
RISK MANAGEMENT IN INNOVATIVE PROJECTS

Kliment Naydenov, Ph.D

Sofia University “ St. Kliment Ohridski” – Bulgaria kl.naydenov@gmail.com

Metodi Ivanov, Ph.D

Sofia University “ St. Kliment Ohridski” – Bulgaria ivanov.metodi@abv.bg

Abstract: The risk is defined as the subjective characteristics of the project in terms of participants and reflects the possibility of a negative for him scenarios and consequences. Risk classification can be made by classification signs such as by subject, by type of investment, degree of loss in the field of vilyanie and source of occurrence. Risk management is a process associated with the identification, analysis of risks and decision-making, which include increasing the positive and reduce the negative consequences of the occurrence of risk events. The risk depends on multiple factors usually associated with the uncertainty of the external environment and limited resources on the project. At the first factors include incomplete and untrustworthiness of information, capacity constraints managers to perceive and process information, randomly occurring events in the work of managers and actions related to counter competitors. The second group includes material, financial and labor resources. Identification of the risk is carried out by various methods, some of which are:

- Brainstorming - appears to be the most commonly used method for identification of risk. Its purpose is to establish an extended list of risks that can be subsequently used to conduct qualitative and quantitative risk analysis.
- Delphi method - used to reach agreement among experts regarding the list and characteristics of risks
- Poll - is possible identification of risk by interviews with experts with the help of specially designed questions.
- SWOT - Analysis - serve to expand the list of risks taken into account
- Structural diagrams - allow to analyze the peculiarities of the structure of enterprises and the resulting risks
- Streaming charts - represent different technological processes and their interrelationships

To the methods of risk management decreased sensitivity analysis of stability, determining the profitability correction parameters of the project, formalized description of uncertainties, scenario analysis, Monte-Carlo method of building a decision tree and others. Risk management in innovative projects is essential and the use of methods to reduce the risk by diversification or distribution of risks release of funds to cover unforeseen risks and insurance risks. Qualitative risk management increases the chances of success in project management in the long term and significantly reduces the risk of ineffective realization.

Keywords: risk management, innovative projects, methods of risk management

УПРАВЛЕНИЕ НА РИСКА ПРИ ИНОВАЦИОННИ ПРОЕКТИ

доц. д-р Климент Найденов,

Софийски университет “Св. Климент Охридски” – България kl.naydenov@gmail.com

гл. ас. д-р Методи Иванов

Софийски университет “Св. Климент Охридски” – България ivanov.metodi@abv.bg

Резиме: Рискът се определя като субективна характеристика на проекта от гледна точка на участниците в него и отразява възможностите за съществуване на неблагоприятни за него сценарии и последствия. Класификацията на риска може да бъде направена по класификационни признаци като: по субекта, по типа инвестицията, по степен на загубата, по сферата на влияние и по източника на възникване. Управлението на риска е процес свързан с идентификацията, анализ на рисковете и вземането на решения, които включват увеличаване на положителните и намаляване на отрицателните последствия при настъпване на рисковите събития. Рискът зависи от множество фактори свързани обикновено с неопределеността на външната среда и ограничените ресурси по проекта. При първите фактори се включват непълнотата и недостоварността на информацията, ограниченията във възможностите на мениджърите да възприемат и преработват информация, случайно възникващите събития при работата на мениджърите и при действия свързани с противодействие на конкурентите. Към втората група се отнасят материалните, финансовите и трудовите ресурси. Идентификацията на риска се осъществява с различни методи, част от които са:

Twelfth International Scientific Conference
KNOWLEDGE WITHOUT BORDERS
31.3-2.4.2017, Vrnjacka Banja, Serbia

- мозъчна атака – явление се най-често използваният метод за идентификация на риска. Неговата цел е да се състави разширен списък с рискове, които могат да бъдат използвани впоследствие за провеждане на качествен и количествен анализ на риска.
- метод Делфи – използва се за постигане на съгласие между експертите по отношение на списъка и характеристиките на рисковете
- Анкета – възможна е идентификацията на риска чрез анкетиране на експерти с помощта на специално разработени въпроси.
- SWOT – анализ - служи за разширяване на списъка на рисковете взети под внимание
- Структурни диаграми – позволяват да се анализират особеностите на структурата на предприятията и произлизащите от тях рискове
- Стрийминг диаграми – изобразяват отделните технологични процеси и тяхните взаимовръзки

