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**БУДІВНИЦТВА І АРХІТЕКТУРИ**

**УКРАЇНСЬКА АСОЦІАЦІЯ УПРАВЛІННЯ ПРОЕКТАМИ**

**АКАДЕМІЯ УПРАВЛІННЯ ПРОЕКТАМИ**

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# «Управління проектами у розвитку суспільства»

## Тема: «Управління проєктами післявоєнної розбудови України»

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# Зміст

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# ANALYSIS OF RISKS WHEN PLANNING PROJECTS TO CREATE CRITICAL INFRASTRUCTURE OBJECTS

The modern world is becoming more and more dependent on the infrastructure that ensures the functioning of the economy and the life of the population, especially in the conditions of martial law. Objects of critical infrastructure, such as energy networks, hydro, thermal, nuclear power plants, transport highways, communication and communication systems, and others, play an important role in ensuring this functioning. Therefore, planning and implementation of projects, programs and project portfolios for their creation are extremely important tasks.

Risk analysis is a process of identification, assessment and management of risks that may arise during the implementation of the project, program and project portfolios. It is an important and fundamental part of the project planning process and allows, on the one hand, to minimize the risk of failure, and on the other hand, to increase the efficiency of the task.

The main tasks of risk analysis include the identification of potential risks and the determination of their potential impact on the project. For this, various theoretical and applied tools for managing projects, programs and project portfolios can be used, including system analysis, SWOT analysis, Ishikawa diagram, decision tree method and others.

In addition, it is important to assess the likelihood of the occurrence of risks and their impact on the project, program or portfolio of projects. For this, you can use qualitative and quantitative methods, in particular, the Delphi method, scenario analysis, impact analysis, and others. Based on the study of the subject area, we will form a model scheme (see Fig. 1).

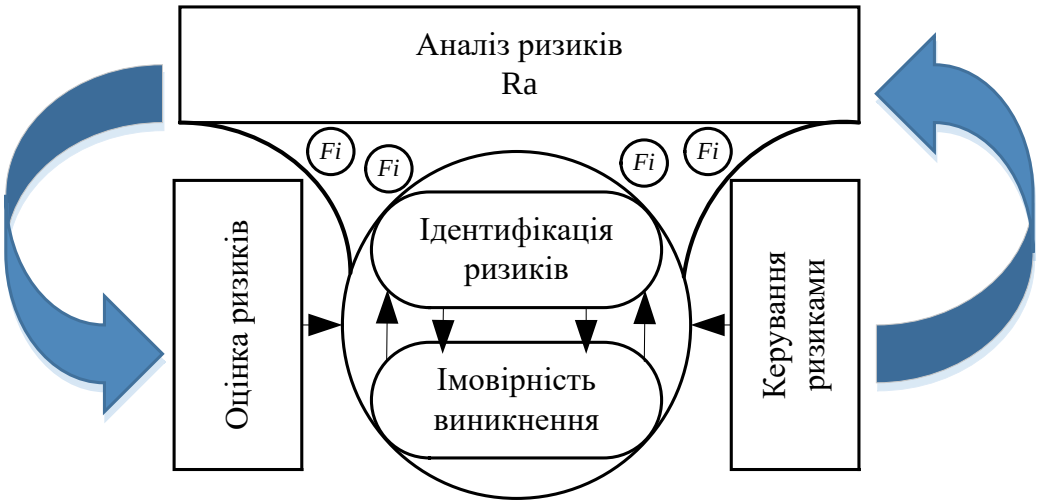


Figure 1. Model-scheme of risk analysis when planning projects to create critical infrastructure objects

The basis of the model scheme is formed by the dependence of the main blocks, which is represented by a formalized expression:

$$Ra=<Ao;Am> \quad (1)$$

where *Ra* – is risk analysis; *Ao* – risk assessment; *Am* - risk management.

