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Risk management in large–scale projects: principles, management tools, results

At the current stage of economic relations development, taking into account external challenges, certain prerequisites have been formed for the application of project management in the activities of individual business entities, as well as at the level of executive power. The analysis of the results of the implementation of national, federal, regional and departmental projects has shown that the application of the methodology and tools of project management has yielded positive results in solving both economic and social problems. At the same time, state, regional and sectoral problems were identified, which can be avoided with a properly organized risk management system in projects. The existing risk management standards contain the principles on which the risk management system in projects should be based, but they need to be linked to the conditions of national and other projects, which are characterized by scale, long implementation period and a large number of participants. The organization participating in the project has its own risks, which the risk management system is focused on, but getting into the new system of interaction of organizations, additional risks arise. According to the researchers of this problem, new mechanisms are needed not only in each organization, but also an integrated system covering all project participants. The authors believe that one of the possible risk management tools in large-scale projects can be considered a scenario approach to project planning, which will allow the most reasonable formation of financial reserves in the risk management system. It will ensure more effective risk management by building their hierarchical structure in the form of a decision tree with consideration of alternatives to risk exposure. In the risk management system, it is necessary to provide for the process of improvement as an actualization of risks, taking into account the dynamics of factors of the external and internal environment of the project.
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At the present stage of the development of economic relations, certain prerequisites have been formed for the widespread dissemination of project management, which is reflected not only in the implementation of the methodology of project management at the level of economic entities, but also at the level of public administration. Such prerequisites include:

- need to find directions and mechanisms for advanced changes in products, technologies, and marketing, which complicates management processes;
- importance of ensuring resource conservation and resource efficiency is increasing, especially for resource-intensive industries, which refers not only to the stage of creating and implementing innovations in various spheres of economy and public life, but also to subsequent applications of innovations;
- high degree of validity of the planned transformations is required not only from the standpoint of commercial, but also social, budgetary and economic efficiency, which requires purposeful consideration of a fairly wide range of environmental factors of a particular project;
- project management ensures transparency and openness, the ability to adjust the trajectory of planned changes in a timely manner, including through organizational autonomy of the project and maximum concentration of managerial efforts to achieve goals;
- project management defines the centers of responsibility for the project as a whole and its individual subsystems, and provides for maximum formalization of management processes.

Risks are inherent in current management activities at enterprises, but in the process of implementing projects and programmes, regardless of their subject area and scale, risks increase. This is due to the following reasons:

- project planning horizon is long-term and this increases uncertainty and the likelihood that environmental factors will change and affect the management processes and results of projects and programmes;
- any project is inherently innovative, since novelty is one of the key features of the project, and innovations are inherent in many risks, including the risk of their commercialization;
- company implementing the project may not have sufficiently developed a mechanism for project management and updating the change control system if it is necessary to consider new options for further implementation of the project.

The situation becomes more complicated if government projects and programmes are implemented by many participating organizations. Having their own risks, which the risk management system is focused on, getting into a new system of interaction between organizations, new risks arise and new mechanisms are needed not only in each organization, but also an integrated system covering all project participants.

Effective risk management requires compliance with the principles that are disclosed in GOST R ISO 31000–2019, focused on the activities of enter-

prises, but these principles can be transferred to the management of large projects that go beyond the boundaries of one organization [1]:

1. The presence of the adaptability property of risk management, which allows you to adjust to the dynamics of the external and internal environment of the organization, changing goals. It is obvious that the project goals are defined at the very first phase, but in large projects, a mechanism for updating goals should be formed if the implementation conditions change radically.

2. Involvement of stakeholders in the risk management process. Given that regional, federal, and departmental projects involve a large number of participating organizations, many risks can be identified in the early phases of the project and taken into account within the contractual relationships of the participants, but negative dynamics that were not identified in the conceptual phase are not excluded.

3. Basing on high-quality, up-to-date and accessible information that reduces the uncertainty of forecast expectations of project implementation results.

In relation to projects, the basics of risk management are set out in GOST R 56275–2014 "Risk Management. A guide to the good practice of project risk management", which sets out the basic principles [2]:

- risk management is considered as an integral part of the organizational processes of the project, including the development of project strategy, planning, change management, thus covering decision-making processes at each stage of the project lifecycle;
- risk management is based on information about the results of experiments, reports on completed work, existing experience, recommendations from stakeholders, forecasts and expert assessments; possible limitations of information should be taken into account;
- risk management should be transparent to all decision-making stakeholders;
- risk management system should be dynamic and sensitive to changes, as new risks arise, previously envisaged risks change, and some risks disappear.

