ANALYSIS OF THE SPECIFICS OF INNOVATIVE ACTIVITY IN THE CONSTRUCTION INDUSTRY IN ASSESSING ECONOMIC RISKS

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Abstract

At present, increasing the efficiency of involving new technologies in economic circulation is impossible without analyzing the effectiveness of innovative activity. Considering the issue of innovation management, it is necessary not only to take into account the multi-level approach and positioning of the methodology of innovation analysis, depending on the adoption of economic decisions, but also to take into account the very nature of innovation as the basis for building valuation activities. A deterrent to the diffusion of innovations is the lack of methods for analyzing and improving the efficiency of innovative projects. Their development continues to be carried out largely without regard to the type and scale of technologies being introduced. The lack of an appropriate methodology leads to the fact that enterprises often refuse to introduce innovations due to the uncertainty of their final results.

Keywords: innovative activity, economic risks, natural resources, innovative projects, risk management

I. Introduction

The term «innovation» comes from the Latin «novation», which means «update», and the prefix «in», which is translated from Latin as «in the direction», if translated literally «Innovatio» «in the direction of change». This concept first appeared in the 19th century, but received a new life at the beginning of the 20th century. In 1900, the Austrian and American economist J. Schumpeter first used this term in economics [1]. Innovation is understood as the result of an intelligent solution that has not been used before, an idea that is invested in the development and acquisition of new knowledge, updating various areas of people's lives, such as technology, products, science, informatization, etc., the subsequent process of introducing this innovation with obtaining additional values (profit, lead, leadership, priority) [2]. Among the scientists of our time, there are many supporters of the classical theory of I. Schumpeter, such as V.P. Loginova and A.S. Kulagin, who understand «innovation» as an object, result, product obtained as a result of the commercialization of scientific and technical activities. At its core, the concept of «innovation» is an economic phenomenon, which is characterized by a process: investment - development - implementation process - obtaining a qualitative improvement. Based on the foregoing, the author believes that «innovation» is the result of any type of activity aimed at improving, developing and achieving something new.

Differences in the identification of innovation as an object of evaluation predetermine the

features of the analysis. If innovation is considered as an innovation, a formalized result of scientific research and development [1, 2], then the assessment of innovation will be reduced to an analysis of the costs and results of R&D and patent analysis (academic approach in analysis). Considering innovation utilitarianly as a new utility to meet new consumer needs [3], the assessment of innovation will be reduced to marketing analysis and commodity assessments (market approach). If we imagine innovation as the production introduction of new or improved equipment or technology [4, 5], then the assessment of innovation is reduced to a technical and economic analysis of the costs of updating production (technocratic or cost-resource approach in the analysis). Identification of innovation as the use of new or improved forms and methods of organizing management [6], including methods of remuneration and incentives, customer service, accounting and control, forecasting and planning, analysis techniques, boils down to the fact that the evaluation of innovation turns into an organizational managerial analysis (managerial approach in analysis). Consideration of innovation from the perspective of an intellectual property object or an intangible asset determines the assessment through property analysis (accounting or accounting approach in the analysis). If innovation means getting high profits from the use of a monopoly of novelty in the market, then the entire assessment of innovation turns into an analysis of the monopoly conditions for obtaining excess profits (commercial or income approach in the analysis). If innovation means obtaining a social or environmental effect from the use of a new or improved social service as a «public good», then the entire assessment of innovation becomes a socio-psychological analysis (non-commercial social approach in analysis). If innovation means a new or improved combination of production factors [7] to minimize costs and maximize results, then the entire assessment of innovation comes down to an analysis of the costs and benefits of a new or modified production function (neoclassical approach in analysis). If innovation is understood as the process of creating and increasing the value of a high-tech business through new added value and reinvestment of profits when using innovations, then the assessment of innovation leads to an analysis of the capitalization of a high-tech business (cost approach or business capitalization approach in the analysis). If innovation is understood as the process of introducing an intellectual property object into economic circulation through the sale and purchase of an innovation with its subsequent use or non-use by the buyer, then the assessment of innovation is reduced to the analysis of the pricing of an intellectual property object for sale or resale (price approach or commercialization approach in the analysis).

