

THE NATURE OF PROJECT RISK. APPROACHES OF THE PROJECT RISK MANAGEMENT AND THE POSSIBILITIES FOR THEIR IMPROVEMENT

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ABSTRACT

Project's specific risk factors are both internal factors that appear as a consequence of their nature and characteristics and external factors that belong to the projects' environment. Risk management is an iterative process that takes place over the entire life cycle of the project and through which risks are identified and analysed in order to offer the adequate responses for each risk. The methods can be used for the identification of the risks involved by the realisation of the projects are general methods (like the risk table, control lists, flaws diagram,) or methods specific for project management (like the Risk Breakdown Structure -RBS) . The general response strategies at the project risk depend on the criteria used: preventing, avoiding, accepting and transferring the risks. A project risk management process has to be a major component of the management of any project, with an important role in the implementation of the objectives indicated at its beginning.

KEYWORDS: *project, risk, management, approaches, methods*

1. The nature of project risk

The analysis of the evolution and level of knowledge concerning the risk and uncertainty leads to the conclusion that in social sciences and in economics it has not yet crystallised, in the present state of knowledge, a single approach of risk and uncertainty; on the contrary, one can notice a variety of approaches. Even if the distinction between risk and uncertainty was drawn in 1921, the concepts had been used long before in the works of certain economists (Cantillon, Smith, Say, Bastiat, Marshall, Bohm-Bawerk). In the present state of knowledge in economics, the risk has both a positive and a negative meaning, being characterised by probability and impact, and the uncertainty is associated with the impossibility of estimating the probability and impact in relationship with certain events.

Any project is initiated and developed in order to develop an answer for one of the users or clients' specific need. It implies an objective and actions to be taken with limited resources. The project risk is a consequence of their main characteristics: limited duration of finalisation; aim and objectives; sum of resources; complexity; uniqueness; novelty. The unique character of the projects is the most important source of uncertainty and risk as the results corresponding to the intermediary deadlines of realisation cannot be precisely defined from the initial stage. The uniqueness imposes the necessity that future risks and uncertainties to be clearly administrated as an essential component the project management process.

Most specialists define project risk as a possibility of not completing the objectives of the project. The project risk is represented by the probability and the impact of any event that can have a positive or negative influence over the project's objectives during

its entire life cycle. The risk of a certain future event over the project can be determined as the result of the probability and impact of that event. From the perspective of the life cycle, the risk also implies the variability of the projects' expected results compared to the expected or planned results. As projects are unique, non-repeatable actions, the estimation of risk is based especially on using the subjective probabilities.

Project risk is the result of the inversely proportional evolution of the degree of accuracy concerning the project implementation period and cost compared to the evolution in time of the possibility to interfere in the project's development. Together with the project's evolution it amplifies the precision of the estimations but it is reduced the possibility to interfere by changing the solutions initially adopted without increasing the project cost. Various risks appear during the project's life cycle stages. The same type of risk has a different impact in various stages of the project's life cycle.

2. Project's specific risk factors

The risk factors are represented by any element or condition that can positively or negatively affect the project during its entire life. Risk factors don't affect the project by their simple presence, but they represent only situations in which risks can materialise.

Project's specific risk factors are both internal factors that appear as a consequence of their nature and characteristics and external factors that belong to the projects' environment. The internal risk and uncertainty factors, generated by the project, are the result of: the project team organisation; the way in which project management is realised during the project; the delays and cost overrun; the formal and informal relationships between the parties involved in the project; the completion of the predicted performances.

The external factors that generate the project risk can have economical, financial, legal, institutional, social, operational, natural or ecological origin. The economical risks are determined both by the organisations' context evolutions and the quality of its economical activity. They can be differentiated, under this aspect, in two essential categories: macro risks and micro risks.

The main legal and institutional risk factors are the tax, monetary, custom and competition regulations as well as the social legislation. The social environment is the source of a great number of events that can affect the project in its various life stages. The social risk factors which have a special importance for the completion of the projects are the population's growth rate, structure and density.

In the projection and implementation stage, the projects are faced with multiple risks due to the implementation period, the great number of activities that have to be conducted and coordinated, the complex relationships that can appear between the members of the project team or the contract relationships among the numerous parties.

The most important natural risks that affect the projects are: massive floods, landslides, earthquakes. The relationship project – environment is a bi-uniform one. The ecological risks that come with the realisation of the projects are those that concern the impact over the biodiversity, population and human health, water and soil, air and climate, cultural heritage and landscape.

3. Approaches of the project risk management and the possibilities for their improvement

Risk management is an iterative process that takes place over the entire life cycle of the project and through which risks are identified and analysed in order to offer the adequate responses for each risk. It represents one of the essential components of the management of a project. The main generally accepted international approaches concerning

the risk management are the guides or standards developed by the specialised institutes and associations: PRAM and PMBOK guides, AS/ANS 4360 and IRM standards, PRINCE 2 methodology.

No matter the name and stages structure of each approach, they all have a series of common elements:

- ✦ they are structured on stages but they don't have a rigid form in which all the stages have to be accomplished in a certain order;
- ✦ they involve a formal approach of risk management process based on the development of written documents for reports;
- ✦ although they can be applied to complex projects, all the approaches have the tendency to simplify;
- ✦ all are iterative approaches of the risk management process with permanent returns from one stage to another;
- ✦ the common stages of all the approaches are: identification, analysis, evaluation and the response to risk.

