RESEARCH ON THE MATTERS OF INNOVATIVE PROJECTS EFFECTIVENESS EVALUATION

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This article describes the concept of innovation and innovative projects. Based on research of domestic and foreign scientists it clarifies the concept of "innovation". After the analysis of the features of innovative projects the authors concluded that the innovative projects effectiveness evaluation should take into account non-economic indicators such as social, ecological, resource, scientific and technological ones. The algorithm of innovative projects effectiveness evaluation taking into account non-economic indicators was modeled. This algorithm can be applied in innovative projects effectiveness evaluation undertaken by the Government of the Russian Federation and Russian funds that are rather interested in improvement of social, ecological, scientific and technological situation in the country and the region than in economic benefits.

Keywords: innovation; evaluation of effectiveness of innovative projects; non-economic indicators.

Russia is a country with relatively young market economics. Rapidly developing production and competition determine innovation activity of enterprises, in particular the development and implementation of innovative projects. In the past decade, the Government of the Russian Federation developed and approved a number of regulations and programs aimed at improving and promoting innovation in the country. [11] In 2011, the Strategy of Innovation Development of the Russian Federation until 2020 was adopted. It was approved by the Federal Government on December 8,

2011 № 2227-р. The document confirmed the recovery of the leading position of the Russian fundamental science in the world. In 2010, the volume of internal costs on science research and development in the country amounted to 523.4 billion rubles. Thus in relative terms, the volume of internal costs on science research and development in Russia is estimated at 1.16% of GDP against 1.70% in China, 2.33% on average in OECD countries, 2.79% in the USA, 3.33% in Japan. [3]

Understanding the significance of innovation is growing at the level of economic entities. In this connection the quality of innovative projects effectiveness evaluation is very important. The wrong and unreasonable choice of an innovative project may result in a financial loss and have a negative impact on the social and ecological environment. Thus, in its assessment the specifics of an innovation project, the uncertainty associated with its implementation and other risks must be taken into account.

The problem of evaluating the effectiveness of innovation and innovative projects is well studied. Evaluation of the effectiveness of innovative projects was developed by many scientists: V. Voropaev, I.A. Zimin, I.I. Mazur, I.S. Khojaev, S.N. Yashin, O.S. Voronin, A.S. Nizamova.

Such Russian and foreign researchers as the B-A. Lundvall, K. Freeman, Joseph Schumpeter, R. Nelson, J. Schmookler, S.J. Glaziev began the studies on innovations. Despite the large number of works devoted to this problem, there remain a number of issues requiring further development and research in this direction. So, the Methodical recommendations on evaluation of investment projects is still used to assess the effectiveness of innovative projects. In the document the specific features of innovative projects are only indirectly taken into account.

Before talking about the evaluation of the effectiveness of the innovative project, you need to understand that there is innovation and innovative project. The first concept of "innovation" as an economic category was used by the Austrian economist Joseph Schumpeter. In his work "The Theory of Economic Development", he defines

the concept of "innovation" as a change with the aim of introducing and using new consumer products, new production and transport, markets and forms of organization in the industry. Christopher Freeman offered a vision of innovation as an interactive rather than a linear process in which innovation occurs automatically as a result of scientific research [13].

Brian T. gives the following definition of innovation: "Innovation is a process in which the item of intelligent invention, information, know-how, or idea gets to the substance". [2] V.N. Lapin suggests considering innovation as a complex process of creation, dissemination and use of new practical tools to better meet the needs of well-known people. [4] Very often, the concept of "innovation", "new development", "novelty" are used as equivalents, although there are differences between them. Innovation does not often show the real thing: new ideas in the field of sales, business, transportation, management decision-making are also innovations.

Thus, combining the basic idea of the above statements innovation can be defined as a process of creation, dissemination and use of progressive ideas that improve the quality of goods and services, the production and management of the enterprise, as well as the interactions with customers and other counterparties.

It is obvious that any innovation is something new, practically implemented, bringing economic and other benefits. The process of innovation requires effective innovation project. An innovative project is a substantiation of introduction reasonability of novelty (innovations in particular) and the process of innovation by means of investing [6, 7]. The innovative project is a form of building innovative companies with fixed terms, stages, resources focused on results. Reasonability of investing for the development of innovation needs to be justified, so that innovative project satisfies certain criteria. A set of criteria depends on the specific sectors and companies in particular. The main criterion is the economic viability expressed through a system of economic indicators. As a rule the method of «Cash flow» is used to evaluate the ef-

fectiveness of innovative projects. It includes the calculation of the following indicators:

1. NPV (Net Present Value) - net present value of the project. Represents the present value of expected cash flows over a forecast period. There is the following approach to assessing the economic efficiency of innovative projects: some authors propose to calculate the net present value of the project (NPV) using compounding (Building cost method) [9].