II. Methods

In the proposed reporting forms, the information base on innovation activities is mainly limited to patent statistics, which reflects only the initial stage of the innovation cycle - the process of producing new knowledge. In addition, the available statistical forms are a collection of only quantitative indicators, the use of which for the management of innovation activity without additional information will give a one-sided assessment. This situation is a consequence of the opinion that existed for a long time, according to which innovation activity was considered as integral to scientific activity. This approach considers a linear model of the innovation cycle, consisting of the following stages: scientific research, inventions, innovations and diffusion of technological innovations. The linear model justified the use of indicators of science statistics as the main indicators of innovation activity. In this case, the innovation policy was limited to accelerating the promotion of innovations at all stages of the innovation cycle. Forms for the collection and analysis of information on innovation activity, submitted both by official statistical organizations and industrial enterprises, do not allow an objective assessment of the potential for

the application of innovative solutions of individual enterprises. In addition, in Russian statistics, organizations that have introduced (completed) innovations in the last three years are declared to be innovatively active organizations, and on the other hand, all organizations that showed the presence of innovation costs in the reporting year are classified as innovatively active. In our opinion, it is advisable to determine the innovativeness of organizations using two indicators [7]: 1) innovative organizations - organizations that have introduced (completed) innovations in the last three years; 2) innovatively active organizations - organizations that carried out innovative activities in the reporting period (three years, a year), regardless of the degree of its completion (the criterion for classifying this type of organization is the presence of innovation costs in the reporting period). In addition, it should be borne in mind that the reporting period in the Frascati Manual is three years. Therefore, for international comparability, indicators characterizing innovative organizations should cover a three-year period of the organization's activity (and not predominantly a year, as it is now).

There are three logical forms of the innovation process [7-8]: 1) simple intra-organizational (natural) involves the creation and use of innovation within the same organization, innovation in this case does not take a direct commodity form; 2) simple interorganizational (commodity) means the separation of the function of the creator and producer of innovation from the function of its consumer, innovation acts as an object of sale; 3) extended is used in the creation of new producers of innovation, in violation of the monopoly of production of the pioneer manufacturer, which contributes through mutual competition to the improvement of the consumer properties of the manufactured goods [4]. Consequently, not every innovative process involves commercial use (see item 1. no product - no commercial use). The innovation process covers a sequential chain of events during which an innovation matures from an idea to a specific product, technology or service and is disseminated through practical use on a commercial basis. Unlike scientific and technological progress, the innovation process does not end with the so-called introduction - the first appearance on the market of a new product, service or bringing a new technology to its design capacity. This process is not interrupted even after implementation, because as it spreads (diffusion), the innovation improves, becomes more efficient, and acquires new consumer properties. This opens up new areas of application for it, new markets, and, consequently, new consumers who perceive this product, technology or service as new for themselves. Thus, this process is aimed at creating the required markets for products, technologies or services and is carried out in close unity with the environment: its direction, pace, goals depend on the socio-economic environment in which it functions and develops. The period that begins with the implementation of theoretical and industrial innovations and includes the subsequent development, development and application of a new scientific and technical idea, improvement of the technical and economic parameters of the manufactured equipment, its repair and other maintenance, and ends with the moment when this equipment is to be replaced with a qualitatively new one, more efficient is called the innovation life cycle.

III. Results

Most scientists involved in innovation development note that innovation policy is dominated by less risky and inexpensive innovations that reduce the level of efficiency of ongoing technological and production changes [6,7]. Due to the fact that many construction companies

operate in accordance with the strategy of "skimming the cream", i.e. in their economic activities are guided by momentary benefits, and this, in turn, is a factor that weakens the innovation process. Given the fact that short-term interests will prevail over long-term ones, investors prefer to implement small-scale measures, rather than actions that give a more significant, but long-term effect. As a result of such actions, innovations take the form of spasmodic reproduction, including in investment and construction activities. At the same time, one should not forget that the effectiveness of innovative processes depends on complex reproduction and technical reorganization, at the same time costs, in addition, there is a time gap between the introduction of innovations and obtaining an economic result. In this regard, it is necessary to carry out a risk assessment in the implementation of innovative solutions, as well as to predict the probability of profits and losses. It should also be pointed out that when implementing innovative construction projects, it is possible to receive not only losses, but also losses. The monetary value of damage is considered to be loss. Unforeseen losses associated with the influence of the factor of uncertainty, inconsistency and alternativeness can be assessed as probable losses from the implementation of the project. In order to accurately assess the feasibility of implementing innovative construction projects, there is a need to improve the classification of risk factors due to the introduction of innovations [9]. With an increase in the number of specific factors that are taken into account when calculating the magnitude of the risk, the accuracy of the results of assessing the economic efficiency and the effect of the implementation of innovative construction projects increases. The classification of factors that influence the formation of risks of innovative construction projects is shown in the figure. The presented classification, based on the characteristics of individual innovation processes, may additionally include other specific factors. External factors have a significant impact on the development of innovations. In particular, the state taxation system, contractors, suppliers, banks and lenders are the main partners in the implementation of construction projects. As a result, unstable interest rates on credit resources increase the level of banking risk from the implementation of innovative projects. An important factor of investment risk is the instability of taxation. Since often the tax benefits that are provided at the initial stage of the project may change for the worse in the process of implementation and operation of the facility. This trend makes it difficult to invest in large-scale construction projects. The supply risk appears with the instability of supplies, with a disruption in the supply of material and technical resources. This risk also complicates the effective implementation of the project. The levers of state protection of the domestic market are also not effective enough. Local investments in the conditions of strong external competition become risky, therefore, there is a decrease in the degree of interest of domestic investors in large-scale investments in construction. Insufficient space [8-9] for domestic entrepreneurs in the market leads to a violation of the balance of supply and demand in the domestic market. Therefore, the expediency of implementing innovative projects is called into question, because. it is difficult to predict the final result of investing. The risk factor from a decrease in market demand and interest in the final results of investing influences the decision to invest in large-scale innovative projects. A significant influence is exerted by specific internal conditions that impede the development of innovation activity and increase the degree of risk of innovation at the level of specific investment projects, along with external factors of innovation risk. This concerns the leakage of personnel from the sphere of scientific and technical activity outside the state. At the same time, there are difficulties in training personnel in the field of innovation [10]. The risk of a lack of scientific and human resources for managing innovative projects is formed by the slow replenishment of the administrative apparatus with personnel oriented towards market management, while reducing the composition of the former scientific and production personnel. With the reduction in financing of investment activities from the own sources of construction companies, there is an internal risk of underperformance of innovative