In turn, a qualitative risk analysis of planning projects for the creation of critical infrastructure objects must take into account the internal environment, which is under the influence of variable factors:

$$Ra=>[Ii;Ip] \quad (2)$$

where *Ii* – identification of risks; *Ip* – is the probability of occurrence of risks.

It is important to note that risk analysis is a process that needs constant updating and revision. Because the conditions of critical infrastructure projects, programs, and project portfolios may change, new risks may emerge, and existing risks may change in their impact, it is necessary to regularly assess and manage risks. Various methods can be used for this, such as FMEA (Failure Mode and Effects Analysis) or PRA (Probabilistic Risk Assessment). A risk assessment can help identify the most significant risks and develop effective measures to reduce them.

After identifying and assessing the risks, it is necessary to develop a risk management plan. This plan should contain a detailed description of the measures

that will be taken to reduce the risks, control them and minimize the impact on the project.

One of the main steps in risk management is the development of a contingency plan. This plan should include a list of possible unforeseen events that may affect the project and the measures that will need to be taken in the event of their occurrence. It is also important to distribute the responsibility for these activities among all participants of the project, program or portfolio of projects and take into account the entire life cycle of the project when analyzing risks. As the risks may be different in the phases of the project such as planning, development, implementation and operation. Therefore, risk analysis should be carried out at each stage of the project and, if necessary, adjusted.

One of the possible risks when planning projects for the creation of critical infrastructure objects is the risk of cyber attacks. In this regard, it is important to consider cyber security risks and develop measures to prevent them and minimize their impact. Such measures may include the development of immunity to cyber attacks, the application of network and infrastructure protection against malicious software, data encryption, etc.

In addition, it is important to consider the risks associated with climate change, natural disasters, military conflicts, etc. Such risks can have a significant impact on infrastructure and can be difficult to predict and prevent. One of the ways to reduce the impact of such risks is to develop measures to increase the resilience of the infrastructure to unforeseen events, such as storing backup copies of data, power backup, diversification, developing evacuation plans, etc.

In conclusion, risk analysis is an important stage in the planning of projects, programs and project portfolios for the creation of critical infrastructure objects, which allows identifying potential risks, their consequences and the probability of their occurrence. It helps to develop plans and measures to prevent, mitigate and manage risks. When planning critical infrastructure projects, it is especially

important to consider cyber security risks associated with climate change, natural disasters, and other events that may affect infrastructure.

National action plans for critical infrastructure risk management can be developed at the country level. Such plans may contain instructions for prevention and restoration of infrastructure in case of crisis situations, as well as instructions for communication between various organizations and authorities in case of crisis situations.

Summing up, the planning of projects for the creation of critical infrastructure objects should include risk analysis and the development of measures to prevent, reduce the impact and manage risks. It is also appropriate to consider possible national approaches to critical infrastructure risk management, which can be important in the development of various projects, programs and project portfolios and ensuring the sustainability of infrastructure in conditions of changing risk dynamics, in particular during the period of martial law.

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## RISK-ORIENTED MANAGEMENT OF SCIENTIFIC RESEARCH PROJECTS OF HIGHER EDUCATION INSTITUTIONS

Innovative activity is inevitably associated with the presence of risk situations [1]. It is believed that in the field of inventions and innovations, the possibility of failure is much more likely than the possibility of success. This is natural, since there are always uncertain conditions, unknown obstacles and events behind the novelty, unexpected technical problems may arise, customers may not like the new product, the situation in the relevant market sector may change, etc.

An innovative product may turn out to be irrelevant already in the course of production, while when deciding on the implementation of this scientific project, its initiators were firmly convinced of the stability of demand for this innovation. And the problem here is not at all that the participants in innovative projects have not sufficiently analyzed the market situation, consumer needs, the pace and direction of scientific activity, or other factors, but rather that the process of introducing innovations is a high-risk activity [2].

Research and development spending is certainly one of the necessary components of successful development, but due to the increased risk, most enterprises around the world are rather cautious about fundamentally new developments, preferring to follow the path of minor improvements to existing products and technologies.