

## IMPROVING THE METHODS OF EVALUATING THE EFFICIENCY OF INVESTMENT PROJECTS

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### **Abstract:**

The necessity of improving the methods of evaluating innovative projects, taking into account the specifics and uncertainty of the innovative project connected with realization and other risks, were substantiated. Interpretations of the concepts of innovation and innovation project were given. The main methods for evaluating innovative projects and the typical shortcomings of existing methods were identified. It was suggested to use the method of real options. The improved methodology for evaluating innovative projects, which will make the assessment more reliable, reduce financial losses and have a positive impact on the economy were presented.

**Keywords:** method of evaluating innovative projects, innovative project, innovation, investment project, real option.

Today, the understanding of the importance of innovation is growing at the level of economic entities. The development of technology in recent years has led to the emergence of new types of economic activity that differ significantly from traditional ones. These differences call into question the effectiveness of the methods adopted earlier in providing a reliable assessment of an innovative project. The assessment should take into account the specifics and uncertainty of the innovation project associated with its implementation and other risks. An incorrect and unreasonable choice of an innovative project can lead to financial losses and have a negative impact on the social and environmental environment. In this regard, the quality of assessing the effectiveness of innovative projects is very important.

The concept of "innovation" is considered in the works of many foreign and domestic authors. Despite the huge amount of work, there are still a number of issues that require further research.

Before considering methods for evaluating the effectiveness of an innovative project, it is necessary to understand what innovation and an innovative project are. The Austrian economist J. Schumpeter in his work "The Theory of Economic Development" introduces the term "innovation" for the first time, thus for the first time he describes the concept of innovation as an economic category. He understood innovation as an innovation, always associated with risk, which is applied in the production process in order to reduce costs per unit of production, or an innovation in the management, organization of an enterprise. Schumpeter noted that during the process of replacing old technologies with innovations, they

act as an engine of economic development. In 1987, K. Freeman in the book "Technological Policy and Economic Superiority: Lessons from Japan"

introduced a modern version of the concept of "national innovation system" in the literature. Freeman proposed the concept of innovation as an interactive rather than a linear process in which innovation occurs automatically as a result of scientific research. V. N. Lapin proposes to consider innovation as a complex process of creating, distributing and using new practical tools to better meet the needs of people.

It is obvious that any innovation is something new, practically realizable, bringing economic and other benefits. The process of creating innovation requires an effective innovation project. An innovative project is a form of building innovative companies with fixed deadlines, milestones, results-oriented resources.

The federal law "On Science and State Science and Technology Policy" defines an innovation project as a set of measures aimed at achieving an economic effect on the implementation of innovations, including the commercialization of scientific and scientific and technical results. In the Russian Federation (hereinafter referred to as the Russian Federation), the essence of the legal and economic foundations of investment activity is disclosed by the Federal Law "On investment activity in the Russian Federation, carried out in the form of capital investments". This law determines the forms and methods of state regulation of investment activities, as well as state guarantees of the rights of subjects of investment activity and protection of capital investments. The law defines the concept of an investment project as a rationale for the economic feasibility, volume and timing of capital investments, a description of practical actions for the implementation of investments (business plan), as well as non-required project documentation developed in accordance with the legislation of the Russian Federation.

The main element for the analysis of the project is the evaluation of its effectiveness. The feasibility of investing in the development of innovations must be justified so that the innovation project satisfies certain criteria. The main criterion is economic viability, expressed through a system of economic indicators. The choice of methods for evaluating the effectiveness depends on the specific project, each project is individual and differs in the amount of costs, the period of the project, and the productivity of the results. As a rule, the DCF (discounted cash flows) model is used to evaluate the effectiveness of innovative projects. Currently, in the Russian Federation, innovative projects are evaluated using discounted methods based on the "Methodological recommendations for evaluating the effectiveness of investment projects".

To assess the effectiveness of innovative projects by dynamic methods, the following are used as the main indicators:

- net present value (NPV);
- profitability index (PI);
- internal rate of return (eng. internal rate of return, IRR);



- payback period, taking into account discounting (English discounted payback period, DPP). Discounted methods for evaluating the effectiveness of projects are actively used in practice to save

mic substantiation of investment projects. However, this practice of application has recently raised more and more doubts. Critics of discounting methods note that the discounting procedure sets a high rate of depreciation of future cash flows from the project, which become a small value. In his monograph, Yu. A. Malenkov says that “when considered from a systemic standpoint, it turns out that this particular criterion ... is the most unsatisfactory, unreliable, subjective and unreliable indicator that does not correspond to the essence of investment efficiency calculations, sharply distorts the real efficiency of investment projects, creating only the illusion of quantitative justification”.