Project management creates advantages in achieving the goals of transforming the activities of enterprises, industries and various spheres of public life by maximizing the concentration of management resources on meeting project deadlines, budgets and indicators of qualitative transformations. But it is precisely these strictly defined project frameworks that create additional risks.

Risks can be significantly reduced and managed more effectively if they are taken into account at the planning stage within the framework of the scenario approach. As an example of this approach, we can cite activities within the framework of the "Strategy for the development of the construction industry and housing and communal services of the Russian Federation until 2030 with a forecast until 2035" [3]. This document initially considers two development options: a risk-free and a risk-free scenario. Some indicators projected for 2030 are presented in Table.

As can be seen from the above indicators, the gaps between the level of indicators planned under the risk-free and risk-free scenarios are significant. To reduce this gap, risk management measures are needed and these measures have a scale commensurate with the level of deviations. This approach is also important from the standpoint of the impact of achieving indicators on other areas of the economy and public life.

The results of monitoring individual national projects allow us to conclude that despite a fairly effective project management mechanism, clearly identified processes and control points, certain risks have arisen that are not provided for by the risk management system, in particular [4, 5]:

- deadlines for the development and conduct of state expertise of design documentation for construction facilities are violated, which leads to late conclusion of contracts with general contractors, violation of construction deadlines and, as a result, violation of project deadlines;
- late payment of completed construction works, which violates the financial stability of contractors, the inability of organizations to update fixed assets, introduce advanced construction production technologies;
- lack of the required number of contractors in a particular region, which leads to an increase in construction costs and a violation of the deadlines for the completion of work in the project;
- formal approach to the development and formation of a number of project targets, the lack of calculation methods, the inability of quantitative values of project indicators to reflect qualitative changes in the system; targets either have too high a level of aggregation.

When forming an integrated risk management system for investment and construction projects implemented in the territories of advanced development, the following risk structure is proposed, focused on the subject vectors of management [6]:

- country risks;

Scenario approach to planning [3]

Indicators	Unit of measurement	Risky scenario	Risk-free scenario
The volume of industrial and civil construction	Million square metres	26.2	34.3
Reduction of the share of falsified building materials used in capital construction	%	30	50
Decrease in the share of imported building materials used in capital construction	%	20	25

- regional risks, in particular, the lack of qualified personnel, which echoes the risks of many national projects;
- municipal risks, including risks of land development in the use of municipal lands;
- risks of management companies' activities.

The following risks are additionally considered [7, 8]:

- regional peculiarities are not taken into account when implementing projects, in particular, taking into account the existing infrastructure when setting targets and allocating federal budget funds;
- there is no clear mechanism for attracting and controlling extra-budgetary sources of financing;
- presence of resource constraints, in particular, with planned large-scale construction within the framework of federal projects, there are risks of availability of building materials;
- shortage of highly qualified personnel in the health care system, preschool education, sports, construction specialties;
- risks of a lengthy procedure for replacing the executors of government contracts (if necessary).

Risks have also been investigated in relation to individual projects, which confirms the existence of common problems. In particular, within the framework of the management of the national project "Culture", measures have been identified and proposed to manage the following risks [8]:

- legislative issues related to the shortcomings of the legislative framework itself and its changes;
- macroeconomic factors related to a reduction in economic growth;
- managerial issues related to the imperfection of management tools in projects;
- financial, expressed in insufficient financing of projects, lack of financial reserves.

The success of national projects is due to the fact that management covers all phases of the life cycle. At the same time, it is necessary to take into account the following factors, which will ensure the achievement of project goals [7]:

- clear interaction between different levels of government and local governments, constant monitoring, ensuring interaction between the state and businesses involved in public-private partnerships;
- increasing the role of local budgets in the allocation of financial resources;
- operational and complete information support of the project implementation processes.

The project planning system already creates good prerequisites for reducing risks. To reduce the impact of uncertainty and risks in projects implemented by executive authorities, the following mechanism has been established [9]:

- status of the control event of the project is determined in the schedule, where the project blocks are highlighted and the result of the control event is described, qualitative and quantitative assessments of the impact of the result on achieving the project goals are given;
- risk management system has indicators — a description of the factors whose influence will lead to a violation of the timing of the control event (the forecast horizon is 3 months); two types of indicators are provided: deviation is critical for the project, deviation is uncritical;
- schedule of control events has been developed (the forecast horizon is 12 months), which contains planned, forecast and actual indicators, and events that do not fit into this schedule are taken into account as other problems and risks with comments on their possible impact on the project parameters.

