

## THEORETICAL APPROACH TO CONSTRUCTION PROJECT RISK MANAGEMENT SYSTEM

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*Risk management in construction is an important scientific and practical task. During the long life cycle of a construction project, a large number of controlled and uncontrolled risks affect it. Thus, the work identified two groups of risks that affect the project - these are the risks of the project life cycle and the risks of the project's environment. The first includes technical, managerial and commercial risks that arise at all stages of the project. The environmental risks of the project include financial, economic, social, external and environmental risks. Thus, the work presents a system of risks of a construction project and suggests ways of managing them.*

Keywords: Risk management system, Construction, Economics, Project life cycle

## ТЕОРЕТИЧЕСКИЙ ПОДХОД К СИСТЕМЕ УПРАВЛЕНИЯ РИСКАМИ СТРОИТЕЛЬНОГО ПРОЕКТА

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*Управление рисками в строительстве является важной научной и практической задачей. На протяжении длинного жизненного цикла строительного проекта на него оказывает влияние большое количество контролируемых и не контролируемых рисков. Так в работе выделены две группы рисков, оказывающих влияние на проект — это риски жизненного цикла проекта и риски окружающей среды проекта. К первым относятся технический, управленческий и коммерческий риски, которые возникают на всех стадиях проекта. К рискам окружающей среды проекта относятся финансовые, экономические, социальные, внешние и риски окружающей среды. Таким образом в работе приведена система рисков строительного проекта и предложены пути управления ими.*

Ключевые слова: риск, система управления рисками, строительство, экономика, жизненный цикл проекта.

## INTRODUCTION

Risk management is the safety valve for every construction project. It prepares the initial, executive and future studies for managing the project's funds and sets all the expected possibilities according to the data and data, as well as knowing the specific scope of the project and its products as a whole. Risk management includes risk management planning processes, risk definition, qualitative risk analysis, quantitative risk analysis and planning. Risk responses, monitoring and control of risks and the

necessary inputs to the risk management planning process are to explore the environmental factors, the operational assets of the organization, the scope statement, the project management plan and the project charter. The planning and analysis meetings are used to prepare the risk management plan.

Construction risk is a consequence of the uncertainty and instability of the economy in market conditions of management, which creates a potential risk for any organization when doing business. In a competitive environment, the problem of management considers risks as significant, and therefore the process of identifying and evaluating risks has become an integral part of the management of the organization. This justifies the importance of research devoted to the problem of economic impact risks on the results of the implementation of the investment and construction Project and Modern economic conditions of management have led to the emergence of new stages of the investment cycle of real estate construction, which changed its content by introducing information management techniques and led to the emergence of new forms of documentation.

Risk management defined by Michel Crouhy is the focus on managing the risk of a future event, it has little effect on some project objectives through a planned and structured process of identifying and evaluating the consequences of risks. Objectives may include scope, schedule, price and quality of work and can be predicted. When they are known risks in projects, it is possible to identify and manage them [1].

According to Robert Mark, risk management for construction projects is defined as «managing a set of events that can be expected in the future in all their positive and negative cases, in addition to managing the risk in a correct and timely manner in order to provide a positive benefit to the project» [2].

An important investment planning document is a business plan of the project, which contains information on the economic attractiveness of the capital invested in the project and its economic efficiency. In most cases when developing a business plan, there is a low level of investment planning and justification that does not reflect the specifics of the construction market variance and does not guarantee to investors that the project will receive the level of profit as a result of the project addition. Use in determining the economic efficiency of the project the calculation methodology is based on the use of discount methods, which significantly reduce the risk of inflation and fairly accurately determine the level of the period of profitability and payback of the project [3].

## RESULTS AND ITS DISCUSSION

The article discussed the real risks that the project is exposed to as a result of continuous changes, which are called dynamic changes that occur to the project and the process is summarized in how to develop the project and get rid of negative risks which may hinder development, both in terms of time and in terms of material [4].

Not all risks can be considered bad risks sometimes open the door to opportunities. For example, if, after exploring the risks in a project, you find that a software subsystem being developed as part of a large manufacturing operation is itself marketable, may decide to hire the best engineers. In a subsystem development company, removing experienced engineers from a project creates additional risks in the project, but in this case it can be compensated for by the opportunity gained [5].

The construction projects sometimes include the presence of some of the ends specified for a certain number of stages and are in the period of completion of the project and in the case of failure by the contractor, this exposes the contractor to pay the amount agreed upon in the contract in the event of delay and that is because the contractor has exposed the project to losses [7, 8].

