project control. Project self-evaluation should focus on evaluating compliance with the procedures and rules in corporate and project level. Project self-evaluation may include: project readiness, compliance control, evaluation of risk management, assessment of cost performance and EVM, etc. Furthermore, it is necessary to carry out the individual assessment of the project team, identify areas that need extra training and encourage continuous improvement. Effective performance evaluation is done by comparing the actual performance with the pre-defined job description. From time to time, it is necessary to implement new processes in managing mega projects. To do this successfully, the project's management must oversee the transition from top to bottom.

After completion of the project, it is necessary to join managers who deal with the operational readiness to the project team, and that will make the transition from the closure of the project to the operational functioning of the new facility. Finally, apart from successfully realized projects, learned lessons are remaining from the whole process of implementation, and they need to be properly archived.

#### **1.7.1. Case study: New Songdo City**

##### **About project**

Songdo International Business District or New Songdo City is the most modern construction project in terms of smart city and the most expensive project of its kind, with a planned budget of about 40 billion US dollars. This city, built from scratch, covers an area of 610 acres, southwest of Seoul, on the coast of the city of Incheon. The project started in 2001 and completion is planned for 2015. It will comprise 80.000 apartments, 4.600 m<sup>2</sup> of office space, 930.000 m<sup>2</sup> of retail space, 460.000 m<sup>2</sup> of hotel space, 930.000 m<sup>2</sup> of public space and the central park area of 400.000 m<sup>2</sup>. Also, within the city, the construction of three foreign universities is planned. The design center and all facilities was made in the most modern way,

using green technology. This project represents one of the largest privately invested enterprises. Ownership is divided between the company Gale International, with a share of 61%, Posco, with a share of 30% and Morgan Stanley Real Estate, with a share of 9%. The master plan was designed by the architectural firm Kohn Pedersen Fox, KPF, from New York. The city of Incheon were responsible for the development of the necessary infrastructure and workforce insurance (Songdo International Business District, 2014).

##### **Project goals**

The main goal of the construction of the city was trade development in Northeast Asia, which has grown rapidly in recent decades. The data shows that already in 1998 27% of world trade took place precisely in this territory, and the most responsible for this is China, as a leading country of the region. As South Korea is positioned in the central part of Northeast Asia, there was a concern that the government will remain isolated from the surrounding giants of world trade. This concern has led the government of South Korea to begin a long-term plan for economic growth and development. The focus of this plan was the opening of a "free trade zone" in 2003 in the city of Kvangjang, Busan and Incheon. The main objectives of this project are:

- To develop a new international city with high standards that go beyond the Korean;
- To manage large, multi-phase project successfully by using the expertise of international experts;
- To encourage foreign direct investment and the participation of investors in the project;
- To attract international companies using the expertise of foreign partners (Lee & Oh, 2008).

##### **Challenges and Solutions**

Planning and implementation of the project were carried out under the conditions of the city Incheon, which contained the following: the construction of a center for conventions with soil for its future expansion, the construction of the central park and the construction of major infrastructure. The company that led the project, Gale International, for this reason,



divided the design phase into two sub-phases: profitable projects and unprofitable projects, so that they could cover the cost of unprofitable facilities. Furthermore, the project faced with cultural challenges because the business environment in Korea was significantly different from the environment in the US. For this reason, managers of Gale International had to learn the business culture and market environment. One of the challenges was the time difference of 13 hours that required additional costs. The answer to this problem was solved by opening the branch company in Seoul in 2004. The political factor was an inevitable problem. During project implementation three president and two mayors of Incheon changed, so the management had to face different views on the project by these politicians and their governments. Also, lack of adequate infrastructure has emerged as one of the major challenges. Officials of the city did not have adequate mechanisms and expertise to solve these problems, and the necessary permits were not issued on time. It took a long time and effort for the project managers to train them and bring them to a level that was required for such complex undertaking (Lee & Oh, 2008).

### **Project benefits**

Songdo is the largest project in the history of South Korea and is a pioneer project of the local authorities and companies. The use of advanced IT technologies and green design represents a new direction in which the world's cities should go, and Songdo will be a source of experience and lessons learned. Financial benefits have yet to be shown, and it remains to be seen whether the project will pay off to the Gale International.

### **1.7.2. Case study: “Big Dig” central artery/tunnel in Boston**

#### **About project**

Central artery/tunnel project, unofficially called "Big Dig", is a mega project performed in Boston, USA and is considered one of the largest and certainly the longest enterprise in the recent history of civil engineering. This project changed the direction of the state highway I-93, called the central artery, which was carried through the city center through the tunnel 5,6 km long. The project included the

construction of Ted Williams tunnel, Leonard P. Zakim Bunker Hill Bridge across the river Charles and Rose Kennedy green belt on the site where once stood the highway. The project was officially launched in 1982, the construction works lasted from 1991 to 2006, and the project was completed in 2007 (Big Dig, 2014). The estimated cost of the project amounted to about \$ 6 billion, and the actual costs were about \$ 15 billion. The project was delayed for 36 months compared to the original plan. The project was 100% funded by the public sector (Omega Centre, 2014).

This project is a kind of paradox. In fact, from a purely engineering point of view, it is a great success that replaced "ugly" section of the highway with a series of tunnels through the city center. Traffic jams and accidents are significantly reduced, and studies have shown that it achieved a profit of \$ 177 million because it saves time in traffic and \$ 120 million due to the tax on new land. On the other hand, in terms of management, the project represents a complete fiasco. 1982 projected costs were \$ 2.6 billion, but to the end of price reached 15 billion, and the time was stretched to nearly two decades. Quality control was very poor, the project scope was constantly changing, and the occurrence of accidents, such as the collapse of the ceiling, has left project managers without any credibility in public (Poole & Samuel, 2011).

#### **Project goals**

The "Big Dig" is built to solve numerous problems: traffic congestions, deterioration of the elevated highway system constructed in 1952 and the need for green areas. The central artery was made for the flow of 75,000 vehicles a day, and in the early 80s, the number of cars has risen to 190,000. This led to more frequent occurrences of traffic accidents, followed by high pollution and noise that often lasted all day. Next, the artery shared Boston 2 parts, and the raised section of the highway looked awkward and ugly. With all this, the need for green areas has been increasing because the arteries occupied a central part of the city. To solve all this, the idea was born of a burial of the part of the highway that runs through the city and to move the traffic underground. The main people behind these ideas were Fred Salvucci, Minister of Transport at the time, and

engineer Bill Reynolds. The planning process has lasted a long time, and numerous parties were engaged in consultations.

### **Challenges and Solutions**

Although the "Big Dig" is one project, it is actually comprised of three large projects, interconnected, but different by the design and construction, in the heart of Boston: burial highway I-93, the extension of the highway toll through South Boston, from the Port of Boston to Logan International Airport through the newly created third arched tunnel called the Ted Williams tunnel and Leonard P. Zakim Bunker Hill Bridge construction across the river Charles. All in all, the project included the construction and reconstruction of highway lane, a distance of 259 kilometers in the corridor of 12 km of tunnels, bridges, viaducts, overhead street and buildings related to the project. Within the construction of the "Big Dig" 132 co-ordinated projects were carried out, which among other things included the relocation of 47 km of gas, electric, telephone, sewer and water installations in which 31 companies participated. The special value of this undertaking was that it has been done in a very densely populated urban environment and that in the time of smooth realization functioning of the city was a must (Greiman, 2013).

Within the construction of the Project Central Artery / Tunnel, over the years, some innovative technologies were implemented, some for the first time use in urban construction (Greiman, 2013). However, much of the implementation of the project did not work properly. Numerous leaks appeared on the ceilings of tunnels whose subsequent repair cost over 10 million dollars. Also, the big mistakes occurred in the procurement and ordering materials that were not in compliance with the required specifications. The result was poorly executed works and long delays in installation, which is why the state eventually sued individual performers and got compensation of about \$ 100 million. Also, in 2006, there have been complaints of some members of the performing companies in terms of corruption and fraud related to these materials. The biggest problem also occurred in 2006 when part of the ceiling collapsed tunnel resulting in one death. Additional work had to be contracted to repair

the great damage that has been incurred, with the complaint and deal with the family of the deceased (Big Dig, 2014). Managers of the project in 1994, to appease the public, drew up a report on the projected costs of the project that showed 6 billion less than anticipated costs in real time and hide the real problems that occurred later. All of these incidents have been constantly expanding the project costs and prolonging the deadline for completion (Poole & Samuel, 2011).

### **Project benefits**

Support of numerous stakeholders, especially the citizens, local communities, local business entities, local and state politicians and state agencies was critical to the "Big Dig". The greatest success of the project is the regulation of the environment that can achieve regulation of traffic, reducing negative impacts on the environment (noise and pollution) and gaining green spaces that until then the city has not had to the extent necessary. Also, the experience gained in the application of innovative technologies and know-how in terms of management problems, cost tracking, time schedule, financial planning and control and innovative contracting represent one of the most important benefits of this project (Greiman, 2013).

## **2. KEY ASPECTS OF THE MEGAPROJECT MANAGEMENT CONCEPT IN CONSTRUCTION INDUSTRY**

Based on the analysis of the contents of the previous chapters, there can be sorted out six key aspects of the concept of management of mega projects in the construction industry:

### **Determination of the purpose, vision and strategy**

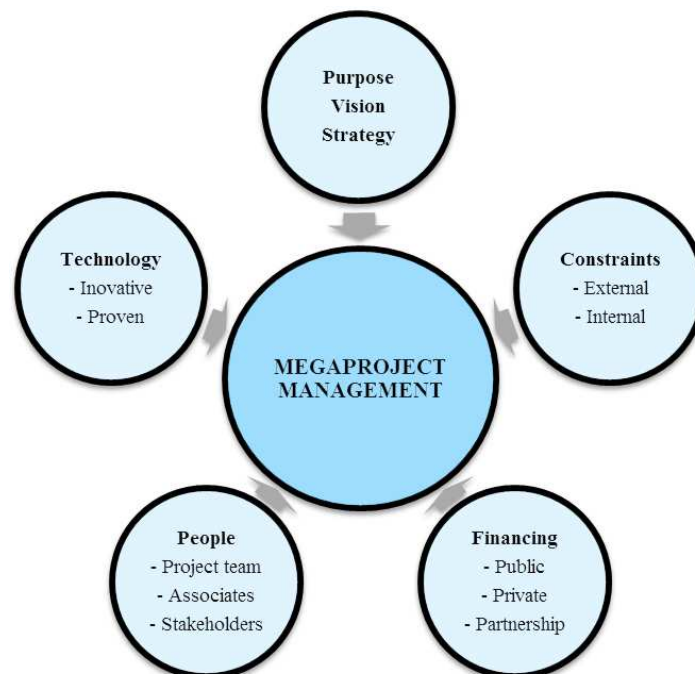
With the idea of building a construction megaproject, it is necessary to determine the actual need for such a project and identify its purpose. The needs may be different. For example, the construction of infrastructure that is missing, such as highways and power, the accumulation of financial and political power, such as mega-cities, or improvement of the environment, such as solar and wind parks.

Profit can also be motive for the building of a megaproject, but due to the long time of execution and a long time for the payment of investment such undertakings represent a major risk for any business or government entity. Some states approach megaproject development for purely political reasons, which could have far-reaching negative consequences. Because the construction of megaprojects completely changes the environment, the overall impact that it will generate must be considered with all the consequences.

### Identification of constraints

Development of a strategy must begin with the identification of any constraints. Constraints

can be different: the political situation, macroeconomic conditions, physical limitations (morphology of the terrain, weather conditions) and others. Megaprojects are often carried out in several countries (highways, pipelines, etc.) with different cultural and economic backgrounds and attention must be paid to the potential problems of such conditions. Often what is regulated in one country in another is not, so management of megaproject has to develop an adequate strategy for each one. Also, due to the long duration, which often exceeds the usual duration of the political mandate, it is necessary to understand that political change can be a key constraint.



**Figure 4:** Megaproject management concept

Macroeconomic changes and changes in the market may significantly jeopardize the megaproject as well. For example, changes in exchange rates or an increase in prices of raw materials. One of the limitations that are imposed in the planning of the mega-projects is the lack of skilled people in the area where the project is located. All these constraints must be seen at the very beginning, to avoid the application of ad hoc solutions that often do not provide the desired results.

### Determination of the model of financing

One of the biggest limitations when it comes to megaproject is financing. Megaprojects are characterized by prices of more than 1 billion US dollars, and can amount to more than 10. These sums represent a serious cost even for the most powerful countries and multinational companies. Therefore, in the concept of managing megaprojects, it is very important to determine the most appropriate ways to raise funds and to determine funding models.

The practice has shown that the least risky model is the public-private partnership. In the determination of the model of financing and making financial plans, it is necessary always to count on a long period of construction, which often exceeds planned, and the long period of return on investment.

