

COMPARATIVE ANALYSIS OF METHODOLOGIES FOR RISK MANAGEMENT OF STRATEGIC INVESTMENT PROJECTS

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Abstract: *Strategic investment project accomplishment is risk taking process. Risk management is, therefore, necessary during the accomplishment of strategic investment projects, and methodologies for risk management projects will be analyzed in that context. Risks that arise during implementation of investment projects can have influence on the outcome and is determined by known probability of accomplishing unwanted events. Therefore, it is necessary to make comparative analysis of different methodologies for management of risks and there is need to point out the most efficient methodology that can be practically used in order to minimize the risk of investment in project accomplishment. In this paper, a contribution is made in mentioned field through choices, analysis, and forming of methodology for management of project risks of strategic investment projects.*

Keywords: *risk management, methodologies, strategic investment projects*

1. INTRODUCTION

Any strategic investment project is characterized by uncertainty and risks, and its successful accomplishment depends on risk management. Current project management methodologies are developed by various associations and organizations domestically, as well as around the World. This paper will take into account some of the most popular and widely used of them: PMI (Project Management Institute) methodology, IPMA (International Project Management Association) methodology, risk management standard ISO/IEC (International Organization for Standardization/International Electrotechnical Commission) 31000, YUPMA (Yugoslav Project Management Association) methodology, GPM (Guidance on Project Management) methodology [1]-[5].

In order to reduce harmful influx of hi-risk events on the process, implementation of risk management is necessary. Preferred type of risk management can be determined using methodology. This paper will produce comparison between different methodologies.

A vast number of various risks, such as business-related, financial, technical, HR-related risks, and so on, can influence the outcome. To lead the project most effectively, an early identification of risk-carrying events should be made, in order to analyze and to address them in timely manner. In other words, appropriate standardized methodology should be employed in course of strategic investment project, in order to implement most appropriate risk management technique.

The aim of this paper is to define, on basis of the results of the comparative analysis, which methodology is most appropriate for risk management of a particular strategic investment project. Also, the aim of this paper is to undertake a complex multifaceted analysis of the impact of the project risks on the overall business success of the organization, and to point to the practical possibilities of implementing project management.

The first part of the paper will describe the impact of risks on the success of strategic investment projects. After that, some of the methodologies used to manage risks in strategic investment projects will be presented, with their comparative analysis.

2. EFFECT OF RISKS TO THE PERFORMANCE OF STRATEGIC INVESTMENT PROJECTS

Risks can generate negative impacts, problems and losses, by reducing the effectiveness of the strategy investment projects. In certain situations, risks can generate an opportunity for achieving favorable results. A large number of authors dealt with problems of the impact of risks on the success of strategic projects [6] - [12].

In [7] are listed authors, who presented interesting classifications of risk factors. Hegazy and Aayed [7] consider that the most important risk factors include: season, location, type of project, duration of contract and type of contract. Herbsman [7] lists following risk factors: costs of materials, labor and equipment, and scope of contracts. Yeo, Minato and Shley [7] cite four groups of risk factors, detrimental for the success of the project: external risks (project modifications, changes in the legal, economic and technological environment), technological complexity of the project, inadequate project management, and unrealistic assessment.

By devising a list of risk factors with significant impact on the effectiveness of strategic projects, we can further analyze them to determine how each individual risk factor influences the success of strategic projects, in order to choose a specific strategy to address the risks.

We should keep in mind that the impact of risk factors may differ in different projects. Because of that, additional assessment of possibility of minimizing the negative impact, of the risk factor on a specific project, is needed. That can be achieved by using appropriate methods and techniques of risk management, and with use of empirical results from literature.

The authors [13] consider that success of capital projects is most influenced by risks arising from an inexperienced contractor, that is, from bad contract. Also, with risks associated with the design of the project and changes in the project. On the other hand, [14] states that there is a significant difference in perception and risk impact between successful and unsuccessful companies.

The studies by [15], show the necessity of empirical investigation of each group of risk factors, and to consider how will they affect the project in order to apply response strategy. A group of factors related to the quality of contracts, point to the project problems, to incomplete information regarding risks, to risks in regard of unavailability of the materials, to problems with application of specific network planning techniques to measure deadlock and damage from downtime, and similar.