There are many risks involved in all phases of a construction project, from Feasibility assessment of the Operational phase. Although great efforts have been made to solve it Risks in their emerging stages and remaining or unresolved risks are transferred or added to the next stage of the construction life cycle [9].

Thus, the Risk management system includes two sets of Risks, including Project Lifecycle Risks and Project Environment Risks listed above (Figure 1)

**Project lifecycle risks** is consisting of 3 types of risks that might appear on every project stage. **Commercial** risk is the probability of non-recoupment of an ongoing project in terms of making a profit by all interested parties. **Technical** risks include the risks of deviation from the production and technological plan for the construction of a building and structure. **Management** risks are problems associated with the organization of work on the construction site and in the construction organization as a whole. Project Environment Risks is consisting of Financial, Economic, Social, External and Environmental risks.

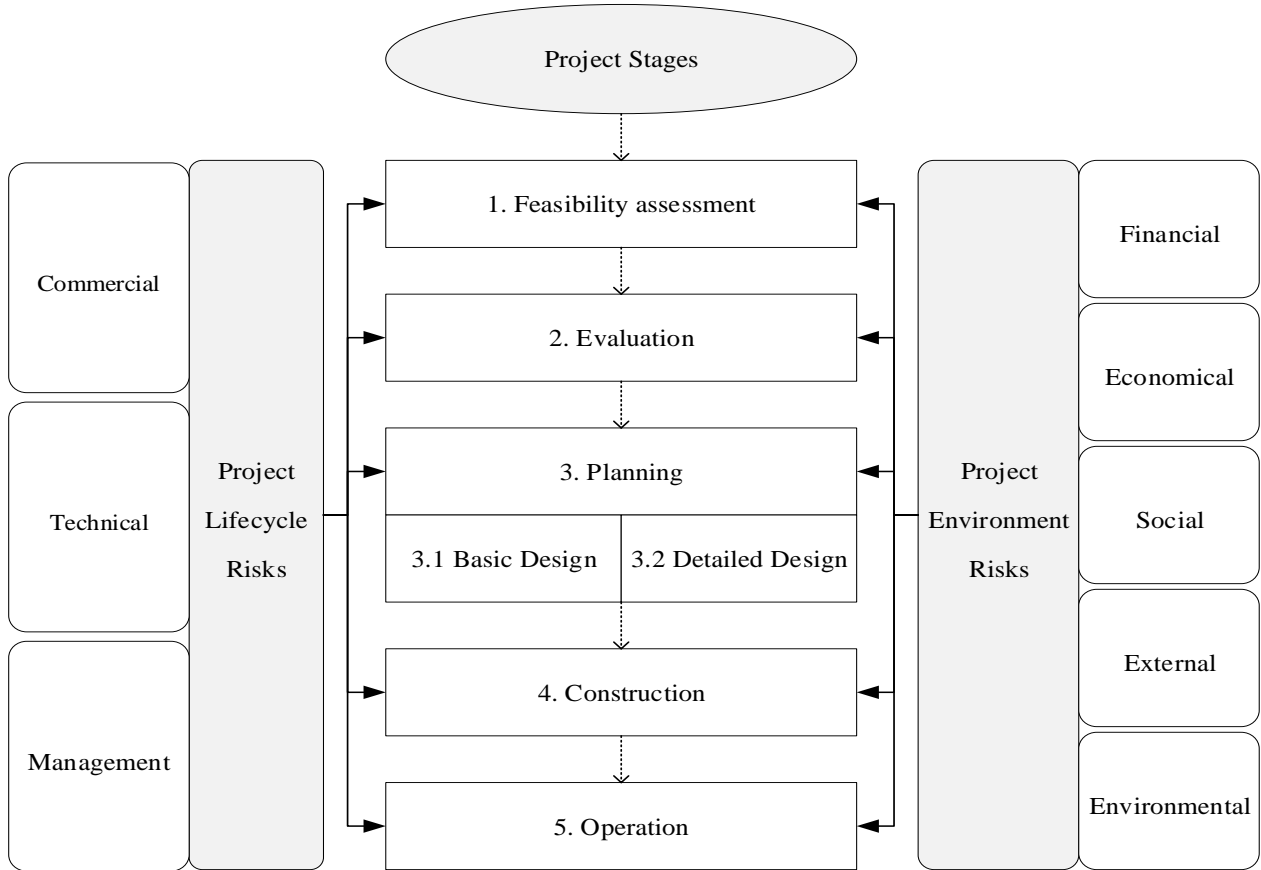


Figure 1 – Construction project Risk System  
Source: The author's own development

In every project there is a risk that the proposed objectives will not be achieved. Implementation plans, however detailed and concrete, do not escape the negative situations or challenges involved in any undertaking. However, construction is one of the sectors where these risks are most noticeable because a project of this type generally goes through many stages before it is implemented. In fact, even at this last stage it is usually adopted by agreements, signatures and clauses that make the processes more complex. Thus, risk management is more specialized than other areas and its main task is to identify threats that can hinder the achievement of objectives [10].