#### **Identification/selection of key roles**

In order to make megaproject successful, key people must be identified. Management must determine who the most important people for cooperation are. These are mostly representatives of state bodies and people of political influence. The level and quality of cooperation with them is vital to the success of the realization of megaprojects. These people can support or be against megaprojects. Also, their mandates are often shorter than the time of realization of the project, so the strategy must be created for all political options. Also, a big role in the implementation of megaprojects has the local community, and cooperation with their representatives is of great importance. A selection of key people refers primarily to the members of the project team. The team must be composed of experienced professionals for each area of the megaproject (design, construction etc.). Besides the project team, the choice of all participants on the project is very important - designers, contractors, suppliers and others. Often these people are elected from the community in which the project is located, so time must be spent for examination of the local market in order to select the best of them.

#### **Selection of technology**

For construction projects, including the megaprojects, the choice of technological solutions defines the project itself. Technology may be innovative or proven, already used, and should be applied on the basis of the purposes of the megaproject. The application of innovative technologies can be a matter of prestige and the desire to set standards, but the risks are much higher. In technology selection, one must take into account data on the development of the environment in which the project is realized, and the availability of materials and labor. Management must select the technology that will be applied depending on all relevant parameters and transmit it to the

designers and contractors to design on their instruction, and run the project.

#### **Establishing a management model**

When an organization for managing the project is established, it is necessary to establish a management model or system. Organization model depends on many factors: the availability of manpower, the number of companies participating in the execution, ownership, and, at the end, the budget. It is important to define clearly the roles and responsibilities through all phases of management: planning, monitoring and control of the implementation and the closure or transfer and commissioning of the constructed object. Depending on the complexity of the project methods and techniques for the management of megaproject should be selected. These are the most common methods of project management: WBS, CPM, PERT, EVM for project monitoring, etc. With the megaprojects, special attention should be given to risk management and change management. The megaproject risks are megarisks and consequences of risk events can cause huge delays and increased costs that can be measured in millions. Also, the project or program manager who manages megaproject must be proficient in implementing changes and directing his team, as well as all other participants to alternative solutions that must lead to the original goal. Also, in addition to standard project management techniques, megaproject manager must pay special attention to the stakeholder management. Stakeholders whose influences are much more significant than in smaller projects must be directed throughout the implementation process towards a common goal - successfully implemented megaproject.

### **3. CONCLUSION**

The application of megaproject management principles is a necessity in modern times, when there is striving to strategic thinking and globalization. Particularly in the construction industry, we are witnessing the emergence of a growing number of megaprojects, the association of countries, even regions, in order to achieve long-term benefits and ensure a functioning infrastructure. Planning entire cities and interstate and intercontinental infrastructure systems requires a more complex approach and

long-term thinking that goes beyond standard project management. Megaproject management becomes a tool of achieving the vision of a modern construction and provides a certain amount of security in terms of realizing global plans.

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## FRAMEWORK FOR POSITIONING CORPORATE BRAND: EVIDENCE FROM SERBIAN MARKET

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**Abstract:** Corporate brand is the one of the fundamental elements of business strategy, and its building involves a project approach, in a series of activities that need to be planned and implemented, as well as different resources that need to be secured. Accumulation of various social factors has led to the rise in importance of the concept of corporate brand. The range from increased public interest in the practices of companies that are behind the famous brand products to business success and economic benefits that companies with strong corporate brands have. This paper presents elements of the brand concept, as well as the framework for activities that position and manage corporate brand. The second part presents the results of a research conducted in Serbia. It examined perceptions and attitudes of citizens, meaning the general public, for the purposes of defining the measure of corporate brand positioning. Research has shown that the perception of all defined components: Perception of the position, Attitude towards the company, Social Responsibility, Management, Companies/Products, to a greater or lesser extent have influence on the positioning of corporate branding by citizens of Serbia.

**Keywords:** Corporate brand, corporate brand positioning, corporate brand management, a measure of corporate brand positioning

### 1. INTRODUCTION

The concept of corporate branding is a topic that interests academics and practitioners because of the value and impact it can have on business performance (Fombrun & Van Riel, 2004; Greyser, 1999). The corporate brand is now considered to be an important source of sustainable competitiveness of companies and is therefore one of the key elements of corporate strategy (Balmer & Gray, 2003). It includes core values that the company nurtures, its corporate culture, identity, business model, people, and can be described as "visual, verbal and behavioral expression of corporate identity and business model" (Knox & Bickerton, 2003). Managing a corporate brand requires a holistic approach, which includes the involvement of different functions within the company, because this process sets the strategic framework for business activities.

The aim of this paper is to define the corporate brand as part of a business strategy and to present a framework of the project of positioning and managing corporate brand, its

basic elements and activities to be undertaken. The second part of the paper presents the results of a research conducted in Serbia, which examined perceptions and attitudes of citizens - general public, for the purposes of defining the measure of corporate brand positioning.

### 2. CORPORATE BRAND AS A PART OF BUSINESS STRATEGY

Corporate branding came up from product branding, equally aiming to make differences and preferences. The brand concept has been present for centuries and was made with an idea to differ products from one to the other producer. Anglo-Saxon word "brand" was delivered from the Scandinavian word "brands", which means "stigmatize". According to Cicvarić (2006) "brand is the recognizable group of elements (name, logo, symbol, design, message) that can identify and differ: organization, products, services (as well as persons, places, and ideas), creating a unique rational and emotional associations, beliefs and expectations for buyers/consumers/users". The core of the

brand is in creating a relationship brand-consumer, also analyzed by Chevalier I Mazzalovo (2004), where the brand was defined as a contract that regulates a relation between company and consumer. This kind of contract is a relation of trust, acknowledging expectations of the consumer on one, and promised characteristics of products from the company on the other hand. Relation and benefits are mutual, and apart from the economic side, the emotional connection is also included.

According to the listed definition of brand, concept can be also applied to the organization, and in that case it means a corporate brand, as a result of numerous relations and experiences that different groups of stakeholders are having with the company. In that context, the corporate brand is an important part of the overall business strategy.

Accumulation of different social factors has led to the increase of importance of a corporate brand: from increasing public interests for policies and practices of companies behind the famous brands (Mitchell, 1999), to the business success and economic benefits, companies with the strong brand have: for example Nike, Shell, Apple (Knox & Bickerton, 2003).

Corporate branding is a concept much wider than the product branding. There are differences in goals and the level of branding purposes, the bases of brand identity, stakeholders, the position of responsibility, etc.

According to the literature and analyzing the differences of brand and corporate brand through dimensions, basic characteristics of corporate brand could be delivered: corporate brand is a part of a corporate strategy; it presents long-term and strategic company resource; it refers to the whole company, and, therefore, needs a cross-functional approach; in the field of responsibility, engages top management and needs to include stakeholders' perspectives, while corporate communications influence creating, positioning and managing corporate brand.

It is important to underline that aside from the organized and created communication

channels and strategies delivered by the company (primary and secondary communication channels, meaning the information collected on personal experiences with the company - for example, working for or cooperating with the company; information collected from close and credible people, that have had personal experiences with the company; information initiated by the company in media, Internet), the corporate brand could also be influenced by information, initialized by non-company resources (media information non-initiated by the company, information about the company on the Internet, rumors).

Among the academic public, there still is no unique, overall accepted definition of a corporate brand. Numerous definitions offered in the literature had been presented by the author Lloyd (2007). Corporate branding, internally, refers to the application and delivering targeted corporate culture, and externally, makes consumers (and all the other stakeholders) understand the company, create trust for the company and its products/services, and accept them (Balmer, 2001; de Chernatony, 1999). Managing relation's paradigm becomes more important with the development corporate brand concept because the relations are seen as important characteristics of the corporate brand (Balmer & Greyser, 2002).

The Scientific debate on corporate brand is still present, and it is also testified by a special edition of the respectful publication *European Journal of Marketing*, dedicated to this topic. Analyzing literature and great number of the academic articles, the basic conclusions are delivered (Melewar et al., 2012):

Corporate branding needs to include stakeholders in creation of brand meaning and the influence on branding strategy, as well as to keep appropriate level of coordination and consistency. Corporate branding is a result, and it manifests itself in both levels: organization and the individual in the organization. Corporate branding is a dynamic process. Bickerton (2002) believes that the interests in corporate brand root in a concept of corporate image and its marketing perspective, respectively in consumer focus. Marketing perspective comes from the

importance that value holds for customers, where the brand is seen as a strategic resource for managing business processes, which generates the brand value. Therefore, there are two approaches of corporate brand study, organizational (top down) and marketing (bottom up).

Underlining the importance of marketing perspective on a corporate level, or the application of brand concept on a corporate level, Balmer, and Greyser (2006) explain corporate marketing through connection of corporate identity, corporate brand, corporate communications, image, and reputation. As it can be seen in the definitions, some authors identify the notion of corporate brand with the notions of corporate identity and image. However, there are differences between these two concepts. According to some authors, the corporate brand has to be a result of identity and needs to communicate identity to stakeholders (Leitch & Richardson, 2003). As the concept of the brand includes tangible and intangible values, corporate brand lays on corporate identity (Balmer, 2001), and on corporate culture (Hatch & Schultz, 2001). Aside from a study of the connection between a corporate brand with the identity and image, connection and relation between the corporate brand and corporate reputation are also researched in the literature. Some authors even introduce a concept of "reputation of the corporate brand" (Balmer & Gray, 2003), which leads to the conclusion of terminological balance for the similar notions. Nevertheless, managing these strategic resources of the company calls for the clear understanding of definitions, constitutional elements and overlapping of these constructs. The framework for understanding and harmonizing the corporate identity, corporate brand and reputation has been defined by Abratt and Kleyn (2012). Strategic choices manifested through the chosen mission, vision, corporate values, culture, and strategy, together with corporate appearance a (visual identity, brand promise, personality and communications) form a corporate identity. Furthermore, a brand image with the reputation dimensions (performance, products and services, society relations, innovations, corporate environment and governance) form a corporate reputation as an overall company assessment from the stakeholder, in time

being. In this framework, corporate appearance and brand image form corporate brand, respectively company's identity and image in public.

Authors then explain the constitutional elements of corporate brand: Corporate appearance, recognizing the demonstration of corporate identity and activities in forming the corporate brand, includes the development of visual identity, brand promises, personal brand and communication brand.

Visual identity includes the company name, logo and symbol, typography, and colors and their application in corporate materials, business vehicles, exteriors and interiors (Melewar & Saunders, 1998). The role of clear and well-communicated visual identity creates associations on corporate brand for stakeholders. Every corporate brand offers stakeholders brand promises, which include both functional and emotional expectations. Corporate brand promise insists on harmonizing corporate culture, business moves, and employees, which deliver that promise. A positive image is to be a result of delivered and sustained brand promise. Brand personality understands human characteristics that can be used to describe a corporate brand. For the corporate brand, the brand personality consists of company employee's characteristics and reflects itself through values, words and activity of employees (Keller & Richey, 2006). These authors' personal characteristics of a corporate brand see through affective (sensible), cognitive (thoughts) and con-native (actions) dimensions that should be led by company employees.

Brand communication understands a strategic approach to creation and management of corporate communications. Brand image is a result of corporate appearance and understanding, accepting and opinion that stakeholders have. Image is a short-term category that reflects a concrete period and includes brand experience, relations, and society.

Brand experience is a result of the interaction between stakeholders and corporate brand, and according to these authors, it consists of

four dimensions, sensual, emotional, expressional and intellectual.

Brand relations are result and consequence of communications, sustaining and delivering brand promises. Well-created, long-term relations result in the creation of brand society. This concept is especially underlined in social media, the platform that connects an individual with the corporate brand, the platform for the interaction and further spreading of a brand message.

The author Vlastelica Bakić (2012) believes that the one of the systematic approaches in building and managing corporate reputation is based on overall process of planning, establishing and sustaining of: corporate culture, corporate identity and corporate image. The corporate brand is seen as a concept that gathers corporate identity and image, and furthermore as a concept that differently systemize same activities and objects. The named approach is a base for an explanation of corporate brand in this paper.

### **3. BUILDING AND POSITIONING CORPORATE BRAND**

Building, positioning and managing corporate brand can be analyzed as a project that involves set of activities that should be done, decisions that should be made and resources that need to be engaged. Below there are basic characteristics of the corporate brand listed, inline with a building model, based on decisions of key stakeholders of the company. The corporate brand strategy defines the way the company is about to fulfill its mission and vision and make value for stakeholders (Järventie-Thesleff et al., 2011). It is usually presented through brand promise, which should be 'lived' and reflected in everyday business for all stakeholders (Aaker, 2004). In value and brand promise delivery, as well as during application of some brand strategy, the company employees have a strategic role - from top management, to the basic positions, which everyday cooperate with different stakeholders. The role of employees becomes clear when we focus on the strategic framework of corporate brand, which is not only the meter of sell but represents what the company is doing, what it actually is, and furthermore, represents

functionally and emotionally created entity. Due to intensive technological changes, the life of products and services is getting shorter so that the corporate brand becomes fundamental for sustaining and keeping a relationship with stakeholders.