Към методите за управление на риска спадат анализ на чувствителността, проверка на устойчивостта, определяне на точката на рентабилност, корекция на параметрите на проекта, формализирано описание на несигурността, анализ на сценарии, метод Монте-Карло, метод на построяване дърво на решенията и др. При управлението на риска при иновационни проекта е от важно значение и използването на методи за понижаване на риска, като диверсификация или разпределение на рисковете, отделяне на средства за покриване на непредвидени рискове и застраховане на риска. Качественото управление на риска повишава шанса за успех при управлението на проекти в дългосрочна перспектива и значително намалява опасността от неефективната му реализация.

Ключови думи: управление на риска, иновативни проекти, методи за управление на риска

The risk is defined as the subjective characteristics of the project in terms of participants and reflects the possibility of a negative for him scenarios and consequences. Risk management is the systematic process of identifying, analyzing and responding to project risks. It includes maximizing the probability and consequences of favorable events and minimize the likelihood and consequences of adverse events project. The project risk is an uncertain event or condition that, if it occurs, has a positive or negative impact on the project. The risks faced by project participants is usually limited to a few. First appears the risk associated with the unstable economic situation and the fragile economic legislation. For projects there and so-called external economic risks. There is also a risk of social and political changes in the country or region associated with the uncertainty of the political situation. There is a risk of incomplete and inaccurate information about the dynamics of technical and economic indicators. It should not ignore the risk of natural climatic conditions, opportunities for Disasters. For large projects, there is also the risk of fluctuations in the labor market and exchange rates. Moreover, there is a technological risk associated with accidents and failure of the equipment. Very often there is a risk of uncertainty on objectives, interests and behavior of participants. Risk classification can be made by classification signs such as by subject, by type of investment, degree of loss in the field of vilyanie and source of occurrence. Of course in practice there are numerous qualifications of risks. Risk management is a process associated with the identification, analysis of risks and decision-making, which include increasing the positive and reduce the negative consequences of the occurrence of risk events. When it comes to realizing the unique, unique and highly innovative assignments, it is reasonable to expect a sharp increase in the level of uncertainty and risk in implementing this kind of project activity. The risk is a major factor in the management of a project. There must be a commitment from the Employer and the Contractor for identifying and controlling risks of the project. This topic requires special attention by all stakeholders in all phases and should be considered at all meetings to verify that all were timely informed. It is also important that contractors are aware of potential risks and that all possible measures to eliminate or minimize taken.

The risk depends on multiple factors usually associated with the uncertainty of the external environment and limited resources on the project. At the first factors include incomplete and untrustworthiness of information, capacity constraints managers to perceive and process information, randomly occurring events in the work of managers and actions related to counter competitors. The second group includes material, financial and labor resources.

Planning of risk management is the process of determining the approach and activities of risk management. It is important to plan and subsequent processes of risk management in order to have comparability between the level, type and transparency of risk management on one side and himself and risk and importance of the project for the organization on the other. When planning risk management deciding on organization, personnel security, choice of preferred methodology, sources of data to identify risk time period to analyze the situation. Additional risk is

Twelfth International Scientific Conference
KNOWLEDGE WITHOUT BORDERS
31.3-2.4.2017, Vrnjacka Banja, Serbia

enhanced thanks to the original openness of project work and this powerful impact it has on the project environment as a combination of external and internal factors may be economic, financial, organizational, administrative, legal, and along with that and social, cultural, environmental and others.