2. IRR (Internal Rate of Return) - the internal rate of return of the project, that is a settlement rate of interest at which the capitalization of regularly received income gives the amount equal to the investments made in the innovative project.

3. DPP (Discounted Pay-back Period) - the payback period of the project based on discounted estimates, that is the duration of the period during which the amount of net income, discounted at the end of investment will be equal to the amount of investment in the innovative project.

4. PI (Profitability Index) - index of profitability of the project which shows the value of asset growth per unit of investment.

The method of «Cash flow» is able to assess only the innovative project cost-effectiveness. M.A. Bendikov said, "The primary endpoint of the innovative 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." [1, pp. 39]. Therefore, we can assume that the effectiveness of the innovation project cannot be considered only from the point of view of economic efficiency. Certainly, the economic feasibility and effectiveness are decisive in the choice of an innovative project. However, in our opinion, one must also consider non-economic performance indicators, such as social impact, environmental impact, scientific and technical effect, etc. Cost-effectiveness is not the same as the social one and is the "blocker" of socially useful innovation [8]. Existing methods of

assessment of the innovative project often based on quantitative assessments take into account only the economic benefit from its implementation. [5]

There is a problem of assessing the effectiveness of innovative projects based on their features. There are following differences between the innovative project and the investment one:

1. The effectiveness of the innovation project can be assessed only by means of the comparative analysis [12], as an innovative project, as a rule, is aimed at improving the performance of the organization as compared to those that are available at the moment.

2. An innovative project covers a wider range of participants than the investment one as it includes all stages of the innovation process [9].

3. Evaluating the effectiveness of the innovative project is the multi-criteria one. This is due to the fact that one and the same project can have different objectives and solve a number of problems and its effectiveness will be evaluated depending on the priority of these tasks.

As an object of the effectiveness evaluation, innovative projects are characterized by:

− capital intensity, that is the high cost of highly-skilled personnel and high-tech equipment;

− multi-stage (for example, they provide for research and development, pilot implementation in production, eliminating gaps and refinement, the introduction of mass production);

− the need to create or purchase of intellectual property;

− increased costs during the development of new technologies, techniques or management concepts;

− a high degree of uncertainty and risk.

− specific ways of financing (venture capital funds, foreign investors, budget items, etc.).

From our point of view, it is useful to divide the process of assessing the effectiveness of an innovative project in two phases [10]:

1. Evaluating the effectiveness of an innovative project based on non-economic indicators;

2. Cost-effectiveness (in particular the feasibility of innovative projects).

Such a division is dictated by the fact that for innovative projects that are implemented by such investors as a state or state funds, the importance of having beneficial projects in terms of improving the environment, technology and the image of the state is higher than the economic evaluation.

At the first stage, innovative projects are evaluated by non-economic indicators. As these indicators have mainly a qualitative basis, we replace them on a comparable form that is on dimensionless units. With the help of expert assessments the value coefficient of each indicator is defined. In addition to expert estimates, Fishburne formula is also applied in cases where performance can be ranked by degree of importance: "not significant", "significant", and so on:

$$\alpha_i = \frac{(n-i+1)}{n(n+1)} \tag{1}$$

where α_i - the boost factor category i indicators; n - the number of categories of performance indicators of innovation projects; i - the number of the category.

Then, the estimates of each indicator are calculated by the following formulas:

$$s_{ij} = \frac{SF_{ij}}{S\max_{ij}} \tag{2}$$

where SF_{ij} - the actual value of the index i for project j; $S_{\max ij}$ - the maximum value of the index i for project j, if necessary, increase i index.

$$s_{ij} = \frac{S\min_{ij}}{SF_{ij}} \tag{3}$$

where SF_{ij} - the actual value of the index i for the project j; $S\min_{ij}$ - the minimum possible value of the index i for the project j, if necessary to reduce the values of the indicator.

Thus, a synthetic (Final) indicator of the project is given by:

$$S_j = \sum_{i=1}^{n} \alpha_i s_{ij} \qquad (4)$$

where S_j - the synthetic indicator of the project j; α_i - the significance of the coefficient (the weight of) performance i category; s_{ij} - estimating the project j.