Primary characteristics of the corporate brand could be presented by the C2ITE model (Balmer & Gray, 2003):

Cultural characteristics (Cultural) - every corporate brand incorporates corporate, professional, national and other types of culture.

Multidimensional concept (Intricate) - includes "multi-stakeholder" orientation and delivers it through different channels.

Tangible characteristics (Tangible) - includes visual elements of identity, then the quality of the product/services, business portfolio, a geographical space where the company operates, generates profit, etc.

Intangible characteristics (Ethereal) - includes elements such as a lifestyle, associations, and emotional reactions, for instance, the company's origin country.

Commitment (Commitment) - insists on a complete commitment for all employees and stakeholders.

According to Hatch & Schultz (2003), the power of the corporate brand and its position determine the key decisions made by stakeholders, forming the framework for building the corporate brand. The model of building the corporate brand is based on decisions of the key stakeholders, as well as ones made by management (business field, what are company's strategic partners, what the organization structure is going to be, corporate identity elements etc.), then decisions made by employees (commitment and loyalty for the company, accepting changes and challenges etc.), as well as decisions made by external stakeholders (wheatear they are about to purchase the products of the company, wheatear they would like to work for the company, would they invest in the company, would they cooperate with the company etc.).

The building corporate brand business case is elaborated in theory and confirmed in practice. Even though the unique model or

theory on the corporate brand business case has not been defined yet, a great number of publications have questioned and confirmed the influence on business performance and results.

Application of the positioning concept on the corporate brand was analyzed in the paper of Tadevosyan and associates (2008). They have started from Proter's (1991) definition of positioning, where it is said to be an overall company's approach, comparing with the competition. In that sense, positioning of corporate brand relates to what stakeholders think about the company and how they see it, comparing with the competition. Conceptually, it relates to all the constituents of corporate identity.

It is needed to emphasize that, according to the characteristics of corporate brand positioning refers to company position in mind of all stakeholders, program of corporate identity has to connect and incorporate the corporate vision, as top management aspect, corporate culture, as employees' aspect and image, as external stakeholders' aspect (Margulies in Tadevosyan et al., 2008).

This way, the corporate brand positioning strategy relates to a strategic matching corporate brand and business environment. Identification of current corporate position, targeted position, activities planning and communication strategy creation is therefore assumed. Here we can conclude that corporate communications have a significant influence on corporate brand positioning.

Starting from the approach of the author Vlastelica Bakić (2012), corporate communications could be watched in two ways: as a channel for communication of company's identity, as well as a part of corporate strategy. Therefore, corporate communications are treated as communication channels and information resources, regarding different business aspects, influencing corporate brand positioning (for instance, management structure, financial results and reports, business events, initiatives and CSR activities). On the other hand, corporate communications are part of company's business, part of a business strategy, and therefore could make impact on corporate

brand (for example, media relations, business society and public sector relations, applying CSR philosophy). Corporate communications give support to business strategy development through planning and delivering communications and relations with all stakeholders, based on corporate values, culture, and identity, which need to be reflected in the business strategy.

Speaking about adequate strategy and positioning strategy, numerous authors have mentioned a situational approach, where a company chooses a strategy appropriate to the situation the company is in. In the context of this paperwork and the importance of corporate identity while studying corporate brand positioning strategy, it is useful to mention that these situations could be understood as different types of identity one wants to create. It is not unusual that the company nurses different identity types, communicating with different groups of stakeholders. Therefore Balmer I Greyser (2002) propose an AC2ID test, determining kind or type of positioning and then the appropriate corporate brand positioning strategy, according to the group of stakeholders the company would like to refer to. According to the authors, kind and types of positioning can be: real, communicated, imagine, ideal and wanted.

Authors of the test (Balmeer & Greyser, 2002) claim that within one company there exist and migrate multiple identities, having a time dimension as well, so that some refer to the past (for example, communicated), some to the present (realistic), and some to the future (wanted). In this context, managing identity and brand refer to in lining all identity types, for having them in conflict is a potential risk, for instance when corporate statements (communicated) are not compatible with reality (real identity), or when the vision (wanted identity) is not in line with the strategy (ideal identity), or when corporate performances (real identity) is not in line with stakeholders' expectations (imagined identity).

Multiple identities and positioning within different stakeholders overview creates a platform of the (corporate) brand (Kapferer, 2008). For understanding the platform of



corporate brand, corporate marketing framework, introduced by Balmer and defined through 11 Ps model and 6 Cs model (Balmer and Greyser, 2006), can be used as a parameter. Both models define and explain brand corporate constituencies. 11 Ps includes: Philosophy and ethos, Product, Price, Place, Performances, Positioning, Personality, Promotion, People, Perception, Promise, while 6 Cs: Character, Culture, Communication, Constituencies, Conceptualizations, Covenant. Bearing in mind that one constituent is corporate communications, we could conclude that corporate communications are one pillar of the corporate brand, and they influence corporate brand positioning and sustaining.

#### 4. MANAGING CORPORATE BRAND

Regarding the important role of communications, combining both approaches (organizational and marketing) in corporate brand study explained in previous text, Bickerton (2000) has developed a conceptual framework of corporate brand management, based on results of previous academic researches.

The overall process starts with study and understanding brand corporate context, its vision, corporate culture, and image. After internal analyzes, it is necessary to research and understand the needs and expectation of stakeholders, in the sense of expected value. Based on the result of internal and external analyzes, as well as on understanding and in lining internal and external factors, communication platform is defined. Adopting the platform, corporate communications activities towards all stakeholders are planned and delivered.

The corporate brand model development reflects a complexity of the phenomenon itself and different ideas and terms, included in the concept. Generally, two models are recognized (Balmer, 2001): Macro models, present in literature in 80-is and 90-is of past century, whose basic benefit was involvement of various constructs, such as corporate personality, culture, identity and image into the corporate brand concept.

Micro models, referred to in lining of different types of identity (for instance, real, communicated, desired) with the image of a different group of stakeholders. According to the analyses of previous models and research results, Knox and Bickerton (2003) have made a definition of six elements of corporate brand that could be used for understanding the concept and management of corporate brand:

Brand context - set up of coordinates that include defining and understanding of vision, corporate culture, current image and competitors' environment.

Brand building - a framework for corporate brand positioning, referring to the definition of "mutual starting points" (CSPs - common starting points) and the way they could be used for brand positioning. CSPs concept was introduced by author Van Riel (1995) and assume central company values, which are about to be the bases of corporate communications. According to Sealey (1999), corporate brand positioning takes the unique organization value proposition (UOVP), which is a pan dam to the unique selling proposition (USP), previously used for product positioning through advertising. According to the pilot research, Knox and Bickerton have conceptualized the framework for corporate brand positioning.

Brand confirmation - in lining and understanding the values determined in the previous step, internally in the organization, and presenting brand suggestions to the external stakeholders. During this step, management involvement and commitment are important. This is the time when the framework for corporate brand positioning and CSPs should be acknowledged. Based on them, it becomes possible to create corporate brand statements, which is to be a core of corporate communications.

Corporate brand consistency means the development of consistent corporate communications. This part of corporate brand positioning gathers initiative, definition and management external and internal communication of the company. The importance of stakeholders and researches on them, as well as the importance of organized efforts for management of communication



with all stakeholders, urges for a need for a strategic approach to corporate communications. On all levels of message creation, it is needed to take care of all stakeholders, because their roles, importance, power, influence, and priorities are changing according to the business period, goals and other factors.

Corporate brand continuity means strengthening the brand within the company. This part recognize modulating all business processes (operations, communications, knowledge, strategic development) according to the corporate brand, from identification of the way they affect the position of corporate brand, so that they can contribute value delivery, to identification of the way they could adopt and improve.

Monitoring the importance and peculiarity of a corporate brand. This part means continuous monitoring and questioning the corporate brand, bases of positioning and in lining of business processes and company's behavior with crucial values of the corporate brand.

After the set up of framework for corporate brand positioning and management, authors have given a holistic definition of corporate brand: a corporate brand stands for a visual, verbal and behavioral expression of the business model of the company.

According the presented characteristics and models, we might conclude that the corporate brand is an important part of the corporate strategy, being a long-term, strategic resource for the company, and its building, positioning, and management urges for a cross-functional company approach and involvement the perspectives of all stakeholders.

## **5. EXAMINING CORPORATE BRAND POSITIONING IN SERBIA**

For the purposes of defining the measure of corporate brand positioning, an empirical research was conducted in Serbia, which examined perceptions and attitudes of citizens, The survey was conducted for the purpose of testing the corporate brand and reputation of Delta Holding Company, in which the author was working at the position of Vice President for Corporate

Communications, during the period when the survey was conducted. The company has given the approval to apply the statistical analysis on the obtained data, to determine the measure of corporate brand positioning among the citizens of Serbia. Results of the research are published with the permission of the company owner. Field research among the citizens of Serbia was conducted by a research agency Nine Media Research.

### **5.1. Methodology and sample description**

The subject of the research was identification and measurement of corporate brand positioning in Serbia, as well as measuring the attitudes of the general public on certain aspects of company operations in Serbia. On the basis of determining the model of corporate brand positioning, research has established the measure CBPS (Corporate Brand Positioning Score).

This study aimed to show the structure of models and corporate brand positioning measures among citizens and identifying aspects of the business (determinants) that affect the corporate brand positioning among citizens. The study, conducted by research agency Nine Media Research, involved the collection of primary data by the method of investigation or a survey in a direct conversation of researchers and respondents. Respondents were given the object and purpose of research at the beginning of the interview. Field research was conducted in 2012 on a sample of 1200 respondents, using the Computer-Assisted Telephone Interviewing – CAPI method. The credibility of the answers was measured by repeated interview on the 20% of respondents.

The sample in the study of the general public was full uniform. The female population in the sample is represented in 628 cases, accounting for 52,33% of the total sample. The number of male respondents was 472, or 47,67% of respondents. Total of 356 respondents were aged 45 to 59, and the smallest number of respondents was aged 18 to 29.

By qualification, the highest number of respondents have secondary education, three years or four-year (66,37%), while highly

qualified (respondents with college or university education) is only 11,86%. Even 20,93% of respondents have no education, incomplete elementary and complete elementary education. The largest number of respondents is by profession unemployed or retired (57,63%). Of the total number of respondents 16,48% are employed in the private sector, and 12,34% are employed in the public sector or social or mixed company.

**5.2. Results**

Construct of the models of corporate brand positioning consists of the components of business and its elements. The components included are: Perception of the company's position in relation to other companies, Attitude about the company (positive thoughts and emotions of the company), Corporate

Social Responsibility, Management, Companies / Products.

Value of CBPS is calculated by using weighted arithmetic mean of pondered values of selected components in the model (Perception position, Attitude towards the company, Social Responsibility, Management, Companies / Products), while the values of the components are obtained by arithmetic mean of the elements. Elements of each component are queries posted to respondents in the survey with a scale of possible answers from 1 to 5 (where 1 is the lowest value and 5 the highest possible value response), which enables the quantification of these and other variables and further application of parametric tests. CBPS structure model is shown in Table 1, and the values of components of CBPS in Table 2.

**Table 1:** CBPS model structure

CBPS MODEL STRUCTURE					
Components	Perception position	Attitude towards the company	Social responsibility	Management	Companies / Products
<b>Ponder</b>	10%	15%	25%	20%	30%
<b>Elements</b>	Company awareness	Desired employer	Socially responsible company	Important businessmen awareness	Real estate investments awareness
	Domestic reputation	Works for citizens' interes	Company's owner awareness	Agrar investments awarness	
		Socially responsible projects	Successful businessmen awareness	Know about investment projects	
				Know about agrar products	

**Table 2:** CBPS components values

Components	N	Mean value	Standard deviation
Perception position	1200	0,892	0,798
Attitude towards the company	1200	0,220	0,292
Social responsibility	1200	1,169	0,598
Management	1200	0,799	0,529
Companies / Products	1200	1,160	0,905

Research question that was asked at the beginning: Is there interdependence between determinants of business performance and CBPS's? This research question requires the definition of two hypotheses: *H1: Determinants of the company's business and*

*CBPS values and are in direct linear interdependence. H2: Changing the value of company's determinants is affecting the change in CBPS's values.*

Proving this hypothesis was done by correlation analysis shown in Table 3. The analysis of correlation coefficients has shown the positive correlation between CBPS's values and all the determinants of the company. Correlation coefficients are either moderate or strong, which indicates that the value of the determinants of companies' business has a significant influence on the formation of CBPS's values. The highest correlation with CBPSa has a determinant Market leader,  $r = 0,557$ , while the observed

determinant of the smallest (but still moderately high) influence is Care about employees,  $r = 0,382$ . With other determinants CBPS there is a moderate correlation ranging from  $r = 0,406$  with Customer orientations to  $r = 0,482$  it has about the Existence of potential for further growth. This proves both hypotheses and answers the research question because it was determined that there was a moderate and a strong relationship between the determinants of business performance and CBPS's values.

