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Risk Control in Construction Project Management

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Abstract: The article examines the problem of risk management in the implementation of investment and construction projects, proposed a comprehensive classification of risks, as well as a risk management mechanism for construction organizations. The approaches to risk management in the implementation of investment projects are outlined. Within the scope of the article, distinctive features of risk assessment methods are highlighted. Methods of analysis and evaluation of investment project risks are considered. Some of the existing methods of risk assessment are analyzed in terms of their advantages and disadvantages.

Keywords: advantages, method, risk, finance, project.

INTRODUCTION

Construction risk assessment is a comprehensive and systematic method for identifying and analyzing potential threats to project implementation, determining their scope, and also affecting key parameters such as timing and cost.

Risk management depends on the latest information, rapid response to changes and quick management decisions, so it is important for the construction company to have tools such as analysis of the reality of the plan for the performance of work, the ability to generate and receive reports on construction projects, and control costs and consumption of resources.

The construction process is unimaginable without special methods of risk analysis and assessment. Traditionally, practitioners have linked the success of a construction project to three main dimensions - time, cost and quality - and in these contexts potential risks are assessed [Chutia, R. *et al*., 2018].

Projects are implemented in highly uncertain conditions. Among the main external factors:

- general economic instability;
- continued epidemiological restrictions;
- availability of resources (labor, materials, equipment);
- Reducing the size of the issuance of preferential mortgages;
- changes in legislation;
- Lack or insufficient training of employees.

Can also highlight those risks that may arise regardless of the current context. This includes errors in the planning and design stages, incorrect calculation of the cost estimate of work, timing, quantity of materials and, as a result, overruns of the initial budget, timely signing of final documents, delays in payments, problems with the quality of work.

Effective Risk Response Strategy [Muriana, C. *et al*., 2017; Razavi, F. S.M, 2012]

Effective Risk Response Strategy in Project Management

Determine the risks for a particular project. The analysis must be carried out at the preparation stage. One of the most powerful methods is brainstorming with stakeholders and decision makers. The experience of previous projects will allow us to identify the list of additional risks that may arise at any stage of implementation.

Assessment of construction project risks in order of priority. Two factors are taken into account - the potential impact on business and the likelihood of its occurrence. It is advisable to use quantitative expressions - in terms of percentage [Alam, T. A. *et al*., 2011; Taylan, O. *et al*., 2014; Naderi, F. *et al*., 2014].

The "high probability" and "high-impact" risks must be addressed first and can create a network of the most important priorities in its management.

Set a response strategy for each hazard. Methods can be divided into several categories, including avoiding risks, minimizing risks, and accepting risks to complete a project. The tactics chosen depend on the potential benefits.

Implement a management plan that will help detail information for all project team members. For each of the identified risks, a detailed description of the resources is provided and Involve all project team members. They should be aware of all the potential risks [Mohammadi, H.S. *et al*., 2014].

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Create a plan of action in the event that the analysis of the facts of the plan reveals unsatisfactory indicators (behind schedule, over budget, etc.)

An important factor in risk management is to reduce the level of uncertainty. Working in conditions of full awareness of the situation on construction sites, the company gets the opportunity to adjust its actions and prevent the emergence of negative consequences Timely identification and response to risks helps to avoid loss of profitability and non-compliance with deadlines, and ensures effective management of construction projects.