programs and projects. In the field of logistics, there may be disruptions and late payments. This combination of factors is the reason for the reduction of own funds allocated for investment in innovative construction projects. When assessing the feasibility of implementing innovative projects and programs, losses from errors in forecasting the expected beneficial results of investments should be taken into account. Often, in prospective economic calculations, it is not possible to determine with high accuracy the expected positive and negative results of the planned investments. Therefore, it is necessary to use the risk coefficient to analyze the effectiveness of the proposed innovative construction projects. With the growth of the volume of innovative projects and programs, this ratio tends to increase. Specific factors that increase the degree of risk of innovative construction projects must be taken into account when developing a risk management mechanism for the implementation of innovative construction projects. The development of an appropriate mechanism will make it possible to make decisions on the most beneficial use of economic resources and increase the socio-economic potential of the territory, its sustainable and safe development. In turn, risk management in the implementation of innovative construction projects should be understood as a set of scientifically based principles, forms, methods, techniques and means of managing innovations in the field of their creation, development in production and promotion to the market in order to make a profit. Risk management in the implementation of innovative construction projects must be carried out in several stages. At the first stage, the classification and structuring of risks is carried out. At the second stage, risk response planning is carried out, and at the third stage, the results of the risk management system are monitored. Terms of use of the property. Based on the existing state of each specific building, various hazards arise during its operation, which can have a negative impact on the state of the housing stock as a whole. When assessing the conditions of use, a database of the study area is formed, which includes information on the geography of the territory, meteorology, infrastructure, distribution of the population by areas of residence, location of industrial and other hazardous industries and facilities, main traffic flows, etc. Pressure factors for new construction, which may include both external and internal pressures. It is important to identify such factors that can have a negative impact on the object and pose a certain danger to it.

The reproduction process, as noted earlier, includes current repairs, major repairs, reconstruction, modernization and new construction. It is important to identify the risks associated with the implementation of these works and which can become a threat to the reproduction process as a whole. The mechanism of state regulation includes various tools, including the development and examination of regulations aimed at understanding possible hazards and ensuring the safety of the territory as a whole, analyzing fire safety systems and services, taking into account the fire hazard of residential buildings, high-risk facilities, systems transportation of gas and electricity. Risk analysis block. After the preliminary monitoring of possible hazards and their classification, using the methods of qualitative and quantitative analysis, the most serious of them are identified. The risks are assessed in terms of their danger and vulnerability of the object to these impact factors. A quantitative analysis of the impact of hazards is carried out throughout the life of the property. The most widely used among the quantitative methods of risk analysis is the probabilistic method, which makes it possible to estimate the probability of relevant events and the potential damage associated with them. The study of risks based on the probabilistic method makes it possible to build various risk assessment methods. Depending on the available (used) initial information, these can be methods of the following types: - statistical, when the probabilities of risk occurrence are determined according to the available statistical data (if available); - probabilistic, used to assess risks from rare events, when statistics are practically absent; - heuristic, based on the use of subjective assessments of the probability of occurrence of risks obtained with the help of expert assessment (used in assessing