**Table 3:** Linear interdependence between CBPS's values and the determinants of companies' business

Business determinants	CBPS	
Care about employees	Correlation coefficient	,382**
	,000	
	760	
Regular payment of wages and contributions	Correlation coefficient	,452**
	,000	
	616	
Care about Serbian citizens	Correlation coefficient	,430**
	,000	
	823	
Trustworthy	Correlation coefficient	,454**
	,000	
	834	
Growth potential	Correlation coefficient	,482**
	,000	
	849	
Leader on the market	Correlation coefficient	,557**
	,000	
	830	
Orientation toward customers	Correlation coefficient	,406**
	,000	
	838	
Products for recommendation	Correlation coefficient	,437**
	,000	
	808	
Financial strength, economic stability	Correlation coefficient	,460**
	,000	
	834	

\*\* Sig< 0,01

### 5.3. Discussion

In order to create a model of corporate brand positioning and identification of measuring CBPS (Corporate Brand Positioning Score) an empirical study described above was conducted, and below are presented the key findings of the research and the implications it has for business practices.

Research has shown that perception of all defined components: Perception position, Attitude towards the company, Social Responsibility, Management, Companies / Products to a greater or lesser extent influence the positioning of the corporate branding with the citizens of Serbia.

CBPS's values are calculated by using weighted arithmetic mean of pondered values

of selected components in the model (Perception position, Attitude towards the company, Social Responsibility, Management, Companies/products), while the values of components are obtained by arithmetic mean of their elements. The mean value of CBPS for the general public is 4.24 (SD = 2.12), and for the business community it is 2.74 (SD = .853). Comparing these two values as well as their variability measures is not possible, due to non-uniformity scale, which was used for measuring.

The study examined the interdependence of the determinants of business performance and established a measure of CBPS. The analysis of correlation coefficients has shown a positive correlation between CBPS's values and all the determinants of the company. Correlation coefficients are either moderate or strong, which indicates that the value of the determinants of business companies has a significant influence on the formation of CBPS's values. The highest correlation with CBPS has a determinant Leader on the market ( $r = 0.557$ ), while the observed determinant of the smallest (but still moderately high) influence is Care about the employees, ( $r = 0.382$ ).

The results indicate the elements of the business that need to be improved to achieve better positioning of the corporate brand. The results presented in this paper are related to the citizens of Serbia, and the general public as a stakeholder of the company. Further research should focus on other stakeholders, i.e. determining the elements of the business that are important for positioning a corporate brand with other stakeholders.

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## CRISIS PROJECT – BASIS OF CRISIS RESOLUTION

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**Abstract:** The crisis project represents formalized document of crisis management that contains qualitatively and quantitatively defined objectives and activities for their implementation. The crisis planning process defines its relation towards the future, its characteristic of solving future problems in which an organization can be found as a result of a crisis. In terms of simple and stable environment, the planning includes and reflects the most important functioning problems of an organization in a crisis situation and prepares the elements of organizational units so that the problem solving is provided directly through the functioning and operationalization of the crisis project. This paper describes the crisis planning process and its basic stages that have implications for the crisis resolution process. Emphasis is on the functions of crisis planning, types and structure of projects.

**Keywords:** Crisis management, crisis planning, crisis, crisis resolution, crisis project.

### 1. INTRODUCTION

Bearing in mind the process of crisis resolution and the necessary measures that are taken, especially their ampleness and engagement of resources, it is necessary to carry out those activities according to plan, in an organized manner continuously with the resolution of a crisis situation an organization is faced with. A regular reader of the present day, aware of the danger that crisis takes along, tries to put things in order. This is the basis that incorporates planning and project for countering the state of chaos that crisis takes along.

Normally, if we consider the context itself of a crisis and its consequences, it is very difficult to determine the pretenders of the general importance. The question than arises as to what group of persons is covered by the damage? What types of damages are taken into account? What their scope can be called harmful? And the problem is that all individual and collective judgments about such characteristics of crises are always imprecise.

Crisis planning is only an initial condition for the successful resolution of a crisis, and it

takes a lot of problems along. The elements of identifying a problem as the initial step of making the crisis project are particularly characteristic. They include different techniques that decision makers use so that the crises project successfully answers the purpose and initial step of crisis resolution.

### 2. FUNCTIONS OF CRISIS PLANNING

Each management process begins with planning, which can be defined as a process of setting future goals, assumptions about the environment in which the certain activities need to be performed, choice of a course of action, means and method of achieving goals. Planning includes analysis of circumstances and possibilities of organization in a changeable environment, total potential, advantages and disadvantages, alternative ways of development and the like. By the term planning it is not meant the precise and formal short-term and long-term projects, but long-term strategic orientation of the organization, which means the diagnosis of the security environment, determining courses of action, objectives which need to be achieved, strategy that need to be chosen to achieve these objectives, and managerial decision-making through all these stages.



Given that all other management functions are adjusted, in the planning process, with the selected goals and tasks of operation, it is easy to understand the responsibility of managers who perform this function. Planning is an integral part of management at all levels, but its dimension varies concerning different management levels, (Mučibabić, 1995).

Planning is an essential starting management function. It is a process that includes the selection of tasks and objectives of that action for achieving them and requests for decision-making, which is a choice between future alternative courses of action. The projects provide a rational approach to achieving the pre-selected objectives. The crisis planning has the task to provide the organization with the following:

- to know why it exists and what is its main field of action in a crisis,
- to know that are its positive and negative sides,
- to know what circumstances and threats come from the external environment,
- to be able to identify and establish the appropriate standards of action and
- to have defined rules of conduct (policy) everybody in the organization will adhere to during carrying out the objectives of the organization in a crisis.

Accordingly the following questions must be answered:

Where is the organization now?  
Where it wants to be in the future?  
How to get there?

Crisis planning is the bridge between current and desired position of the organization and the ways of overcoming the crisis situation it is faced with. Without planning, the work is left to chance. The planning is intellectually demanding process because it seeks to clearly determine the courses of action and to establish decisions on the purpose, knowledge and precise estimates (Pomjan, 1987).

Basically, the purpose of crisis planning is to exclude, that is reduce the probability of occurring unforeseen events in order to reduce the risk of selected measures to a minimum. Bearing in mind that the future is always uncertain to some extent, so the planning cannot exclude risks arising from uncertainty, so it seeks to reduce them and by this increase the probability of occurrence of the desired state (Osmanagić Bedenik, 2002, p. 34). It is also important to emphasize the significance of the crisis planning from the perspective of its functional efficiency. We can talk about it, when the contribution of the crisis planning can be shown to the level of the function realization (optimization of the crisis project, flexibility, creativity and safety) in a particular organization or any other military organizational system.

## 2.1. Importance of planning

Possible consequences or probability of occurrence of certain crisis cannot be reduced to an acceptable level. For this statement we can give an example. If all preventive measures are taken so that a fire does not break out in an object-building, it cannot be affected that this was done in a similar way in other facilities that are under the same roof or nearby. The fire in any of them can cause damage from smoke or fire in the whole area and prevent work or residence. In such a situation there is no possibility of avoiding the crisis, but simply the procedure for emergencies must be planned.

Planning for emergencies includes organization and decision-making before a crisis occurs. The pre-crisis planning provides enough time for management to consider all the possibilities, think about everything, consider the benefits of different procedures and even check to what extent they are ready to act. It is easier to perform well each of these important tasks in normal times, and very difficult and stressful during the crisis.

An example of the procedure in case of fire on the motor vehicle carrying hazardous materials or explosives. One should not wait for the fire to spread, but respond promptly.

Every driver of such vehicle and the people responsible for security must be trained to effectively use the fire-fighting equipment, that is to know how to act.

The importance of planning follows from its four most important aspects:

- contribution to achieving the purpose and objectives of the work,
- priority in the managerial functions,
- the omnipresence of planning and
- the efficiency of planning.

Each project and all its accompanying plans should contribute to achieving the purposes and objectives of the organization. It follows from the nature of the organizational process that exists to fulfill the common purposes of owner, managers and employees in the joint action. Planning logically precedes the execution of all other managerial functions because manager must plan to know what types of organizational relations and special qualifications are required, which way to lead subordinates and what type of control should be applied, so it is required to plan first all other functions of management.

Planning and control are inseparable. Control without a plan is meaningless because there is no way to determine whether it is the desired direction if that direction is not determined earlier. Planning is a function of all managers but some managers are engaged in more important planning (basic and applicable to the major part of the organization) whereas others are engaged in simpler planning (limited to a smaller extent of the work).

## 2.2. Levels of planning

By the well-known hierarchy of management in an organization, the hierarchy of planning is carried out as well:

- strategic management deals with strategic planning;
- mid-level management deals with tactical plans;
- lower management deals with operational plans.

The planning process is carried out from the top of the organizational pyramid towards the lower levels, that is, strategic management defines the key assumptions of planning (mission, goals, strategy) which are reformulated at lower levels into the realizable plans.

Strategic planning deals with survival and development of the organization over the long run in accordance with the principles of effectiveness and efficiency. Strategies define a set of actions and necessary resources for achieving strategic goals. Their purpose is maximum utilization of the benefits that the organization has in regard to the competition as well as opportunities offered to it in the external environment (Boin, t Hart, 2003).

At the tactical level, the strategic objectives are transformed into specific goals of individual, organizational parts of the organization (marketing, finance, production and other plans). This procedure defines the main activities each of these functional units has to perform to achieve strategic goals.

The operational level of planning handles developing specific procedures and processes; that is tasks that have to be performed at a given time with the available resources.

Time on which a particular form of planning refers to is reduced from the top toward the bottom of the management pyramid.

## 3. CONTENT OF CRISIS PROJECT

Looking at the plan as a final result of the planning, it can be concluded that it practically, in the most general sense, contains the following elements:

- objectives - What, by when?
- assumptions - Under what conditions?
- problem - Why?
- measures - How?
- resources - With what?
- dates - When?
- holders - Who?
- results - What effects?

Such content of planning elements, as well as their combination can serve as a basis for defining criteria for differentiation of individual plans. The planning process itself is based on different criteria of divisions. Each division highlights some aspect of planning. The plans can be broken down as follows: purposes or missions; goals; strategies; policies; procedures; rules; programs and estimates.

Mission or Purpose defines the basic function or task of the organization. Every kind of organized operation should have a purpose or mission. In essence, the purpose of a company is production and distribution of goods and services.

Objectives are endpoints towards which the activities are directed. They do not represent only the endpoint of the planning but also the completion towards which are directed organizing, staffing, leading and controlling. Each individual part may have its own goals that contribute to achieving the objectives of the organization. These goals are consistent, but different in so far as the section of production alone cannot ensure the achievement of the objective of the organization (Fink, 1986).

The term "strategy" managers increasingly use to indicate a broad area of operations of the company. The strategy is defined as determination of the basic long-term goals of the company, adoption of courses of action and allocation of resources necessary for their realization. The purpose of the strategy is to identify and communicate, using the composition of the main objectives and policies, the image of the organization. The strategy seeks to define exactly how the company will meet its goals, and that is the task of many larger and smaller supporting programs. Its usefulness in practice and importance in guiding the planning justify the positioning of the strategy as a particular type of plan.

Policies are plans in so far as they represent more general statements or agreements that lead or direct the thinking process in decision

making. Policies define the area within which decisions should be made, they ensure consistency of decisions with objectives and contribution of decisions in their achievement. Policies make it possible to resolve issues before they become a problem, therefore they make unnecessary the analysis of the same situations every time they occur. Policies exist at all levels of the organization and they range from the fundamental policies of the organization over the policies of the main sections to small policies applicable to smallest segments of the organization. There are many kinds of policies, for example, employment policy, employee motivation policy etc. Policies are guidelines for decision-making because they allow a certain freedom of decision-making, otherwise they would be rules. The creation of an integrated policy in order to achieve objectives of a company is difficult because:

- a large number of managers participate in the creation and interpretation of a policy which necessarily leads to variations in their understanding;
- it is difficult to control because it is difficult to determine the actual policy, and the desired policy may not always be clear;
- they are rarely defined in writing.