Risk identification is a determination of the risks that may affect the project and documenting their characteristics. Participants in the process of determining risk are: the project team, the team of risk management specialists from other branches of the company, customers, end users, other project managers and external experts. Risk identification is an iterative process. The first iteration can be made part of the project team or a team of risk management. The entire project team and key stakeholders can implement the second iteration. Once identified a risk, develop and implement even simple and effective measures to overcome it. Identification of risk is a process that starts from the beginning of the project and is carried to its end. The identification of risk determines what risks may affect the project and documenting the characteristics of risk. Risk identification can be carried out both in the scheme "cause - consequence" - what can happen and what may result, and the scheme "consequence - cause" - what consequences should be avoided and to which must be strive for. Generally there are two options for risk analysis - quantitative and qualitative.

Qualitative risk assessment is the process of presenting the qualitative analysis of risk identification and risk requiring rapid response. This process prioritizes risks according to their potential impact on project objectives. The qualitative risk analysis is one way to determine the importance of certain risks and directing efforts to deal with them. The reaction time may be a critical factor in some risks. The evaluation of the quality of information available also helps in the reassessment of risk. The qualitative risk analysis requires an assessment of probabilities and consequences through established methods and tools.

Quantitative risk analysis is a numerical expression of the probability of a risk and its consequences on the project. This process will use a technique based on a simplification of the simulation "Monte Carlo" analysis and decisions, in order:

- Determine the probability of achieving a goal of the project.
- Prob exposure draft risk and determining the replacement cost and schedule.
- Opening of the risks that require the most attention, by calculating the relative importance of the project.
- Identify realistic and achievable cost, schedule or scope.

Identification of the risk is carried out by various methods, some of which are:

- Brainstorming - appears to be the most commonly used method for identification of risk. Its purpose is to establish an extended list of risks that can be subsequently used to conduct qualitative and quantitative risk analysis.

- Delphi method - used to reach agreement among experts regarding the list and characteristics of risks

- Poll - is possible identification of risk by interviews with experts with the help of specially designed questions.

- SWOT - Analysis - serve to expand the list of risks taken into account

- Structural diagrams - allow to analyze the peculiarities of the structure of enterprises and the resulting risks

- Streaming charts - represent different technological processes and their interrelationships

To the methods of risk management decreased sensitivity analysis of stability, determining the profitability correction parameters of the project, formalized description of uncertainties, scenario analysis, Monte-Carlo method of building a decision tree and others. Risk management in innovative projects is essential and the use of methods to reduce the risk by diversification or distribution of risks release of funds to cover unforeseen risks and insurance risks. Qualitative risk management increases the chances of success in project management in the long term and significantly reduces the risk of ineffective realization.

- Planning responses to the risk is the process of developing options and determining actions to enhance opportunities and reduce threats to carry out the project. It includes assigning responsibilities to individuals or groups on action in individual risks. This process ensures adequate response to the identified risks. The effectiveness of planning events is directly related to increase or decrease the risks of the project. In practice, there are 4 methods to reduce the risk.
 - - Avoid - include diversion of activities involving the risk
 - - Transfer - transfer of responsibility for risk to another party
 - - Minimization - conducting their own special measures restricting the amount of risk and creation of special measures to reduce losses

Twelfth International Scientific Conference
KNOWLEDGE WITHOUT BORDERS
31.3-2.4.2017, Vrnjacka Banja, Serbia

- - Acceptance - taking responsibility for risk and willingness to take possible losses at the expense of own funds.

In practice revealed three possible remedies of risk. Distributions of risk between participants, insurance and determination of reserve funds to cover unforeseen expenses. Risk allocation is done by design of the project plan and contract documents. As with the analysis of risk allocation may be qualitatively and quantitatively. For quantitative risk allocation in project applies the so-called conceptual model. The model is based on standard methods for decision on who is the "decision tree". The method is based on the creation and visualization of a clear structure of problems and areas of decision with logical character. Initially elected measure of many possible technical measures and tracks the response (response) system as a result of this measure. Then choose action of many possible actions or interventions on the system. Obtained subsequent state of the object. The consequences of a series of election measures and impacts the system and the corresponding probabilities of occurrence of stochastic effects form the utility function according to which risk is assessed. Qualitative risk allocation involves project participants decide to expand or shrink the range of potential investors. The more risk will be distributed to investors, the less potential investors will be found. Insurance itself is one of the ways to spread risk reduction. It is possible that the risk to be insured in several insurer and thus he can be reallocated them. One of the specific forms of insurance is called hedging. It is an effective system of measures offsetting price risk. Such measures are the most used in the practice of financial instruments, which limit the risk of loss and are as follows:

- Option - this is a valuable book (derivative financial instrument), which expresses the right to buy or sell a certain number of securities or other financial instruments at a fixed price until a certain time or on a certain date.
- Futures contract - this is a valuable book (derivative financial instrument), which expresses the right and the obligation to buy or sell a certain number of securities or other financial instruments at a fixed price on a certain date.
- Forward exchange contract - a contract to purchase a certain amount of foreign currency on a specified future date at a predetermined exchange rate and conditions for implementation.
- Swap - this is a financial instrument, a legal transaction - contract to exchange a series of future payments, in which at least one party is unknown amount of future payments (but known formula in which will be determined - the amount is determinable by a specific formula) . In essence swap can be viewed as a series of forward contracts. The most common types of swaps are: interest rate swaps, currency swaps, credit swaps, commodity swaps, swap on shares.
- Interest Rate Swap deal - it's species concept of a legal transaction - a contract between two parties to exchange based on notional principal interest payments for a specified period.
- Repurchase agreement and reverse repurchase agreement - It is a legal transaction contract in which the transferred securities to a commitment to repurchase them (or substituted securities with the same characteristics) at a specified price on a specified future date or date that will be determined by the transferor. The agreement is repo country selling the securities and a reverse repurchase agreement for the country buying them.
- Put Option or Call Option - This is a tool to exchange financial assets or financial liabilities (financial instruments other than equity instruments of the entity) which give the holder the right to receive potential future economic benefits associated with changes in fair value of the underlying contract financial instrument.

The reserve funds to cover unforeseen risks are separate funds with a clear objective, namely working capital allocated to cover losses. Usually when creating the structure of the reserve to cover unforeseen expenses using two approaches. In the first approach, the reserve is divided into two parts - general reserve and special. General reserve covers estimates of the project, and the special, price changes, increased costs and payments under the contract. The second approach involves the creation of a reserve whose structure reflects unforeseen expenses by type. This approach provides sufficient control over unexpected expenses, but used for small projects.

Monitoring and risk control is the process of tracking identified risks, monitoring residual risks and open new risks. It helps enable plans and risk assessment of their effectiveness. This is a continuous process throughout the project. Over time, the risks change, appearing new, some anticipated risks do not materialize. Good monitoring and control of risks provides information that helps making effective decisions before the materialization of the risk. Risk control may include selection of an alternative strategy, resorting to a backup plan, perform corrective action or pre-project planning. The project manager and team leader for risk periodically receive information on the

effectiveness of the plan and the existence of unexpected influences and take appropriate measures in the course of the project. Monitoring and control will answer the following questions:

- The reaction in terms of risk is in line with the plan
- The reaction sufficiently effective and efficient
- The risk has changed compared to the previous period
- Was there a risk and in what amount
- Manager has taken the necessary measures
- The risk was planned and did not arise by chance

Every project goes through certain stages in their development. The concept of the project life cycle is an especially important. Project managers broken down into several stages. Usually used standard PMBOK PMI. It divides the project into 4 stages - concept design, development, implementation (realization) and completion. Depending on the stage determines the type of risk. Phase of the project concept to identify risk factors and uncertainties. Phase of project development risks into account in a financial plan for the project and determined response measures. In the implementation phase of the project corrected the budget, specifying strategies for risk mitigation implemented monitoring and risk control. The stage of completion of the project is an analysis of the means of contingencies, analysis and summary of the actual manifestation of risk and uncertainty in completion of the project.

A system of risk management for innovation projects allows approaches to risk not as statistically constant parameter but rather as manageable. This system helps to influence the risk by creating opportunities for minimization and compensation of its influence.

REFERENCES

- [1] Agranovich B. Risk management how tos volume 1, 2012
- [2] Guide to the Project Management Body of Knowledge (*PMBOK® Guide*)—Fifth Edition, 2013
- [3] Newton P. Managing project risk, 2015