The values of the synthetic indicator lie between 0 and 1. The closer the synthetic index to 1, the more preferred the project is. It must be emphasized that we are talking about the preference of a project that is within the selected indicators.

At the second stage, using methods of cash flow the cost-effectiveness of projects (counting figures NPV, IRR, PI, DPP) is calculated. Among the efficient projects from the economic point of view we choose the one that has the maximum yield.

The above technique can be used to evaluate innovative projects in cases where investors and company management set the task not only to profit from the project, but also to solve problems related to the improvement of environmental, social, scientific and technical situation at the enterprise, in the region or in the country.
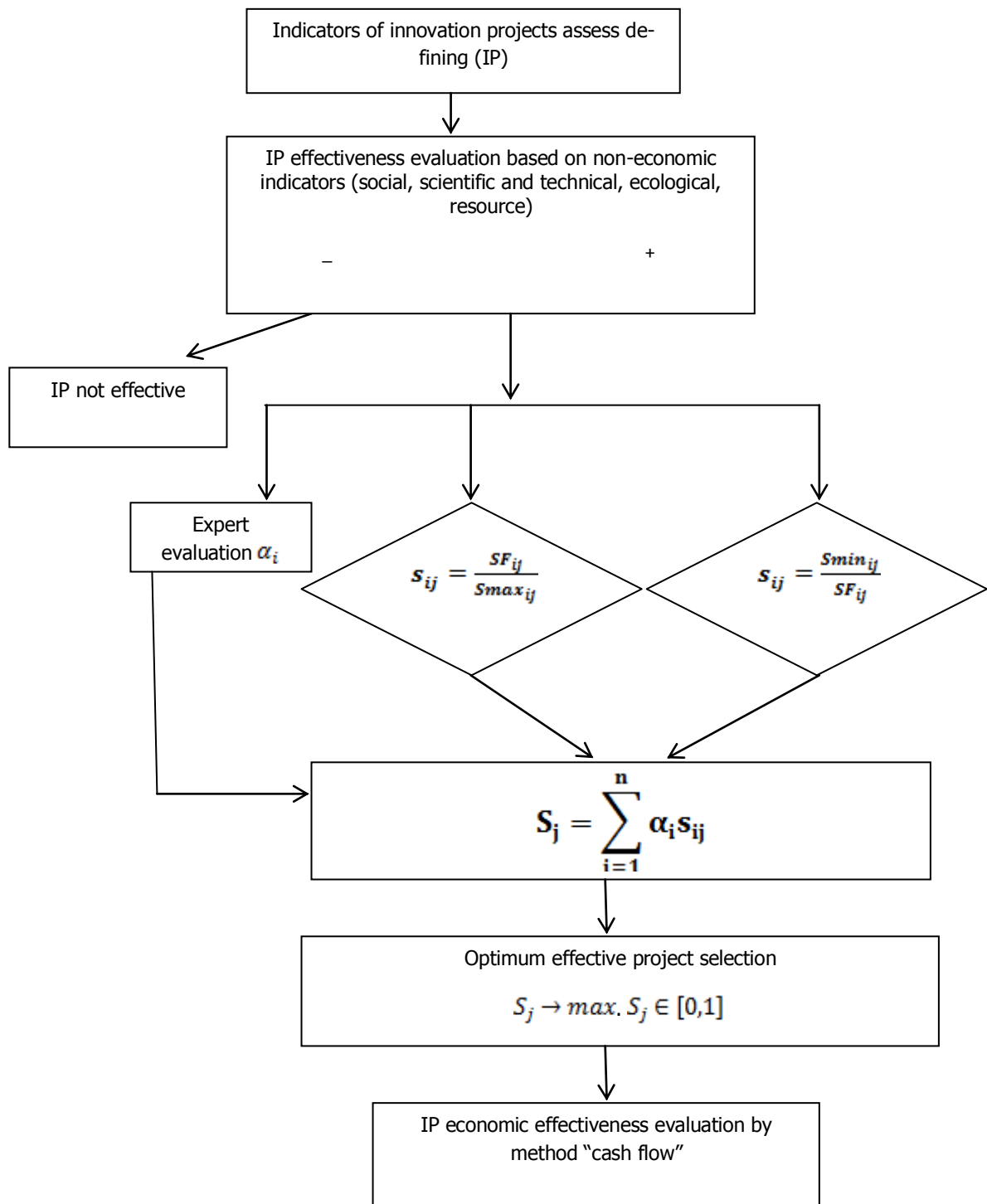
Picture - Algorithm for estimating the effectiveness of an innovative project based on non-economic indicators

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