Procedures are plans that establish a necessary course of action in future activities. These are the chronological sequences of required actions, which is guidelines for performance, and not for reflection, they specify the manner in which a certain work must be done. Procedures often cross the border of one section.

Rules explicitly require exactly defined actions or departure from them and do not allow any freedom of decision-making and they are the simplest types of plan. They are different from the procedures in the sense that they direct the operation without defining a time sequence. Procedures are set of rules, but the rule does not have to be part of the procedure. Rules and procedures prevent reflection, and they are used when it is desired

that members of the organization do not act at their discretion.

Programs are set of goals, policies, procedures, rules, assigned tasks, steps to be taken, resources to be employed and other elements necessary for running a business, and they are usually supported by the estimate. The main program may require a series of accompanying programs in which process all require coordination and timing.

The estimate is a statement of expected results expressed numerically that is programs expressed by the figure. An estimate can be expressed financially, in working hours, in the units of product or machine hours, or in any other numerical form. It is a fundamental planning instrument in many companies because it forces the company to make a numerical compilation of the expected cash flow, costs and revenues, capital expenditures or capacity utilization. It is necessary for control, but only if it reflects the plans (Boisvert, Patrick., Moore, Raphaël, 2003). Having in mind the availability of data, we differ planning under certainty conditions and planning under uncertainty conditions. In the first case, all the necessary data are available, and it is expected the occurrence of a certain situation for sure. In the second case, there is incomplete data and the different probability of occurrence of different situations, which is taken into account by applying appropriate planning methods. This is an important segment in the context of crisis resolution, especially in the preparation of crisis plan and assessment of the extent of the problem.

#### 4. PLANNING STEPS

Determining the "chances" in the external environment of the organization, as well as within the organization is the starting point of planning, and is commonly called SWOT analysis (Strengths-Weaknesses-Opportunities – Threats). Then the goals are set, in the first place for the entire organization, and then for each work unit. Objectives are set for the longer and shorter periods. The objectives of main sections control objectives of

subordinate sections, and thus objectives form a hierarchy as well.

The third step is determining the critical planning assumptions; that is predictions, a fundamental policy of the organization and existing plans, briefing these assumptions to all participants and achieving agreement. The principle of planning assumptions says that if the individuals responsible for planning fully understand and approve the use of consistent planning assumptions, the planning in the organization will be more coordinated.

The fourth step of planning is search and examination of alternative courses of action. The problem is not in finding alternative courses but in their reducing. It is always necessary to make various preliminary tests find the appropriate courses of action.

The next step is the evaluation of alternatives concerning many uncertainties, problems, lack of resources and various non-measurable factors for the relatively simple problems as well, so this evaluation is quite difficult.

In the sixth step, the plan is to be adopted, and this is the real point of decision-making. It is possible that managers choose to follow more courses of action instead of one best if that is the most favorable solution.

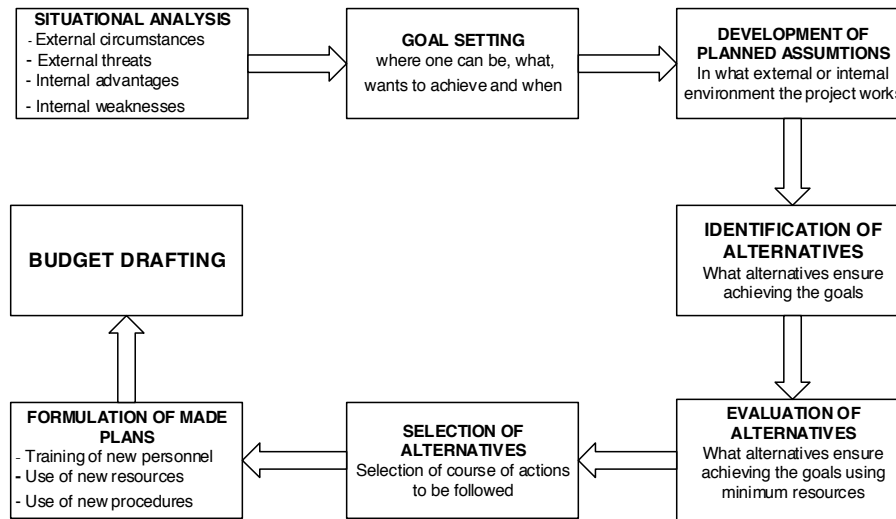
Then follows making of the workable plans that are required to support the fundamental plan of the organization. After making decisions and setting plans, the final step is their development, and that is quantification in the form of an estimate. Each part or program of business or other operation can have its estimates, which are linked to the overall estimate. The above mentioned planning steps are shown in Figure 1.

Specifically, each organization in some way plans how to handle an emergency situation. Aware of the dangers of various sources of threats they plan and organize exercise by such situations. They pre-determine how they will respond and where will take victims for treatment. If they have a supply of medicines

and medical equipment in order not to be caught unprepared.

The plans for such situations (emergencies, extraordinary events) are not expected to

prevent the crisis. They are activated only when a crisis event occurs. They can only mitigate the negative effects of the crisis and more quickly return the normal operations.



**Figure 1:** Steps of the planning process (Harvard Business Essentials, 2005).

For the military organizational systems, when it comes to drawing up crisis plans, particularly bearing in mind the characteristics of military organizational systems and their functioning, it is advisable to stand by the following steps in working out an effective crisis plan:

- Step 1: Create a planning team.
- Step 2: Assess the extent of the problem.
- Step 3: Draw up a plan.
- Step 4: Run a check on a plan.
- Step 5: Update a plan.

Step 1 - Create a planning team - practically results from the experience acquired in recent years. Planning for emergencies or extraordinary events will be effective only in the situations where the team is well chosen. It should be formed, so that enriches the planning process with different skills and different attitudes of people. The head of the team should bring together members with experience or special skills for every aspect of a possible crisis. This ensures that the most important elements in the planning and anticipating crisis events are not lost.

Step 2 - Assess the extent of a problem - is caused by the planning process and starts from the moment when the planning team is created. First, the extent of a problem is assessed. This means that the attention should be focused towards potential events that could cause a crisis, and that matter should be looked into. For the successful realization and overall consideration of such a situation it is necessary to bear in mind the following:

- More people know more
- Perform a brainstorming session in a relaxed atmosphere to make it easier to identify all the important issues
- Identify the person who will record on board the ideas of the participants in the debate. The views on the same topic should be recorded under the single title (e.g., answers to customer questions and parrying to questions from the press are to be classified under " Communications ").
- After the team assesses the problems, a wide range of people should be informed about its conclusions. Other

participants may know something that you anticipated.

Step 3 - Create a plan - follows after the presentation of all opinions of what can go wrong and conclusions of the biggest issues derived from them; after this it is proceeded to drawing up a plan for access to each of them or to those for whose solutions exist funds. The aim is to work out an action plan by carrying out preparations for the implementation of the plan that would reduce or stop the harmful consequences of the crisis.

Step 4 - Run a check on a plan - results from the need and attitude that we cannot be sure that the plans worked out on paper will have effect in reality. It is always necessary to check them in simulated conditions. That's what is carried out when conducting fire-fighting training in barracks, schools, workplaces and the like. This is what the army does when introducing new equipment and tactics.

Running a check on a plan for emergency situations or extraordinary events is the best way to find weaknesses and opportunities for improvement. This is a very good way to build confidence in the ability of the organization to control and resolve the crisis that arose.

Step 5 – Update a plan - follows as a basis that it is not enough to make a plan and then think that it solves everything. It is known that in the plan, in case of fire, there are persons on each floor capable of handling fire extinguishers and hydrants. Other persons know the procedures in case of fire and were given instructions to safely and quickly leave the building.

However, things are changing. In the plan for the operation and procedures in case of fire there must be appointed new persons who 'command' on each floor when the previously appointed persons get new jobs, new duties, complete their education and so on. Telephone numbers are changing and need to be updated. Periodically, fire-fighting training

should be conducted to make people well remember how to act in emergency situations. The update is necessary, but it is always easier than creating a new plan.

In the process of planning and drawing up the crisis plan it is necessary to determine the starting time for drawing up of the plan. A particular issue that points towards the rapid preparation of the plan is conditioned by the case if the major risks become a reality. This is what points towards the rapid preparation of the crisis plan in the manner described in the previous part of the text.

Every beginning of the creation of the crisis plan is difficult. There is always question where to start. The basic principle to be followed is to start with the simplest. In that case, one should bear in mind the environmental conditions in which the organization exists. It is necessary to have a clear and precise plan of informing members of the organization, employees and other officials in the case of any situation, eg. fire, snow storms, floods and the like (Harvard Business Essentials, 2005).

## **5. PLANNING FOR THE CRISIS THAT CANNOT BE PREDICTED**

Everything that has been said about predicting the potential crisis implies a certain skill. One cannot always anticipate every threat, and it is precisely these unpredictable threats that often inflict the maximum damage.

How to prepare for situations that cannot be predicted? Is it even possible? The approach to planning in the previous five steps cannot be helpful for the threats that are not identified. However, this should not be an excuse for passiveness and one might say lack of seriousness in the functioning of the organizational system of any kind. What is required is to prepare everything in order to be ready for operation regardless of the kind of crisis. To put it simply, when it comes to military organizational systems, operational capabilities to act at any time should be developed and maintained (Karović, 2014).



Preparations can be carried out by creating a team to manage a crisis that consists of extremely adaptable, capable and determined individuals authorized by competent persons. It handles making all crisis decisions and should play a leading role in the organization. The head of the crisis team should have a strong character and experience. This position requires exceptional leader skills in handling extreme situations, to make decisions under pressure and to work as part of a team. The head of the team must have the ability to analyze quickly information and to coordinate work of the whole team.

The team needs to be in direct communication with the police, firefighters, ambulance and stakeholders in the organization. This team should be able to make decisions quickly and to communicate smoothly. It must also cover all the expertise needed to overcome the crisis. It is very important for the team to have the authority to act, because without such authority, the team is useless. The team should be composed of the head of the organization General Manager-Commander, Chief Financial Officer-person in charge of finance, legal entity of the organization-lawyer, head of the investment affairs sector, a spokesman for the public relations and a person responsible for human resources.

Appointment of a crisis team before the crisis occurs a good first step to achieving readiness for action in any crisis. It is not enough because it is necessary to train the team in a joint operation, work, and decision-making. This can be achieved only through practice, that is by working on one's skills through specific assimilation exercises. It is a special characteristic of the army, police, firefighters and ambulance to use simulations to work on their skills and prepare for unpredictable situations.

The crisis team should implement and adapt appropriate actions from the crisis plan for operation in a specific crisis. Roles and responsibilities are defined in the crisis plan. This is how the teams for crisis situations should work, which is typical of commands of a certain level in the decision-making process.

## 6. STRUCTURE OF CRISIS PROJECT

Creating and building the system of solutions of crisis management should be initiated by the management of the organization. The system must be implemented and adapted to the level of performance in such a way that the entire staff is involved in that process.

Regardless of the measures taken for risk reduction, especially by reducing the risk, not every risk can be reduced. Crisis management deals with crises that prevention itself cannot prevent. It includes the prolongation of the greatest possibility for the functioning and recovery of critical functions as quickly as possible.

The most important processes in crisis management are: creation of the concept of organizational and procedural conditions for dealing with incidents as effectively as possible and managing the special structures for response in case of crises and crisis response forces.

Crisis plan includes all the crisis-relevant structures and planned procedures for a response of the organization to the crisis. A good crisis plan is short and precise. Drafting procedures in the form of check lists ensure that they include only important things. The crisis plan covers all the points and shows who handles what.

Crisis project includes the following contents:

- assumption of the crisis, goal, and purpose,
- allowed activities (procedures),
- formation of special crisis structures (organizations)
  - crisis response forces,
    - defining forces, areas, regions and competencies in response to the crisis,
    - activities and responsibilities specific in crisis management
- establishment of special procedures for dealing with the crisis, restoring normal operations and post-crisis performance
  - chain of commands and warnings,

- models of escalation and de-escalation,
- informing inside the organization and out,
- specific measures for recovery and restoring normal operations,
- information for post-crisis operation,
- creation of scenarios based on the components of the plan
  - evacuation,
  - power failure,
  - pandemics.

Here are listed the main elements of the crisis plan that are implemented for each organization separately. They are worked out by a group of experts or team appointed by the head of the organization and implemented through specific simulation exercises. Crisis plan must be constantly refined and updated (Karović, 2014).

## 6. CONCLUSION

The paper emphasizes the most important elements relevant for the development of the crisis project aiming at successful countering crisis by using defined procedures. The importance of creating a crisis project is essential for any organization and described procedures for developing are only the elements of the organizational processes so that an organization could exist in a modern environment.