In [16] are listed factors with impact on the success of the project - time, costs, projected quality and delivery to the required performance are stated.

In [10] are listed four critical risk factors to the success of the project:

1. Training and education
2. Top management support
3. Business strategy
4. User feedback

We can conclude that there are many risk factors with influence on the effectiveness of strategic projects, in various ways.

3. METHODOLOGIES OF PROJECT RISK MANAGEMENT

There is a number of methodologies in risk management theory, for managing project risks, that do not differ significantly, because they contain the same or similar sub-processes.

Some of the best known methodologies for managing project risks will be discussed further in the text, such as: PMI methodology, IPMA methodology, Risk Management Standard ISO / IEC 31000, YUPMA methodology, and GPM methodology [1] - [5].

3.1. PMI methodology

The PMI methodology [1] categorizes the area of project risk management knowledge into 6 sub-processes. The methodology contains the following sub-processes:

1. Plan Risk Management – The process of defining how to conduct risk management activities for a project.
2. Identify Risks – The process of deterring which risks may affect the project and documenting their characteristics.
3. Perform Qualitative Risk Analysis – The process of prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact.

4. Perform Quantitative Risk Analysis – The process of developing options and actions to enhance opportunities and to reduce threats to project objectives.
5. Plan Risk Response – The process of developing options and actions to enhance opportunities and to reduce threats to project objectives.
6. Monitoring and Control Risks – The process of implementing risk response plans, tracking identified risks, monitoring residual risks, identifying new risks, and evaluating risk process effectiveness through the project.

3.2. IPMA methodology

The IPMA methodology in its manual [2] proposes the following process steps for managing project risks:

1. Identify and assess risks and opportunities.
2. Develop a risk and opportunity response plan and have it approved and communicated.
3. Update the different project plans affected by the approved risks and opportunities response plan.
4. Assess the probability of attaining time and cost objectives, and keep doing it during the project.
5. Continuously identify new risks, reassess risks, plan responses and modify the project plan.
6. Control the risk and opportunity response plan.
7. Document lessons learnt and apply to future projects; update risk identification tools.

3.3. Risk Management Standard ISO / IEC 31000

The risk management standard ISO / IEC 31000 relates to the risk management in organizations, but can also be applied to the project risk management. It points out the principles and generic guidelines for risk management, and contains a wide range of decision making activities, strategies, implementations of processes, operations, functions, sub-projects, production, services and assets. ISO / IEC 31000 can be applied to any type of risk, both with positive or with negative consequences. To comply with this standard, necessary knowledge and skills should be acquired in order to create optimal risk assessment and risk management during the life cycle of strategic investment projects. Implementation of risk management according to [3] in strategic investment projects can bring multiple benefits, including: increased probability of achieving (business) goals, increased awareness of, and understanding of the need such as identification and risk management in strategic investment projects, improving health and safety of employees, improving business, improving ability to identify chances and threats, and so on.

3.4. YUPMA methodology

The group of authors within the YUPMA association developed a generalized methodology for project risk management, which includes following sub-processes:

- a. Risk Identification: Identification is the initial stage in the process of project risk management, which involves finding and determining risk events, i. e. risk factors, which occur in the life cycle of the projects, and the grouping and classification of risk factors according to certain criteria [4].
- b. Risk Analysis and Evaluation: Risk analysis is the phase in which the nature of certain risk factors is analysed, after which the analysis and assessment of the probability of the emergence of certain risk factors and the quantification of the impact of risk factors on the outcome of the project are carried out. In the course of the analysis, it is very important to identify high-risk events with a major impact on the result of the project. [4].
- c. Planning the Risks Avoidance and the Risk Response: Response planning is the stage in the process of project risk management where, based on previous analysis, strategies for the prevention or response to possible risk events are defined, in order to avoid or minimize the possibility of risks occurrence in the project implementation, and to reduce possible losses [4].
- d. Controlled Application of the Risk Response: Monitoring and control is the stage where it is determined whether the planned risk response strategies provide the desired results or whether there is a need to introduce new ones. [4].

