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## Risk management in construction projects

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### Abstract

In the era of galloping globalization, there is no way not to talk about the risk, which has become an indispensable part of everyday life. The risk is present everywhere, in every area of life. One such area is the construction industry, where risk is ever-present element of a great puzzle. Effective risk management, does not apply to the resignation of the risk, which is seemingly the cheapest option activity. The basic problem of this option, however, is its senselessness economic, because what is potentially profitable, it is by definition risky and something that does not pose a risk, it is interesting from an economic point of view, and thus, does not bring tangible benefits. Therefore, the effective risk management will be to find a "golden mean" in its management, in relation to the implemented project. On the one hand it will involve protection against the risk of negative side, by means of detailed identification and classification of risk, resulted in a comprehensive analysis. On the other hand, the management should be based on checking the maximum benefits of these decisions, using all the tools of mathematical and analytical. A detailed analysis, taking into account all aspects of escorts, including even stakeholder analysis will allow us to effectively risk manage what the future will translate into tangible benefits for our project. Identification of project risks, based primarily on determining what its types may affect the project, together with an indication of their characteristic parameters, and estimating the probability of its occurrence on the project. These conditions can be divided into three groups: assurance, uncertainty and risk, under which, in turn, preserve the three types of investors: risk preference, neutrality toward risk and pure risk aversion and its measurement. The result of risk identification and analysis of the project, will be a list of events showing the cause and the probability of an event, and its final assessment of the impact on the environment.

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## 1. Introduction

In the era of progressive globalization it is hard to avoid risk, which has become an indispensable part of everyday life. Risk is present everywhere, in every aspect of our life. One of such aspects is the construction industry, where risk is an inherent element. Effective risk management does not mean the removal of risk, which would seemingly be the cheapest option. From economic point of view this option is pointless because what is potentially profitable is by definition risky and activity that does not pose a risk is not economically interesting, and thus, does not bring tangible benefits [7].

## 2. Identification and risk assessment

Each project is associated with risk-taking. Enterprises and institutions should be prepared for the occurrence of possible risks. Very often companies have a strong tendency to take risk at the beginning of their activity and therefore many of them become bankrupt in the first two years from their foundation. However, financial institutions and banks have very poor appetite for risk. They run their business so as to be resistant to risks because they operate the assets of their depositaries. As part of portfolio they choose to implement those projects whose variance (uncertainty) is acceptable. Therefore, before the implementation each project should undergo risk analysis performed along with the identification of possible risks. Identification of risks in construction projects is based primarily on determining what types of risks may affect the project, identifying their characteristic parameters and estimating the probability of their occurrence in the project. The need for risk identification stems from the decision-making conditions under which an investor is at the moment [1].

The result of the project's risk identification and analysis is a list of incidents showing their causes, probability and final environmental impact assessment. In 1921, Frank Knight defined clearly the difference between risk and uncertainty: "*Uncertainty is to be seen in a decidedly distinct way from the well-known concept of risk, from which it has never really been separated. (...) The main point is that in some cases the risk is a measurable magnitude, while in others it has a completely different nature; depending on the type we have to deal with there are far-reaching and fundamental differences in the understanding of this phenomenon. (...) It seems that measurable uncertainty or the actual risk, which is a term we are going to use, is so different from the immeasurable uncertainty that in consequence it does not constitute uncertainty*" [5].

### 2.1. Risk types and examples

The most common risk division is classified in terms of occurrence frequency and the scope of impact. In general terms, the division is as follows:

Risk in terms of frequency:

- *Systematic risk*, otherwise market risk independent of entity control,
- *Specific risk relating to specific projects*, along with all variants.

Risk in terms of impact scope:

- *Fixed risk*, concerning the whole economic system,
- *Variable risk*, otherwise non-fixed concerning a given enterprise.

Besides, we distinguish the following risk types:

- *Financial risk*,
- *Time-related risk*, risks connected with failure to implement the undertaking or individual activities,
- *Technical risk*, connected with failure to provide quality of the finished project,

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