If one looks at this approach to the creation of the crisis project, than the crisis management represents the systemic anticipating and preparation for the internal and external problems that may seriously threaten organizational effectiveness, reputation or survival. What is characteristic within the crisis project is primarily based on defining a set of procedures that an organization will use, that is which it will follow in case of a crisis. One should always bear in mind that there is only a relatively small number of procedures that will be used in a crisis situation and that can be pre-defined, and that most of the elements of the crisis management should be developed "in situ", that is in accordance with

crisis. There are especially emphasized the steps of the crisis planning process and the basic contents of crisis project that enables successful dealing with the crisis. All the steps are intertwined in one another and represent the continuity of the planning process. It is emphasized the importance of involving the entire organization in the process of implementation of a crisis project. In this way, an organization can successfully confront the crisis and overcome the situation it faced with. The structure of the crisis project included all the vital elements necessary so that it has a purpose and by this ensures the success of functioning of an organization in a crisis. It includes the procedures and techniques necessary for successful overcoming of crisis and implements in a whole system of organization.

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## EVALUATION OF INVESTMENT PROJECTS IN PUBLIC UTILITY SERVICE SECTOR

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**Abstract:** This paper starts with defining the investment projects in the public service sector and methods and methodologies used in their evaluation. We will give an overview of the alternative methods used in evaluation, along with their advantages and disadvantages. We showed when methods can give incorrect results and in which cases certain methods are acceptable in the evaluation, also when they could lead to incorrect results connected to the profitability of the projects. This paper will show the most significant elements of the evaluation of projects in public utility service sector. Issue of projects in public utility service sector becomes more and more significant with the process of Serbia's joining the European Union. There is a need for advancement of public infrastructure, with the goal of a greater contribution to environment preservation and improvement in the standard of living. Serbia has a possibility to advance public infrastructure with the financial help of the European Union.

**Keywords:** European Union funds, investment projects, methodologies for evaluation, projects' evaluation, public service projects, public utility service sector

### 1. INTRODUCTION

Public utility service sector is a sector of public significance, and the projects in this sector influence a wider social community, which is why it is important to do adequately the evaluation of justification of these projects. Evaluation of the projects in the public service utility sector is one of the bases of improvement of public infrastructure, but also the base for obtaining the financial means from the government or from the European Union funds. This is why we can use various methodologies to evaluate and analyze the projects' profitability. The need for improvement of public infrastructure imposes itself as an imperative in the process of European integrations and Serbia's joining the European Union. Many municipalities and public service companies do not have adequate documents necessary for project realization, and they do not do the evaluation of project justification in an adequate way, they do not pay enough attention to the standards that they have to follow. This paper gives basic theoretical overviews of the most significant notions concerning the projects in public service sector, as well as some useful

directions that public service companies should follow and rely on in order to understand the issue of project justification better, or to obtain the help in financing the realization of the projects.

### 2. CHARACTERISTICS OF INVESTMENT PROJECTS IN PUBLIC SECTOR

A special group of projects comprises investment projects that are directed towards building and equipping of certain objects for various purposes. Investment project represents a complex technical and technological, organizational, financial and legal undertaking, whose goal is to build and equip the objects, the ones that are proven in the previous investment studies to be necessary to the investor and which realize certain profit (Ivković & Popović, 2005).

Word *public* "refers to people, belongs to people, refers and influences the nation, state or society; opposite of private, for example, a public good, road or lake". Public is "any group of people that has a real and potential interest in company's success or can influence

the ability of a company to achieve its goal. The public implies one or more physical or legal entities and their associations, organizations or groups” (Hannay, 2005)

Public projects are usually done in the field of construction, environment preservation, information systems, communication technologies, health services, financial services, safety needs, defense etc.

One specific thing about public, state projects is their life cycle. PMI states the following as the stages in life cycle of construction projects:

1. Launching the project,
2. Planning and preparation of technical documentation and
3. Supply. (Project Management Institute, 2006)

Another specific thing about public projects is the additional interest groups (besides the participants which are characteristic for any kind of projects) which comprise: the public, regulators, and means of public informing, future generations, and private sector.

### **3. CHALLENGES OF PROJECT MANAGEMENT IN PUBLIC SECTOR**

Managers in the private sector usually like to emphasize that their job is much more demanding than the project managers in the public sector. They consider the projects in the private sector to be more complex, under the stricter monitoring of management and under the pressure of quicker execution. Even though the projects in the private sector can be followed by difficulties, in many cases it is easier to achieve results in the private sector than in the public sector.

Reasons which determine the complexity of the projects in the public sector:

1. They are executed in the environment of often conflicted goals and results,
2. Include many groups of shareholders with various interests,

3. Some political interests have to be satisfied and realized in the public eye,
4. They have to follow strict administrative rules, politics and processes that can delay realization of the project and decrease project resources,
5. Demand cooperation of external participants of the project team for trade, employment etc.,
6. They often have to work with the existing staff unlike the private sector because of the protection of the labor rights and employment system,
7. They are realized in organizations that are usually not appropriate nor have they participated in direct project activities or they were not successful in projects,
8. They are realized in the environments that can be characterized by political opposition. (Wirick, 2009)

Investment projects in public sector are different from the commercial projects in private sector by the level of funds got for realization, effects of the project which emerge in the process of exploitation and overall results of implementation of investment projects (Jovanović et al., 2014) Besides these there are differences in terms of institutions that finance projects and the manner of project evaluation.

### **4. PUBLIC SERVICE UTILITY SECTOR AND THE PROJECTS IN THE PUBLIC UTILITY SERVICE SECTOR**

Public utility service sector is a public sector which implies doing public service activities, i.e. providing of public services to physical and legal entities, financing and maintenance of objects and devices of public infrastructure at the level of municipalities and cities.

Projects in public utility service sectors are the projects of public significance for local and wider community which are organized and implemented by the local self-governments, public companies or physical and legal entities that have this right based on

the contract with the local self-government or Public Utility Company. These projects represent a form of public projects, but they refer to the smaller number of users (municipality, city or a wider area of town) than when we talk about public projects. Investments that refer to local infrastructure include local transport infrastructure, ecological infrastructure, water supply and wastewater treatment, prevention from pollution from agriculture, industrial pollution and social infrastructure.

Utility projects are mostly projects of great values and long lifecycles, so that is why financing or help in financing is necessary by multiple entities. In Thessaloniki agenda from 2003, EU stated that, in the Balkans, all investments that develop infrastructure in areas of energy, traffic and telecommunications will be a priority and preconditions for the increase of regional competitiveness and attractiveness for investors. (Ivanišević et al., 2011)

## **5. EVALUATION OF INVESTMENTS PROJECTS**

According to the common methodology, there are four basic stages in investment project realization: preparation, evaluation, realization and monitoring the effects (Pecić & Marić, 2013)

Evaluation of the project can be defined as a systematic and objective assessment of projects, programs or strategies, their structure, realization and results. The goal of project evaluation is to determine relevance and success in attaining goals, performances and sustainability of the projects. Project evaluation is a new notion in our region. Even in the countries of European Union this term was put to systematic use in the second half of 20th century.

Evaluation or project evaluation is done before, during and after the realization of a project. The evaluation before project realization is most important because it separates profitable from non-profitable projects and chooses the financially favorable projects. Evaluation during the realization of a project is done to avoid or correct potential

errors and irregularities, by composing reports on project advancement. Final report on the project success, evaluation after the completion of the project, is done after the realization. Recommendations from this report are taken into consideration while defining the new projects with similar or complementary goals. (Jovanović et al., 2006)

The most important studies that represent the foundation for decision-making in the process of investment projects management are the following: pre-investment study, investment study and realization study. (Pecić & Marić, 2013)

## **6. METHODOLOGIES FOR EVALUATION OF INVESTMENT PROJECTS IN THE PUBLIC SECTOR**

Making the investment decision represents one of the most significant stages in the investment process because an incorrect investment decision can cause long-term disastrous consequences for the company. When making a decision about investing in a certain project one should determine the justification of the investment, effects that will be delivered in the future, results and goals that it will realize. Division of the effects that a project brings in the future is on economic and social effects. Commercial projects that are mostly realized by companies have the goal of realizing the financial results. They cannot be expected to care more about social than financial aspects of projects.

The decision-making process is very important in management. It is empirically proven that in the labor structure, 92% of the time is spent in the decision-making process in managerial structure. (Jovanović I., 2006). In order to facilitate the decision-making process, to shorten the time and increase the security in the decision made, the evaluation uses various methodologies that consider financial as well as the social influence of the project. These methods are used in investment projects in non-economy branches, mostly in health industry, culture, education, defence because of the great number of indirect effects that these projects have, as well as evaluation of those projects that demand great financial

investments, like projects in traffic, investments in large energy objects, and in agriculture. The most significant internationally acknowledged methodologies for evaluation of investment projects are World Bank methodology, UNIDO and OECD methodology, and they are all based on Cost-Benefit analysis, i.e. they represent its modified forms.

### 6.1 Analysis of cost effectiveness

Analysis of cost effectiveness is a form of economic analysis which compares relative expenses and results of two or more ways of attaining certain goals. It evaluates the projects where the results can be identified, but their value cannot be expressed.

This analysis is based on the same principles like cost-benefit analysis, but what differentiates it is the fact that it does not assign money value to the project's effects. While the goals can be only indirectly assessed, expenses related to every offered alternative can be calculated based on options with the project or without the project.

Using the analysis implies the following stages:

1. Goals' defining and analysis;
2. Defining the alternative for goal accomplishing;
3. Evaluation of total expenses of every alternative;
4. Evaluation of effectiveness of every alternative from the point of view of goal accomplishment and the height of costs;
5. Comparison and analysis of alternatives. (Simić et al., 2011)

According to Kazanowski (Kazanovski, 1968), the cost effectiveness analysis must have a common goal or purpose that has to be realized, alternative ways to goal accomplishing and limiting factors for problem-solving.

Usage of this analysis is much more complex with public sector projects evaluation, where one needs to fulfill a certain goal that is impossible to measure quantitatively; e.g. improvement of the environment or improvement of the education system. Cost effectiveness analysis is usually used in the health care system, where it is impossible to express the health effects in terms of financial means.

### 6.2 Cost-benefit analysis

World countries use the methodology known as cost-benefit analysis, for evaluation of the projects which have predominant social dimension, i.e. social effects. Cost-benefit analysis is a technique of project evaluation and it is developed as an answer to the lack of financial analyzes of investment projects. The standard financial analysis evaluates cash flows of the investment project without cost analysis and benefits that the projects brings to the society as a whole. With commercial projects (for example the introduction of a new product) financial analysis of cash flows is enough for the investor to determine whether the expected return rate justifies the investment. On the other hand, with public projects low or even negative return rate does not have to mean that the project should not be realized. Some projects represent a legal obligation while others are important to realize some public purpose. Unlike financial analysis, CBA comprises the social dimension as well, which means that it determines if the project's total benefit is greater than the total expenses of the society. This analysis is most common in sectors of transport and environment protection since it is simpler to quantify the non-market effects and to define it in terms of financial means.

In the broader sense, CBA includes:

1. Project description – the problems the the project should solve and the goals that it needs to realize;
2. Socio-economic context – social and economic background of the project;



3. Institutional analysis – details of organizational and institutional aspects of project implementers;
4. Credit rating analysis – the limit to which the project implementer can participate in financing the investment;
5. Demand analysis and affordability – main factors which influence the demand for a service as the result of the project and the forecast of demand for the service in the future. Besides this, this segment should examine the affordability of the service as the project result;
6. Technical and structural analysis – technical options for providing services, physical input data and investment expenses for every of the options;
7. Financial analysis – financial viability of the projects from the point of view of the project implementer;
8. Economic analysis – upgrading of financial analysis which takes into consideration the wider effects of the project on the society as a whole, as well as on the environment;
9. Analysis of sensitivity, risk and scenarios – main risk factors that can influence the success of the project. (Toft & Brdarević, 2009)

Economic analysis implies the conversion of market into transfer prices, monetization of non-market influence, including the additional indirect analysis influences, discounting the assessed expenses and benefits, and calculation of indicators of economic yield of the projects. (Čupić, 2009)

Basic parameters for decision making in economic analysis are Economic net present value (ENPV), Economic rate of return (ERR) and Benefit-cost ratio (BCR).

### 6.3 UNIDO method

One of the most common methodologies for the evaluation of the investment projects in the world is UNIDO (United Nations Industrial Development Organization) methodology. This methodology includes

evaluations of commercial and national viability of projects.

UNIDO method is different from the other methods because it starts with the domestic prices as a base for determining of transfer prices. With UNIDO method, the transfer prices are determined based on the characteristics of the domestic demand, i.e. based on the “readiness to pay” for certain goods or services. The unit of measure is aggregate demand, so according to that all units are expressed in domestic prices. UNIDO method takes consumption as an ending reason for the investment, so in accordance with that it uses the expenses of the project and measures them in relation to the consumption, instead in relation to investments.