complex risks from various hazards, when not only statistical data are missing, but also mathematical models or models are too rough, i.e. their accuracy is low). Testing risks, evaluating various alternatives for the impact of the risks under study and predicting its consequences. Methods for predicting the extent of damage over time of use can be divided into two groups: 1) methods based on a priori (estimated) estimates obtained using theoretical models and analogies; 2) methods based on a posteriori estimates (assessment of the extent of an emergency that has already occurred). Taking into account the influence of various factors on individual risk: types of negative events, their frequency, strength, mutual arrangement of sources of danger and objects of influence, the security and vulnerability of innovative objects in relation to the damaging factors of sources of danger, the costs of implementing measures to reduce the negative impact of individual factors - justified rational measures to reduce natural and man-made risks to the lowest possible level. Separate hazardous phenomena, potentially hazardous objects are compared with each other in terms of the magnitude of the individual risk, and critical risks are identified [8-9].

Planning for response to identified risks. This block includes the development and justification of strategies and operational action plans designed to effectively implement decisions to neutralize the identified risks and ensure the achievement of the set goals. Initially, based on the rational distribution of financial resources generated from the funds of the budgets of various levels, the population and business, it is necessary to determine the order of implementation of organizational measures to improve the sustainability of the functioning of the housing stock. Of greatest interest is the use of such tools as [7-8]: - rational placement of objects serving the property. It is necessary to place hazardous production facilities (gas boilers, electrical substations, gas-balloon equipment, etc.) in such a way that the possible harm caused by them is minimal; - risk insurance. It is possible to use various types of insurance, including insurance of property risks and liability insurance for causing harm to life, health and property of citizens and the environment; - development and implementation of preventive measures to reduce risks and reduce their consequences. An important role in the prevention of emergency situations is assigned to national, departmental and territorial organizational and economic measures. They allow, through the application of administrative measures (penalties), to stimulate work to reduce the risks of emergencies and manage them with the help of a tax mechanism and concessional lending; - introduction of an emergency response mechanism. Includes planning of actions in case of an emergency, taking into account the interaction of various services with state administration and control bodies, as well as members of the public and the population. Monitoring the results of risk management is a process that must be carried out regularly to identify weaknesses in this system, track the results and make certain adjustments to the risk management process aimed at ensuring the most effective implementation of an innovative construction project.

IV. Discussion

In modern conditions, there are specific factors that increase the degree of risk of innovative construction projects. Such factors must be taken into account when developing a risk management mechanism for the implementation of innovative construction projects [6]. The developed and substantiated risk management mechanism in the implementation of innovative construction projects will make it possible to make decisions on the most beneficial use of economic resources and increase the socio-economic potential of the territory, its sustainable and safe development. Risk management in the implementation of innovative construction projects must be carried out in several stages. At the first stage, the classification and structuring of risks is

carried out. At the second stage, risk response planning is carried out, and at the third stage, the results of the risk management system are monitored.

In general, the problem of determining the economic effect and choosing the most preferable options for implementing an innovation requires, on the one hand, the excess of the final direct and indirect, pure and explicit effects of using the innovation over the full costs, taking into account the payback period, and on the other hand, comparison with the same in nature. effect and cost of similar innovation options. Another problem of determining economic efficiency is related to the need to distinguish between the effectiveness of innovation activity among producers and buyers [4, 5]. The main criteria for substantiating the economic efficiency of innovative activities for manufacturers are the accounting rate of return on investment, simple and discounted payback periods, net present value, profitability index and internal rate of return. The assessment is completed by determining the stability and sensitivity of these indicators to changes in internal and external parameters. The cost-effectiveness of innovation activities for buyers needs to be considered differently. The buyer, acquiring innovations, improves his material and technical base, production and management technology. He bears the costs associated with the purchase of innovation, its transportation, development, etc. The cost effectiveness of the buyer for the use of innovations can be determined by comparing the following indicators [7]: - the cost of production and sales of products before and after the introduction of innovations (cost savings); - proceeds from the sale of products before and after the introduction of innovations (increase in revenue); - the cost of consumed resources before and after the introduction of innovations (resource conservation); - the average number of personnel (saving of living labor); - labor productivity before and after the introduction of innovations (increase in productivity); - the ratio of the operational effects of innovation consumption and own costs, including the costs of after-sales service or maintenance of operation, especially for science-intensive and technically complex innovations, outsourcing costs, etc. Outsourcing costs should be taken into account when calculating the economic efficiency of innovation activities for manufacturers and buyers, if both need highly qualified professionals for the service operation of science-intensive and technically complex innovations. Especially if the innovative project is one-time, then it is worth outsourcing it to a professional team, since it is unrealistic and expensive to grow a team of professionals in a short time. In this case, it is possible to partially shift the risks of failure of the project deadlines or losses to the company providing outsourcing services, and thus, in the event of an unsuccessful project, partially compensate for their costs.

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