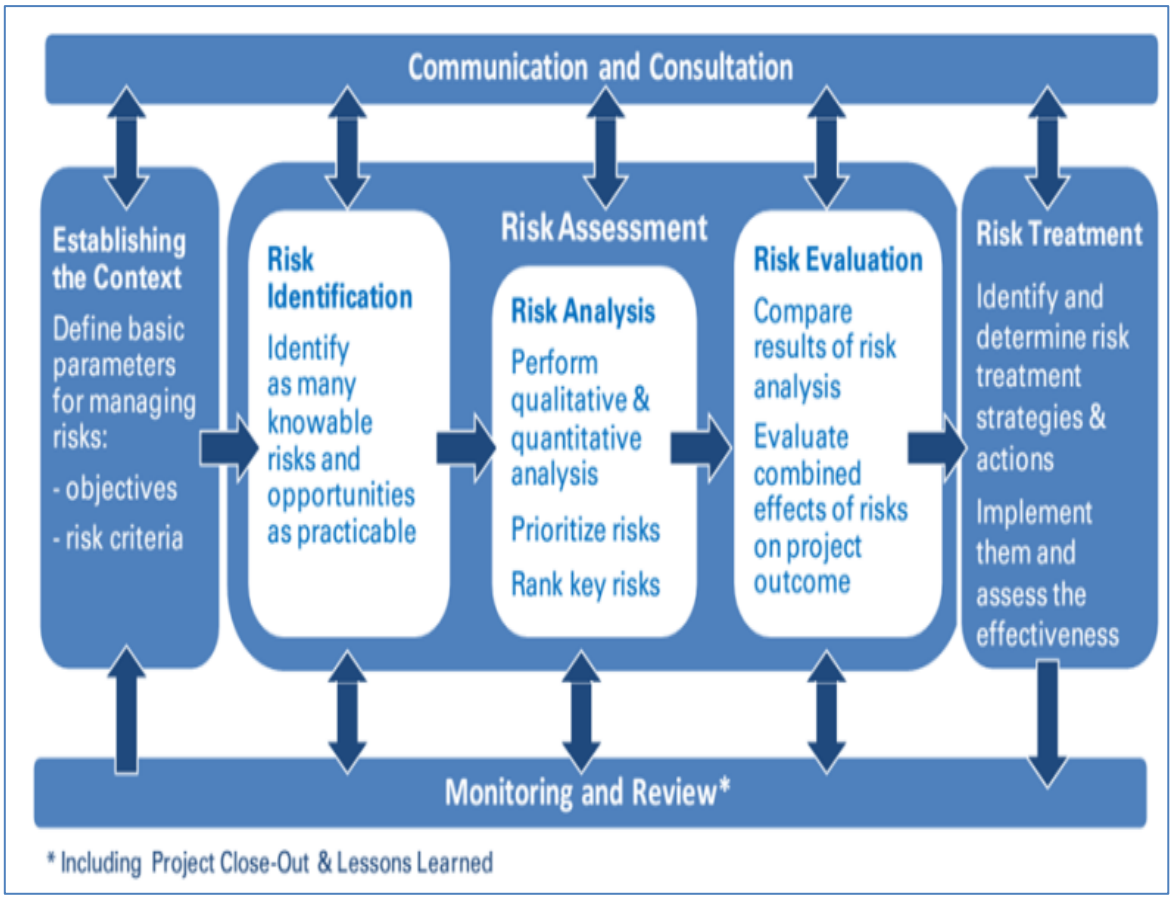

Figure 1: Project planning & reporting best practices Risk Management Guideline

METHODOLOGICAL ASPECTS OF THE ANALYSIS

The use of project management methods can lead to negative situations, their occurrence allows you to solve the main problems of the probability estimate and the magnitude of the visual consequences. However, the existence of many different methods of project management makes it difficult to solve the problems [Sabzeparvar, 2018; Kumaraswamy, M.M. *et al*., 2001].

Depending on the unknown issues in the field of risk classification and the level of their impact, each company structures them differently.

public organizations, bodies of social and environmental control, mass media information - all of them significantly expand the scope of risks. in a dynamic environment. in order to avoid the onslaught of the increasing flow of risks, construction companies must gain experience, be flexible and open to new ideas. Management of construction organizations at may believe that a trained and experienced personnel is the key to successful management risks. Undoubtedly, the skills of good engineering and administrative staff are an extremely valuable asset. However if the specialist goes on vacation, quits rises through the ranks, the risk management mechanism, which depends on the skill and experience of this specialist, begins to falter.

An intuitive approach to risk management, instead of a systematic process, worsens the risk management system - managers are often afraid to identify all possible or real problems. Sometimes, due to fear of the management personnel of the organization, many negative situations and their

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consequences are not detected in time or they are completely hidden, and this often leads to an increase in negative consequences during construction. Currently, in Kazakhstan there is an opinion about project risk management as a process consisting of the following stages: risk identification, risk assessment, risk control and risk financing. Risk management refers to their control and financing, while risk analysis refers to their identification and evaluation. This concept today retains its popularity in the domestic public literature. The vast majority of risk management researchers adhere to this concept. [Zhang, L.Y, 2003; Ebrahimnejad, S. *et al*., 2010; Williams, T, 1995; PMBOK, 2016]