The cash flow method can only assess the profitability of an innovative project. M. A. Bendikov noted that the primary point of an innovation project is the assessment of its technical and economic feasibility from the point of view of the enterprise, the definition and assessment of its impact on the region and its economy, the environment, etc. Therefore, it can be assumed that the effectiveness of an innovation project cannot be considered only from the point of view of economic efficiency. Of course, economic feasibility and efficiency are decisive factors when choosing an innovative project.

However, non-economic performance indicators must also be taken into account, such as social impact, environmental impact, scientific and technical effect, etc.

To date, the methods that are used to evaluate the effectiveness of innovative projects do not provide at the initial stages of screening out clearly unpromising projects. This is due to the fact that the uncertainty and risks of innovative projects, which are much higher than in investment projects, are not taken into account. The disadvantage of dynamic methods for evaluating innovative projects is the lack of a complete analysis of existing project scenarios. One way to eliminate this shortcoming is a kind of synthesis of the decision tree and the net present value method, which is an assessment using the real options valuation method (ROV). The real options method has been introduced into the literature as an approach that can overcome the limitations of NPV in evaluating investment opportunities. Since the real option method derives from the financial option method, we will begin with a brief description of financial options in order to better analyze real options.

The method of financial options is a method that was conceived, as the name implies, in the field of operations in financial markets. Financial options are instruments that, upon payment of a premium, give the right to buy or sell the asset underlying the option (which can be a stock or a bond) at a specified price, which is set when the option is entered into. This right may be exercised on a specific date in the case of a European option type, or within a specified period in the case of an American option type. In the case of an option that allows you to buy shares at a certain time (call option), when buying a share, the value of the underlying asset can be

higher than the price agreed in the option (strike price), which makes it convenient to use the option, giving a positive payoff, determined by the difference between the strike price and the underlying value. On the other hand, in the case of a put option or a put option, a positive result is obtained if the strike price exceeds is the value of the underlying asset.

When we talk about real options, we mean the right to make transactions or change its characteristics during the project. It is this ability that makes it possible to link real and financial options. Ultimately, options are the ability to implement and modify any company's projects. A. V. Bukhvalov defined a "real option" as an opportunity to make flexible decisions under conditions of uncertainty, as well as a tool aimed not at risk insurance, but at maximizing growth.

Evaluation of projects by the method of real options is carried out in several stages. First, the project is analyzed by means of dynamic methods for evaluating its effectiveness, then uncertainties are modeled using the event tree method, in which the project is divided into stages and the main milestones of the project are identified. Dynamic indicators are calculated, but in different versions, based on the uncertainties of the project. Further, key decisions for the implementation of the project are determined, on the basis of which a decision is made on the further development of the project (increase, delay in development, adjustment of the strategy, abandonment of the project).

The key difference of the real options method is that it takes into account the possibility of changes in the conditions of the project and the availability of a choice of alternatives at various stages of its implementation.

Existing methods for evaluating an innovative project take into account only the economic effect of the project implementation due to the fact that the methods are based only on quantitative estimates. For a complete analysis of the project, it is necessary to divide the process of evaluating the effectiveness of an innovative project into stages:

1. At the first stage, innovative projects are evaluated by non-economic indicators. Each indicator is subject to expert risk assessment, as well as risk assessment taking into account the weight of the indicator. With the help of expert assessments, the coefficient of cost of each indicator is found. Based on the results of the examination, the risk level of the innovative project is determined. The advantage of this approach is the combination of technological and strategic aspects, as well as the simplification of the evaluation of science-intensive innovation projects under conditions of uncertainty.
2. At the second stage, projects are evaluated using the real options method, using an event tree to model project uncertainties.
3. At the third stage, the economic efficiency of the project is calculated by discounting the cash flow (indicators NPV, IRR, PI, DPP).

A qualitative assessment of the effectiveness of an innovative project can only be obtained by combining different assessment methods. For innovative projects that are implemented by



investors such as the state or state funds, it is important to have profitable projects not only on the basis of economic evaluation, but also in terms of improving the environment, developing new technologies and improving the position of the state at the international level. In the management of innovations, innovation projects and innovation processes, the joint quantitative and qualitative assessment of their effectiveness occupies a key place.

In conclusion, we can add that innovative projects differ significantly from investment projects and require significant changes in the methods for evaluating the effectiveness of projects, which will reflect the features of innovative projects and their environment.

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