### CONCLUSIONS

The scale and complexity of large engineering projects involves risks that must be managed appropriately to achieve their objectives and although the project formulation team synchronizes with the project management team, although it may be an added value due to the knowledge of the project, it can involve significant risks as long as aspects of Construction is pending during the design and project process and they can eventually be the subject of negotiation on the part of the contracting companies.

## REFERENCES

1. Ai, Jing, Patrick L. Brockett, William W. Cooper, and Linda L. Golden. 2012. Enterprise Risk Management through Strategic Allocation of Capital. *Journal of Risk and Insurance* 79: 29–55.
2. Anton, Sorin Gabriel. 2018. The Impact of Enterprise Risk Management on Firm Value: Empirical Evidence from Romanian Non-Financial Firms. *Inzinerine Ekonomika-Engineering Economics* 29: 151–57.
3. Papanikolaou, M. and Xenidis, Y., 2020. Risk-Informed performance assessment of construction projects. *Sustainability*, 12(13), p.5321.
4. Jannadi, O.A. and Almishari, S., 2003. Risk assessment in construction. *Journal of construction engineering and management*, 129 (5), pp.492-500.
5. Al Khattab, A.; Anchor, J.; Davies, E. Managerial perceptions of political risk in international projects. *Int. J. Proj. Manag.* 2007, 25, 734–743.
6. Del Cano, A. and de la Cruz, M.P., 2002. Integrated methodology for project risk management. *Journal of construction engineering and management*, 128(6), pp.473-485.
7. Han, S.H.; Kim, D.Y.; Kim, H.; Jang, W.-S. A web-based integrated system for international project risk management. *Autom. Constr.* 2008, 17, 342–356.
8. Van Wyk, R.; Bowen, P.; Akintoye, A. Project risk management practice: The case of a South African utility company. *Int. J. Proj. Manag.* 2008, 26, 149–163
9. Yang, Y.; Tang, W.; Shen, W.; Wang, T. Enhancing Risk Management by Partnering in International EPC Projects: Perspective from Evolutionary Game in Chinese Construction Companies. *Sustainability* 2019, 11, 5332
10. Olsson, R. In search of opportunity management: Is the risk management process enough? *Int. J. Proj. Manag.* 2007, 25, 745–752

## ЛИТЕРАТУРА

1. Ai, Jing, Patrick L. Brockett, William W. Cooper, and Linda L. Golden. 2012. Управление рисками предприятия посредством стратегического распределения капитала. *Журнал рисков и страхования* 79: 29–55.
2. Anton, Sorin Gabriel. 2018. Влияние управления рисками предприятия на стоимость фирмы: эмпирические данные румынских нефинансовых фирм. *Inzinerine Ekonomika-Engineering Economics* 29: 151–57.
3. Papanikolaou, M. and Xenidis, Y., 2020 Оценка эффективности строительных проектов с учетом рисков. *Устойчивое развитие*, 12 (13), с. 5321.
4. Jannadi, O.A. and Almishari, S., 2003. Оценка рисков в строительстве. *Журнал строительства и управления*, 129 (5), стр. 492-500.
5. Al Khattab, A.; Anchor, J.; Davies, E. Управленческое восприятие политического риска в международных проектах. *Int. J. Proj. Manag.* 2007, 25, 734–743.
6. Del Cano, A. and de la Cruz, M.P., 2002. Интегрированная методология управления рисками проекта. *Журнал строительства и управления*, 128 (6), стр. 473-485.
7. Han, S.H. Kim, D.Y. Kim, H. Jang, W.-S. Интегрированная интернет-система для управления рисками международных проектов. *Автомат. Констр.* 2008, 17, 342–356.
8. Van Wyk, R.; Bowen, P.; Akintoye, A. А. Практика управления рисками проекта: пример южноафриканской коммунальной компании. *Int. J. Proj. Manag.* 2008, 26, 149–163
9. Yang, Y.; Tang, W.; Shen, W.; Wang, T. Повышение эффективности управления рисками путем партнерства в международных проектах EPC: перспективы эволюционной игры в китайских строительных компаниях. *Устойчивое развитие* 2019, 11, 5332
10. Olsson, R. В поисках возможностей управления: достаточно ли процесса управления рисками? *Int. J. Proj. Manag.* 2007, 25, 745–752