3.5. GPM methodology

Several authors [5] from the German Association for Project Management (GPM) presented a risk management process that consists of the following stages:

1. Risk Identification: research and risk finding are undertaken at an early stage,

2. Risk Analysis and Evaluation: Assessing and expressing the harm of a particular risk in amounts of money, by quantitative methods; Quantitative evaluation of the likelihood of occurrence of a particular risk, and calculation of the risk value using the probability of occurrence and the money loss.
3. Selection: Risk categorization is carried out in several groups, in accordance with the estimated likelihood of occurrence and calculated loss, in order to pay particular attention to the risk group with greater likelihood and higher possible loss.
4. Monitoring: It is carried out during the project; At this stage, an assessment of the impact of risk factors is carried out, as well as an assessment of the effects of the applied risk response strategies.
5. Plan Risk Response Strategies: Strategy is being planned as a response to a particular risk; Choosing an appropriate action by: avoiding, reducing, mitigating, transferring or by accepting the risk.

4. COMPARATIVE ANALYSIS OF THE DESCRIBED METHODOLOGIES

This paper presents a comparative analysis of described methodologies. By analyzing those methodologies for managing project risks, it can be concluded that they all have essentially the same or similar steps. All of the analyzed methodologies contain the following phases:

1. Risk management planning,
2. Identification,
3. Analysis,
4. Response to risk,
5. Monitoring and control,
6. Assessment,
7. Reconsideration,
8. Consultation.

The overview of project phases containing the previously described methodologies is given in Table 1.

Table 1: Project phases in the mentioned methodologies

Metodology	Planning	Identification	Analysis	Response	Monitor and Control	Assesment	Reconid eration	Consul tation
PMI	X	X	X	X	X			
IPMA	X	X	X	X	X	X		
ISO 31000	X	X	X	X	X	X	X	X
YUPMA		X	X	X	X	X		
GPM		X	X	X	X	X		

It should be noted that all methodologies contain identification, analysis, risk response planning, and monitoring and control phases. Some of the methodologies contain fewer numbers of phases, other are somewhat more detailed and contain more phases.

This comparative analysis shows that the contents of each individual phase include the same or similar elements, methods and techniques. In analyzing the aforementioned methodologies for project risk management, in addition to considering the coherence of certain phases of the methodology, the content of the project phases is also considered, such as the use of procedures, methods and techniques, of identification and classification of risks, as well as quantitative methods and techniques to be used in risk analysis and assessment.

Deciding which strategy is best suited for the specific identified risk of the project being monitored, is of particular importance. All methodologies suggest, in general, the same set of risk response strategies.

However, the question is how to choose the appropriate strategy for the specific risk within the project. This depends on the characteristics of the project, the expected results of the project, and the specific factors of the observed risk. First of all, the likelihood of risk occurrence and the magnitude of the impact, or loss, that can happen if the observed risk occurs.

3. CONCLUSION

Contemporary organizations permanently invest in development, and execute the strategic investment projects in the most efficient ways, due to their need to increase competitiveness. In order to accomplish these projects timely as planned, and with the planned costs, it is necessary for them to use modern methodologies of project and strategic management. When choosing between methodologies, it is necessary, among other things, to focus on the strategic goals of the organization.

The paper analyzes some of the most important risk management methodologies proposed by contemporary literature [1] - [5], [17] as well as the project management practice. During the analysis, it was concluded that identification is the process of finding, determining, and classifying of risks that may occur in course of implementation of the project. We also came to conclusion that some phases are common to all of the observed methodologies: identification, analysis, risk response, monitoring and control.

All of these phases are interconnected, so the risk management process turns into a continuous process, which takes place during the entire period of accomplishment of a particular strategic investment project.

Special attention is given to the comparison of appropriate phases between selected methodologies. The connection between the project risk management and the success of a particular project has been identified. Based on the analysis, it can be concluded that there are many risks that affect the success of strategic investment projects.

The purpose of using the aforementioned methodologies is to facilitate management, as well as project control, by using various approaches, methods and guidelines. Different characteristics of various strategic investment projects require specific methodologies. Therefore, the development of new project management methodologies will continue.

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