At the same time, almost all authors pay special attention to the issues of risks in investment design, that is, the calculation of the effectiveness of investment projects, taking into account uncertainty and risk, and not enough attention to risk management in the process of implementing construction projects. In modern conditions, this concept needs to be improved [Colicchia, C. *et al*., 2012]. A detailed analysis of studies published over the past few years in domestic materials and their comparison with modern foreign methodological approaches revealed discrepancies between domestic and foreign ideas about the risk management process. In the domestic literature, the concept of the sequence of actions in the process of project risk management is preserved, namely, the division of this process into two main stages: risk analysis and risk management. At the same time, it is impossible to talk about the existing unified approach in foreign sources. Careful examination of the methodological approaches to risk management published in other countries showed clear contradictions in the division of the risk management process into separate functions. As a result, at this stage in the development of risk management theory, there is no unified approach and standard methods for identifying and assessing risks; ongoing discussions about the conceptual apparatus; ways to reduce the degree of exposure to risks to an acceptable level have not been studied deeply enough (in the domestic literature, insurance is mainly discussed). This leads to a weakening of the significance of the risk management mechanism in the process of implementing investment construction companies, as well as to the rejection of the practical use of this technology, which ultimately updates the research topic [Muriana, C. *et al*., 2017].

The purpose of this study is to develop methodological foundations for risk management in the process of implementing investment construction projects. Thus, the formulated goal allows us to formulate a scientific hypothesis that considers risk management in the process of implementing investment construction projects from individual functions organized into a process, such as planning risk identification, risk assessment, risk treatment, control, and documentation [Olfat, L. *et al*., 2010].

Table 1: Goals and objectives of risk management functions

Functions	goal	task
Planning	Designate the order, sequence and timing of the implementation of risk management measures.	1. Develop a risk management plan. 2. Determine the need for staff training.
Risk identification	Get a description of the risks of implementing an investment construction	1. Identify 5-15 real situations that may have a negative impact on COI implementation in the future. 2. Document the characteristics of these situations, taking into account why they are considered as risks.
Risk assessment	project	1. Determine the likelihood of risks. 2. Determine the amount of losses in case of risks. 3. Calculate the degree of impact of risks on the course of COI implementation. 4. Establish the level of each identified risk.
Risk treatment	Assess probable losses in the course of COI implementation.	1. Develop detailed activities within the risk treatment strategy: set deadlines for completion; distribute responsibility; allocate the necessary resources. 2. Implement risk treatment activities.

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Control	Reduce impact	1. Determine the effectiveness of risk treatment. 2. Adjust risk treatment measures if they are ineffective

Managers and specialists of construction organizations will be able to most accurately determine the possible risks in the implementation of this mechanism, which will lead to the most effective management of a construction organization. The project risk management process is essential in investment activities. The main functions of investment risk management include: current forecasting and planning of activities, identification of sources of risk, selection of management decisions necessary to eliminate the impact or reduce negative factors, calculation and justification of the economic feasibility of the project, ensuring normal operation in any changing situations, calculation of the acceptable level of risk , development and implementation of measures to minimize the identified risks of the project, forecasting and modeling of relationships between factors, as well as complex diagnostics [Chutia, R. *et al.*, 2018]. The existence of investment risks creates the need to manage them. To date, various methods for assessing the level of risk are used. A risk management method is a technique or a system of techniques for performing individual operations in the risk management process [Mohammadi, H.S, 2014]. However, the main problem is the choice of the most appropriate risk assessment method, since each method has its own scope, as well as advantages and disadvantages.

There are a huge number of methods for assessing investment risks. The most relevant are: sensitivity analysis, analysis of alternative scenarios, Monte Carlo simulation, which are presented in Table.

Table 2: Basic methods for assessing investment risks

Method	**Sensitivity analysis**	**Analysis alternative scenarios**	**Simulation according to method**
Advantages	Simplicity	Relationship between parameters can be taken into account	Takes into account the dependence of some parameters on others
Flaws	Does not take into account the dependence of some parameters on others	Enough labour intensive	A technically very complex method

CONCLUSION

Sensitivity analysis allows you to run a kind of crash test, roughly and quickly evaluate the project. That is why this method is the most popular. This method is used to determine the factors that greatly affect the project, as well as to calculate the influence of factors that are difficult to predict. An important drawback of this method, despite its simplicity of calculation, is the lack of correlation between individual factors. When applying this method, it is necessary to determine the factors that are independent of each other. When evaluating alternative scenarios, it is necessary to construct three scenarios: pessimistic, optimistic, and realistic [Sabzeparvar, 2018]. The analysis of this method allows you to take into account the relationship between the parameters and delve into the study of possible options for the implementation of the project. The main problem with this method is the need for preparatory work, the lack of information, the level of qualified experts. The analytical method is the correct and most complex way to consider risk assessment. Using the Monte Carlo method, one can analyze projects of social significance, take into account the dependence of some project criteria on others, and evaluate projects with high accuracy. It is the most valuable way to analyze risks related to costs and expenses.

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