Non-tradables are expressed in domestic prices, domestic currency, so that they can be included in the analysis straight away. When we speak about the imported goods, tradables, they are expressed in other currencies, so by application of transfer exchange rate they are changed into domestic prices and domestic currency. According to this methodology, the project effects can be divided into direct socio-economic results (net output of the project), direct socio-economic expenses (project’s inputs) and indirect social results and expenses (external factors). (Ivaniš, 2010)

UNIDO method of project evaluation is divided into following stages:

1. **Analysis of profitability of investment** refers to the commercial profitability of the project, i.e. benefits that the investor expects from the project.
2. **Financial analysis** is done according to the years of the life cycle of the project, and the goal is to see if the project is constantly liquid and solvent. It includes the liquidity analysis and the analysis of the capital structure.
3. **National profitability analysis** includes the assessment of the contribution of the public project to the growth of national income. This refers to the project’s benefit for the entire

society. In case of private investors, national evaluation is done only in case of necessity for financial help by the state or giving consent to the realization of certain kinds of projects.

4. **Evaluation in the conditions of uncertainty** analyzes the changes of certain parameters and movements in the future, which can lead to problems in realization and profitability of the investment project. This analysis uses the criteria of the breakpoint, analysis of sensibility and analysis of probability. (Vukadinović & Jović, 2012)

#### 6.4 World Bank methodology

International Bank for Reconstruction and Development (IBRD) is one of the financial institutions of World Bank Group. It is an international financial institution that participates in financing the development projects in states that are bank's members, i.e. provides loans for the approved projects, which have to be realized in accordance with the regulations and procedures that the bank demands.

World Bank provides financial and technical help to the developing countries worldwide. Its mission is to participate in poverty battle in a professional manner, with the goal of attaining the long-term results; it provides means, expands the knowledge, and helps build capacities and creation of partnerships in the public and private sector in developing countries (Petrović et al., 2012)

World Bank evaluated projects by using the methods of net present value and internal rate of return. It calculates costs and benefits of the project according to transfer prices that should be mutually and internally comparable. In order to achieve this, all domestic factor and goods prices are transferred into world prices and expressed in one currency. This is done for all the goods, regardless whether they can be interchanged or not. On the other hand, the transferred prices should be ponders that treat certain project goals.

Cost-benefit analysis is the base of project evaluation methodology for the World Bank. Benefits are defined through their influence on the realization of basic goals of the country, while the expenses are seen from the aspect of lost benefits alternative resource usage, depending on their influence on realizing the social goals. Basic social goals are best expressed through the selection of numeraire. World Bank uses the social income that is available for investments as numeraire. It is expressed in a convertible foreign currency or the equivalent value of the foreign currency expressed in domestic currency by application of the official exchange rate. This is because the bank gives credits and loans in foreign currency, so it is possible to make comparison of transfer interest rate with the interest rate that is paid for the foreign loans (Simić et al., 2011) Transfer prices are set according to the dependence of the basic goals of development on the available basic resources. If there is a low availability of certain resources, i.e. they are in high demand, and then their transfer price tends to be high.

Investment projects that are financed by loans go through several stages in which the World Bank has an active role, i.e. through stages it controls project realization and helps during realization.

These are the stages:

1. Strategy and identification,
2. Project preparation,
3. Project assessment,
4. Project approval,
5. Project implementation,
6. End of project,
7. Evaluation of the project. (Vukadinović & Jović, 2012)

#### 7. FINANCIAL ANALYSIS

Financial analysis is the process that is done by institutions that develop the project in order to determine the financial sustainability and profitability of the suggested project.

Future profitability and the survival of an enterprise depend on long-term decisions that are made at a certain moment. One of the main goals of financial analysis is to foresee and assess the financial success of the project in a certain period of time, i.e. whether the project will be financially profitable and sustainable in the long run.

There are four alternative methods of evaluation and choice of the projects that are used in capital budgeting:

1. Return interval,
2. Net present value,
3. Internal rate of return and
4. Profitability index.

### 7.1 Return interval

Return interval of the investment project shows the number of years necessary for the initial financial investment to pay off.

*Acceptance criterion.* If the calculated interval of return is lower than the maximum acceptable return interval, the project is accepted; if not the proposal is rejected.

*Problems (lacks).* Firstly, the return method does not take into consideration cash flows that appear after the return interval. Secondly, this method does not consider money value because it sums up cash flows regardless of the time harmonization of these flows. Finally, the maximum acceptable return interval that serves as the rejection standard is a subjective choice.

### 7.2 Net present value

Methods of discounted money flows enable us to make a difference between time schedules of money flows for various projects by discounting of these money flows on their current value. There are three main methods of discounted money flows net present value, internal rate of return and profitability index.

This method is based on the assumption that all the expenses and incomes are based on money inflow and outflow, i.e. money flows in the foreseen period of project exploitation. The fact that net present value takes into consideration the entire exploitation lifecycle

of the investment is one of the basic advantages of this method. These money flows must be reduced, discounted to the moment of the beginning of exploitation of the investment project. (Vukosavljević et al., 2014)

*Acceptance criterion.* If net present value of the project is equal or higher than zero (or the current value of income is greater than the current money outflows) the project is accepted; and if not the project is rejected. (Van Horhe & Wachowicz, 2005)

*Lacks.* The basic lack of this method is the fact that it points only to the absolute measure of the investment efficiency.

### 7.3 Internal rate of return

Internal rate of return (IRR) for an investment project is a discount rate that equates the current value of the expected net money flows with the initial money outflow.

*Acceptance criterion.* We usually apply the comparison of the internal rate of return and the demanded rate of return. Demanded rate of return on the investment is a minimal rate with which the project is accepted. If the internal rate of return is greater than the demanded rate, the project is acceptable, and if not, the project is rejected.

*Lacks.* There are some tricky parts of calculating the internal rate of return:

1. The condition under which the internal rate of return functions: NPV of the project has to drop with the growth of the discount rate. However, if we compare the projects that have the same internal rate of return, we can come to the incorrect results if the projects have different positive and negative money flows during the years. Internal rate of return can neglect the signs before the amounts of money flows, so that the final decision on the justification of the project cannot be based on the internal rate of return without calculating net present value.

2. Multiple rates of return. Internal rates of return can have many advantages for one investment, i.e. for one project. The reason for this is a double change of the sign of money flows. The number of internal rates of return can be equal to the number of changes of the sign in the cash flows. In this case, the decisions are made based on net present value.
3. Projects that exclude each other. Companies usually have to choose between several alternatives which exclude one another. If we choose between mutually competitive projects, we should choose the one which has the greatest NPV. In this case we can come to the incorrect conclusions if we use the internal rate of return. (Brealey et al., 2007)

#### 7.4 Profitability index

Profitability index (PI) or cost-benefit ratio of the project is the relation between the present value of the future net flows and the initial money outflow.

*Acceptance criterion.* When the profitability index is equal or greater than one, investment project is acceptable. Methods of net present value and profitability index give the same results for acceptance – rejection. (Van Horhe & Wachowicz, 2005)

*Lacks.* When we use profitability index, there is a possibility of favoritism of small projects over large projects with the greater NPV. Profitability index is designed with the goal of selecting the projects with the greatest NPV per invested money unit. This is good when the means are limited. When they are not, greater NPV is always better than the smaller NPV, even when we invest more money units. (Brealey et al., 2007)

Indicators for the evaluation of financial success of the projects that are co-financed by the EU. Financial analysis applies the following indicators for the evaluation of

financial success of the project co-financed by the EU:

1. Financial net present value of the investment,
2. Financial profitability rate of the investment,
3. Financial net present value of the capital,
4. Financial profitability rate of the capital. (Ivanišević et al., 2011)

Financial analysis of infrastructural projects financed by the EU and the amount of grants that can be get from the EU funds. Although the maximum percent of EU funds are defined by programs, the real maximum grants for a specific project are calculated by using the methodology of financial means which are missing.

When we calculate using the total investment expenses, the indicators are called the financial net present value of the investment and financial profitability rate of the investment. This principle considers the project's profitability before it considers how it will be financed.

When we calculate using only a part of the investment expenses that are covered from the national sources, the indicators are called financial net present value of the national capital and the financial profitability rate of the national capital.

#### 8. LOCAL INFRASTRUCTURE AND FINANCING FROM THE EU FONDS

EU membership opens great possibilities for financing the priorities of local self-governments because it enables the access to European structural funds, as an instrument of application of the regional policy of the EU. The regional policy of the EU is directed towards the decrease of economic, social and territorial disparity that exists among the regions in Europe.

In the period from 2007 to 2013, 347 billion euros was invested in the European regions

through the instruments of the regional policy of the EU. Available means were for example allocated to improvement of transport and internet connections between the regions, to supporting the small and medium enterprises in developing areas, to investments in cleaner environment and to promotion of education and skills. EU funds are invested in innovation, development of new products and production methods, energetic efficiency and solving the problems caused by the climate changes. (Ivanišević et al., 2011)

Strategic determining of the directions of development of local infrastructure has to be adjusted to the changes in the way of planning of IPA funds. The rules of programing have been changed, so some key changes happened in the way of preparation of long-term planned EU documents, on whose findings the preparation and the selection of projects to be financed were based. Conducting of those planning documents was based on the project approach, so until 2010 planning of IPA funds was based on suggestions of individual projects. That approach has certain lacks: projects are always individual – every project lasts for a short period of time, it solves only one problem and there is no framework for consistent long-term effect on changes, which is important for the process of European integrations. Certain areas must have a planned framework of the desired changes that will be realized in a specific period, but it is necessary to measure their influence on the changes in those certain areas and fulfilling of the demands and criteria for European integrations. As EU and its members consider the help to EU processes to be long-term, the project approach is substituted by the so-called sector approach.

Sector approach is the way to base the development cooperation on the principle of coordinated support for the local national programs, such as the poverty decrease strategy, sector program, thematic program or the program of specific organization. Local authorities should consider the way of coordination and preparation of sector programs, which can have a thematic structure (environmental protection, decrease of pollution in the cities, waste and water

management etc.), as well as the preparation of territorial programs which include problem solving noticed at the specific territory.

### **8.1 IPA – Instrument for pre-accession assistance**

European Union provides financial assistance to individual and group users through instruments for pre-accession assistance (IPA). This assistance is provided to the countries candidates and countries potential candidates with the goal of introducing the necessary political, economic and institutional reforms. IPA includes five pre-accession instruments which were used before 2007: PHARE, SAPARD, ISPA, CARDS, and pre-accession instrument for Turkey.

IPA is a new pre-accession instrument of financial assistance established by the European Commission. IPA has a goal of supporting the strengthening of democratic institutions and government of law, government reform, economy reform, obeying the human and minority rights, gender equality, strengthening of civil society, advancement of regional cooperation, attaining of sustainable development and decrease of poverty. Besides all this IPA funds are directed towards economy recovery, an increase of energy efficiency, transport, a decrease of negative climate changes influences. (European Commission, 2013)

Financial means directed towards states candidates and potential candidates for membership have the goal of every country on the way to join European Union having a functioning market economy, as well as the capacity to deal with the pressures of the competition and market forces inside EU.

IPA financing by EU can be in the maximum amount of 85% of the total project expenses. For the approval of the suggested projects, it is necessary to provide the amount of co-financing from the own sources or other sources in the minimum of 15%. (Veljanovski, 2010)

IPA consists of five components:

1. Assistance to transition and building institutions – assistance in financing of building institutions and other activities connected to that goal. This component encourages measures for the advancement of stabilization and the process of transition, encouragement of democratization of society and improvement of the market economy.
2. Cross-border cooperation – encouragement of cooperation between member countries, candidate countries and potential candidate countries
3. Regional development – finances investments and the connected technical support in the areas of transport, environment and economic cohesion.
4. Human resources development – has the goal of developing human capital through education and training, as well as the battle against the exclusion of the sensitive groups of society.
5. Rural development – has the goal of development of rural areas, i.e. the support in agriculture restructuring and its adjustment to the standards of the European Union when it comes to environment protection, human, plants and animals health protection, welfare of the animals, as well as the issues of labour conditions improvement, i.e. increase of work safety. (Simon Forrester et al., 2011)

#### **9. EUROPEAN UNION AS THE GREATEST DONOR TO SERBIA**

With more than 2.6 billion euros of grants in the last 13 years (from January 2014) in all areas, from the government of law, through the reform of the government, development of society to protection of the environment and agriculture, European Union is the greatest donor in Serbia.