The scale of the project is a source of risk in cases where the detail of individual processes is insufficient and indicators turn out to be too aggregated for operational risk management [10].

The project result is focused on a certain group of consumers and a long-term project is inextricably linked with the risk that consumer preferences change. Given this fact, it is necessary to make adjustments in the management process based on feedback from consumers, customers, and the target audience [11].

The way to identify risks is to develop a risk structure, which is a hierarchical system of potential sources of risk. This approach helps the project team to fully take into account the sources of individual project risks associated with each contractor. Another approach is also possible: risks are displayed in the form of a simple list of risk categories. As an effective risk management tool, the option of identifying them based on building a decision tree is also considered. This allows us to consider risks systematically, clearly structure, visualize their relationship, and consider management alternatives. This is important for organizations that participate in several projects simultaneously [12].

Considering the methods of reducing the risks associated with the investments of project participants, in particular, a group of risks associated with the construction of capital construction facilities is identified [13]:

- risks of misuse of funds;
- risks of increased costs for the construction of facilities;
- risks of possible regulatory and regulatory restrictions on construction, including land use;
- risks of increasing the construction time.

For effective risk management, it is necessary, first of all, to focus on the sources of risk and events that have caused negative consequences, rather than on the consequences themselves. It is necessary to take into account the hierarchical risk system of a particular project: first, risks that can affect the project as a whole (deadlines, costs, targets) are identified, and then those inherent in individual stages and types of work [14].

Considering large-scale projects implemented at the state level, including in the context of radical changes in economic relations on the world market, it is proposed to focus on the following risks [15]:

- economic risks can be minimized if the priorities in the economic policy of the state are correctly set, dictated by the need to implement an anti-crisis development scenario;
- socio-political risks are reduced if the society has an understanding of the importance of the projects being implemented;
- information risk management is focused on maximizing public awareness of the importance of national project goals and ways to achieve them.

In order to improve the risk management processes for the implementation of national and federal projects, it is proposed to use an approach based on the application of the Deming cycle [16]. In this case, the management process includes 4 stages:

- planning (risk identification, risk assessment and risk management plan);
- implementation (continuous monitoring based on the control card);
- mandatory annual monitoring;
- improvement (updating of risks depending on the completion

of activities and dynamics of external and internal factors of the project).

Based on the available points of view on the problem, it can be concluded that the problems of risk management in projects require further consideration and the search for new tools. This applies not only to risk identification methods at the project planning phase and consideration of alternatives, but also to establishing a hierarchical relationship of risks, developing a mechanism for updating the system.

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Риск-менеджмент в крупномасштабных проектах: принципы, инструменты управления, результаты

На современном этапе развития экономических отношений с учетом внешних вызовов сформировались определенные предпосылки для применения проектного управления в деятельности отдельных хозяйствующих субъектов, а также на уровне исполнительной власти. Анализ результатов реализации национальных, федеральных, региональных и ведомственных проектов показал, что применение методологии и инструментария проектного управления дало положительные результаты в решении как экономических, так и социальных проблем. В то же время были выявлены проблемы государственного, регионального и отраслевого характера, которых можно избежать при правильно организованной системе управления рисками в проектах. Существующие стандарты по управлению рисками содержат принципы, на которых должна основываться система риск-менеджмента в проектах, но требуется их привязка к условиям национальных и других проектов, которые характеризуются масштабностью, длительным сроком реализации и большим количеством участников. Организация-участник проекта имеет собственные риски, на которые ориентирована система риск-менеджмента, но, попадая в новую систему взаимодействия организаций, возникают дополнительные риски. По мнению исследователей данной проблемы, необходимы новые механизмы не только в каждой организации, но также интегрированная система, охватывающая всех участников проекта.

Авторы полагают, что одним из возможных инструментов управления риском в крупномасштабных проектах можно рассматривать сценарный подход к планированию проектов, что позволит наиболее обоснованно формировать финансовые резервы в системе управления рисками. Обеспечит более эффективное управление риском построение их иерархической структуры в виде дерева решений с рассмотрением альтернатив воздействия на риск. В системе управления риском необходимо предусматривать процесс улучшений как актуализацию рисков с учетом динамики факторов внешней и внутренней среды проекта.

Ключевые слова: *проектная деятельность на современном этапе, проблемы управления, принципы риск-менеджмента, стандарты, методы идентификации рисков, эффективная система управления*

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