There are some differences concerning the structure and the particularity of risk management process among the described approaches:

- ✦ in the case of some approaches (PRAM) the stages can take place in the same time, as the beginning of a stage does not depend of another stage's end;
- ✦ some approaches (IRM, PRINCE 2) consider the identification stage as the first stage, while other approaches (PRAM, PMBOK, AS/NZS 4360) indicate preparatory stages before the identification of risks;
- ✦ there are common approaches of the risk management process at project and organisation level (IRM) but most approaches (PRAM, PMBOK, AS/NZS 4360, PRINCE 2) focus on project risk management;
- ✦ the project's environment is considered the starting point of risk management in the case of PMBOK and AS/NZS 4360 approaches, while others (PRINCE 2) focus on the internal risk factors of the project;
- ✦ some approaches (PRAM, IRM) consider risk management as the key point of the project management while others (PMBOK case) try to integrate risk management in the project's general management;

The possibilities to improve the risk management process concern the risk management plan for which two solutions were proposed:

- ✦ the first one is focused on using the control and monitoring file and is applied in less complex projects;
- ✦ the second one, specific to more complex projects, focuses on project's risk management reports.

Another proposed method of improvement concerns the use of the project's final reports as methods for characterising the causes, appearance and impact of risks. The reports from the end of each project have to highlight the main difficulties and the risks involved in its realisation.

4. The main methods applicable for the identification and analysis of risks. The general response strategies at the project risk

A series of methods can be used for the identification of the risks involved by the realisation of the projects:

- ✦ general methods, that come from other activity fields: the risk table, control lists, events diagram, flaws diagram, brainstorming, Delphi technique;
- ✦ methods specific for project management like the Risk Breakdown Structure (RBS)

Risk breakdown structure (RBS) was proposed for the first time by David Hillson¹ in analogy with WBS (Work Breakdown Structure) as a group directed towards the sources of the project's risks which organizes and defines the project's total exposure to risk. The risk breakdown structure is a hierarchical structure of the potential risk sources, like each level of a WBS is a more and more detailed definition of the activities necessary for the completion of the project.

The most important specific methods applicable in the case of risk analysis of any project are the expected monetary value method, the standard normal deviation method, the probability – impact method and the risk breakdown matrix.

The expected monetary value method consists in taking into consideration several scenarios or events in connection with their subjective probabilities of occurrence. In this method the model is broken down in a number of components and each of them is examined separately through associated effects and probabilities.

The standard normal deviation method is a risk quantification method which determines the level of risk associated to a certain implementation period of the project proposed by the beneficiary or estimated by the project manager. Based on elements of the PERT technique, the method analyses the length of the project's activities as random variables characterised by their division and dispersion.

The risk hierarchy matrix (probability – impact matrix), as a quality analysis of risks, aims (like all the other methods of analysis) at combining the probability and impact of each identified risk in order to establish its degree of importance in the completion of the project. Three steps have to be covered in order to establish a hierarchy of the risks associated to the project according to their probability and impact: establishing a matrix that connects the probability of a risk event to a classification number; creating a matrix that allows the evaluation of a certain risk's impact over the major objectives of the project; combination of the data from the previous steps and determination of the total number of points for each risk according to a previously established grid.

Grimaldi and Rafele (2004)² have combined the risk breakdown structure (RBS) and the work breakdown structure (WBS) into a risk breakdown matrix (RBM). The advantage of the breakdown matrix is that it allows the analysis of risk by combining the component elements of WBS and RBS at any level, including the activity level.

The application of the other methods of analysis depends of the projects' particularity and the moment in which the analysis is done. One of the directions for perfecting the analysis methods is to take into consideration the competence of the specialists that do the estimations. This can be done by giving competence marks to each specialist according to various criteria (professional experience, level of study, published works, experience in project management). The estimations given by specialists are weighted with the competence marks obtained.

The general response strategies at the project risk depend on the criteria used: preventing, avoiding, accepting and transferring the risks. If the degree of risk acceptability is used as a criterion, beside frequency and impact, the options for its prevention are: adaptation, precaution, protection and transfer through insurance.

The most frequent used methods as response to risk are: distribution of risks between contract partners, guarantees, deposits, methods and techniques of exchange risk management and interest rate risk management, insurance during the project's period of implementation and exploitation. The response to risk can be perfected by using the

¹ Hillson D. – “Use a Risk Breakdown Structure (RBS) to Understand Your Risks” in “Proceedings of the Project Management Institute Annual Seminars and Symposium”, San Antonio, 3-10 October 2002

² Grimaldi S., Rafele C., - „Analisi del Rischio. Modello Gerarchico per l'analisi del Rischio” in „De Qualitate”, Editura Nuovo Studio, Milano, 2004, p.22-38

experience and knowledge from previous projects. This implies for the organisation to develop a memory of the relevant events occurred during the previous projects from which to keep the most suitable measures and response actions.

5. Conclusions

Project's specific risk factors are both internal factors that appear as a consequence of their nature and characteristics and external factors that belong to the projects' environment.

A project risk management process has to be a major component of the management of any project, with an important role in the implementation of the objectives indicated at its beginning. Risk management is an iterative process that takes place over the entire life cycle of the project and represents one of the essential components of the management of a project. Project's risks must be identified, analysed and as a result, the most appropriate response strategies must be applied.

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