From 2000 the European Union has realized many projects in the area of traffic infrastructure (Liberty Bridge, Žeželj's bridge

and Gazela bridge, roads and border crossings), health (ambulance cars, mamographs, medical waste management), solid waste, quality of air and water treatment, (Subotica, Sremska Mitrovica, Užice, Požarevac), as well as in the area of justice system reforms and state government (Erasmus). Every year the EU donates around 200 million euros from the IPA funds, for the projects which will be realized in the following period, so Serbia is the greatest recipient of grants of the European Union in the entire region of the Western Balkans. (Davenport, 2015)

Currently, there are over 600 projects that include a wide range of sectors for the welfare of the citizens of Serbia. The sign of special trust between The European Union and Serbia is that Serbia, in 2014, took over the management over the EU financed projects.

Besides IPA programs, Serbia can use the EU funds through the programs of Civil Society Facility (2.5 million euros), TEMPUS program (4 million euros), and means for refugees inside Regional housing program (€12 million). (Delegation of the European Union in Serbia, 2014)

#### **10. ADVANTAGES AND DISADVANTAGES OF FINANCING FROM THE EUROPEAN UNION SOURCES**

Negative aspects of financing from the European Union sources are mostly connected to very bureaucratic systems that surround these programs, and they refer to the following:

1. Financial demands are too high. There was a certain facility connected to the demands for guarantees, so organizations do not have to provide them always. However, when they have to provide them, finding guarantees and warranties for a project in terms of real estate or cash can still be impossible.



2. Procedures for submitting the demands are too complicated. A lot of time and effort must be put into creation of project suggestions - for filling the application, planning the budget in a special form, finding the letters of support, warranty letters from the co-financing parties and statement from the bank and the auditor, because the application can be rejected on purely formal grounds.
3. Already set and overly strict approach can stand in the way of creativity. Usually applications are accepted or rejected depending on whether they fit in with the foreseen goals, and whether they are in accordance with the programs that have been previously accepted, but to what extent the projects can expand the limits of the existing policies is not taken into consideration. (Hajrula, 2007)

Positive sides of European Union funds financing are first and foremost the amounts of financial means that can be obtained. Also this is a good way to practise strategic planning of projects, improvement of management in an organization, encouraging of partnership, widening of business networks to other countries and organizations, acquiring the knowledge because of exchange in European networks and overcoming the traditional financing through national governments. This form of financing facilitates another financing of the organization in the future.

#### **11. THE EXAMPLE OF PROJECT FINANCING THROUGH IPA PROGRAMS – PROJECT FOR WASTEWATER TREATMENT IN KRALJEVO**

Serbia is in the process of coming close to membership in the European Union and as such it has the intention to harmonize the regulations with the EU directives, including the Directive on urban wastewaters. That is why waters protection as a segment of the environment protection, demands a significant investment fund with the goal of providing

water and environment quality. Directive on urban wastewaters demands the collection system and a plant for wastewater treatment in Kraljevo to be provided. System for collecting wastewaters and atmosphere waters in Kraljevo is in a poor condition and a great part of the system has to be renewed or replaced. The goal of the project is to emphasise the reconstruction of the existing network, separation of atmosphere water and sewerage system and building only small parts of the collector in the town of Kraljevo which will enable the proper functioning of the entire sewerage system. This would also be followed by building a plant for wastewater treatment at the existing location.

The main goal of the investment is providing an integral solution of the issue of collecting, drainage and wastewater treatment in agglomeration of the town of Kraljevo. By realizing this investment the following will be provided:

1. Decrease of the potential source pollution;
2. Decrease of the concentration of the dropped nutrients in river flows;
3. Decrease of the health risk for the local population;
4. Boost in economic development of the entire area; and
5. Obeying of the local and European laws and standards in respect of wastewater treatment.

The town of Kraljevo is the investor; it is represented by Directorate for Planning and Construction. The creation of the General Project, previous Justification study and Study on the influence on the environment is financed by European Union through Technical assistance for project preparation for IPA component, at the suggestion of Ministry of energetics, development and environmental protection.

Planning period begins with the creation of the Justification Study and ends with the last year of financial and economic projections. This period will last for 25 years, starting from 2014 and ending in 2038. The total value of the project is 28.5 million euros, which can

vary because of the incomplete understanding of the adequacy of the existing sewerage system. 70% of the investment value of the project is the means expected from EU funds. The Republic of Serbia will finance 20% of the total project value, and the town of Kraljevo 10% of the total value.

Justification study did analyses of developmental possibilities of the investor and the project, analysis of the current situation, analyses and projections of the market aspect, analysis of the influence on the environment, financial analysis and evaluation, socio-economic evaluation, sensitivity analysis and the assessment of risk.

Two options for the efficiency of treatment were analysed: Option 1 – conventional plant with active sludge and anaerobic sludge stabilization; and Option 2 – plant with the active sludge in sequential batch reactor and subsequent aerobic sludge stabilization. In both cases, the relation between gain and expenses is above 2.5. Still option 1 is ranked as the better one because the gain in this option is much greater than the expenses. Both scenarios have been analyzed. The purpose of the scenario analyzes is to evaluate the feasibility of the alternatives in respect of time planning and the sequence of project's components. This analysis came to a conclusion that all the scenarios have positive net value and greatest net value is realized in scenario 3 (60 million euros). The relation between gain and expenses is also the greatest in scenario 3 (3.67). The selection of scenarios will depend on the availability of means of financing of investment and purchase power of the population, in order to cover all expenses of labor and maintenance. Each of the scenarios is useful for the society because the economic benefits are greater than the economic expenses, but according to the net present value it would be best to choose scenario 3.

Investing in the network of collectors and a plant would be completely done in accordance with EU regulations, EU directive on wastewater treatment and laws of the

Republic of Serbia. Town of Kraljevo and PUC "Water Supply" Kraljevo have enough capacities to conduct the mentioned investments, together with adequate assistance.

## 12. CONCLUSION

Projects in the public service sector, the utility service, are projects which have a wider social significance, so it is very important to evaluate the project adequately. These projects have a long lifecycle, demand great investment funds for realization and usually it is expected that more subjects will participate in financing. Investing in projects in the area of utility services and in the public sector, brings multiple effects, economic and non-economic, direct and indirect, which influence wider circle of users. Various methodologies have been developed for the evaluation of public sector projects, which can help in project analysis. Standard methodologies that are mostly used and which are worldly recognized are UNIDO methodology and World Bank methodology, which rely mostly on Cost-Benefit analysis.

For economic evaluation of the projects return rate is used, net present value, internal return rate and profitability index. These methods are usually used together, but there are cases when they provide different results. In that case, the results provided by net present value on the profitability of the investment project are most commonly taken into consideration. Wider social effects of the project, i.e. the effects which a project has on the entire society, are taken into consideration for non-economic evaluation of the project. EU funds offered to the countries candidates are also available to Serbia. IPA program is one of the programs done by the European Union, which has a goal of development of utility infrastructure and regional connecting of countries towards realizing the mutual goals.

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**Serbian Project Management Association (YUPMA)** was formed as YUDRUP in 1986. In 1997 it has become a full member of the International Project Management Association (IPMA). YUPMA and its members have so far taken part in a large number of national and international research and other projects in the field of management.

### CERTIFICATION

YUPMA offers the international certification through the YUPMA CERT programme based on the IPMA<sup>®</sup> certification programme. The YUPMA CERT programme objective is to test and verify the competence of candidates in project management.

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### SEMINARS

YUPMA also organizes appropriate training in the field of project management via seminars, courses and lectures delivered by both our and foreign experts. Training courses are organized periodically or at the request of a company or another organization. YUPMA's standard offer includes a number of seminars and courses which can be geared to the specific requirements of the participants. On completion

of any seminar the participants receive a certificate.

Listed below are some seminars the Association organizes:

- Project management
- Training for project managers
- Project management in IT
- Managing the EU projects
- Business Plan Preparation
- Project Management in Specialized Fields (health-care, education, public administration...)
- Project Management Software Packages (MS Project, Primavera)

### SYMPOSIUM

One of YUPMA's major tasks is the organization of symposia bringing together the experts engaged in project management and related disciplines. One of the major objectives of these scientific meetings is to describe the position and the development of project management in Serbia and in the region. So far, sixteen symposia on project management have been organized and they are traditionally held every spring on the Mount of Zlatibor



# FAKULTET ZA PROJEKTN I INOVACIONI MENADŽMENT

## NASTAVNI PLAN OSNOVNIH AKADEMSKIH STUDIJA - PROJEKTN MENADŽMENT

### I GODINA

#### *I Semestar*

- Menadžment
- Osnove ekonomije
- Informatika I
- Engleski jezik I

#### *II Semestar*

- Teorija upravljanja projektom
- Matematika
- Informatika II
- Engleski jezik II

### II GODINA

#### *III Semestar*

- Strategijski menadžment
- Alati za upravljanje projektima
- Teorija organizacije
- Osnove finansija

#### *IV Semestar*

- Osnove marketinga
  - Softverski paketi za upravljanje projektima
  - Upravljanje ljudskim resursima - Izborni
  - Upravljanje promenama u projektu - Izborni
  - Upravljanje rizikom projekta - Izborni
- (Studenti biraju dva izborna predmeta)

### III GODINA

#### *V Semestar*

- Upravljanje investicionim projektima
  - Projektni menadžer i timski rad
  - Program menadžment – Izborni
  - Upravljanje projektima u javnom sektoru - Izborni
  - Preduzetništvo – Izborni
- (Studenti biraju dva izborna predmeta)

#### *VI Semestar*

- Projektni portfolio menadžment
  - Upravljanje informatičkim projektima
  - Projektna organizacija - Izborni
  - Izrada biznis plana - Izborni
  - Upravljanje komunikacijama u projektu - Izborni
- (Studenti biraju dva izborna predmeta)
- Praksa i završni rad

## NASTAVNI PLAN MASTER AKADEMSKIH STUDIJA - PROJEKTN MENADŽMENT

### I GODINA

#### *I Semestar*

- Savremeni menadžment
- Metodologije projektnog menadžmenta
- Pravci razvoja projektnog menadžmenta

#### *II Semestar*

- Upravljanje znanjem
- Projektno liderstvo
- Upravljanje kvalitetom projekta

### II GODINA

#### *III Semestar*

- Upravljanje kapitalnim projektima – Izborni
  - Upravljanje biznis i društvenim projektima – Izborni
  - Upravljanje ugovaranjem u projektu - Izborni
  - Informacioni sistemi u organizaciji - Izborni
  - Krizni menadžment - Izborni
  - Projektno finansiranje - Izborni
- (Studenti biraju tri izborna predmeta)

#### *IV Semestar*

- Praksa
- Završni rad

# FAKULTET ZA PROJEKTNII I INOVACIONI MENADŽMENT

## NASTAVNI PLAN OSNOVNIH AKADEMSKIH STUDIJA - POSLOVNI I INOVACIONI MENADŽMENT

### I GODINA

#### *I Semestar*

- Menadžment
- Osnove ekonomije
- Informatika I
- Engleski jezik I

#### *II Semestar*

- Teorija upravljanja projektom
- Matematika
- Informatika II
- Engleski jezik II

### II GODINA

#### *III Semestar*

- Strategijski menadžment
- Proizvodni menadžment
- Teorija organizacije
- Poslovne finansije

#### *IV Semestar*

- Inovacioni menadžment
  - Menadžment tehnologije
  - Upravljanje ljudskim resursima - Izborni
  - Marketing menadžment - Izborni
  - Upravljanje promenama - Izborni
- (Studenti biraju dva izborna predmeta)

### III GODINA

#### *V Semestar*

- Ekološki menadžment
  - Investiciono odlučivanje
  - Biznis inovacije - Izborni
  - Preduzetništvo – Izborni
  - Upravljanje komunikacijama - Izborni
- (Studenti biraju dva izborna predmeta)

#### *VI Semestar*

- Upravljanje inovacionim projektima
  - Savremeni menadžer
  - TQM - Izborni
  - Izrada biznis plana - Izborni
  - Menadžment MSP - Izborni
- (Studenti biraju dva izborna predmeta)
- Praksa i završni rad

## NASTAVNI PLAN MASTER AKADEMSKIH STUDIJA - POSLOVNI I INOVACIONI MENADŽMENT

### I GODINA

#### *I Semestar*

- Savremeni menadžment
- Liderstvo
- Inovacije i preduzetništvo

#### *II Semestar*

- Elektronsko poslovanje
- Upravljanje znanjem
- Operativni menadžment

### II GODINA

#### *III Semestar*

- Upravljanje finansijskim rizikom - Izborni
  - Finansijski menadžment - Izborni
  - Menadžment u javnom sektoru- Izborni
  - Krizni menadžment - Izborni
  - Upravljanje rizikom -Izborni
  - Upravljanje tehnološkim inovacijama - Izborni
- (Studenti biraju tri izborna predmeta)

#### *IV Semestar*

- Praksa
- Završni rad