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Analysis Model of the Innovation Business in a Particular Spatial Organization

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***Abstract*—The aim of the study is the methodological and methodical improvement of the special regime of entrepreneurial activity of special forms of spatial organization, due to the analysis of problems and prospects of its current implementation in conditions of high importance and relevance for the technical and technological modernization of the economy. With regard to the mechanisms and tools for the development of innovative and technological zones of entrepreneurial activity, it is proposed to improve the efficiency of the special economic regime of the territories of Russia due to the multidimensional detail of the objects of evaluation according to various criteria. To monitor the innovativeness of business entities of economic zones, a model for assessing the effectiveness of innovative activity of subjects of a special spatial organization is proposed, based on the calculation of an integral indicator that gives the characteristic of innovative activity in 6 blocks of analysis. The proposed model can be widely used in the economic regulation of subjects of special spatial organization to improve their innovation activity and efficiency.**

Keywords—space and economic policy, special economic territories, efficiency evaluation, innovative activity of the company, model, coefficients.

I. INTRODUCTION

At the heart of any special regime is its unique administrative and economic status in the form of a set of rules that regulate a particular sphere of activity, individual territories, various types of objects or entities, etc. the Multiplicity and ambiguity of various benefits and preferences within the framework of a special administrative and economic regime requires a significant revision of both the conceptual principles of their use for the development of special territorial zones, and the regulatory mechanisms and instruments for their implementation. The last is most important, because the formation and implementation of this special regime is currently being implemented in a predominantly «manual» type of state management, when the prevailing non-legal or informal ways of decision-making, which, of course, requires the development of tools for the analysis and evaluation of the implementation of the stated functions of the special territorial zones.

Priority and the main economic attention to the creation of effective regional and interregional areas of innovation-oriented advanced development, of course, should be associated with the processes of modeling such systems, «smart» analysis and regulation. One of the most important elements in the chain of necessary actions is the analysis of efficiency and effectiveness of innovative activity of subjects of the special spatial organization which are in the conditions of special type of tax, administrative, customs and other regime [1; 2; 3; 4; 5].

In general, there is a limited set of assessments of the effectiveness of the subjects of the special economic regime of the territories of Russia either in the framework of administrative measures [1] or in the aspect of scientific research [6; 7]. The latter, while analyzing the current domestic situation in this area and the current world situation, to a greater extent, give a critical assessment of the existing options for assessments and proposals for improving the efficiency of the special economic regime of the territories and its analysis.

The main criticism of the existing administrative documents is related to the limited number of statistical indicators used, including the volume of investments within the zone, the number of jobs created, the volume of production in the SEZ, the volume of exports, the amount of taxes collected. Experts are invited in the first place the extension of the list of indicators by evaluating the indirect impact: growth of GRP, increasing recognition of the region in international markets, the increase in the overall workforce of the region, the growth of living standards in the region, promote economic transformation, etc. [8].

As a result, new systems of indicators are formed to assess the effectiveness of special economic regimes [9; 10] or only tax preferences [11]. However, all of them are not even subject to practical testing because of the lack of necessary publicly available statistics. In this regard, we should take advantage of the recommendation of specialists [12], who emphasize the importance of having a system of assessments, since it is impossible to assess the work of territories with a special economic regime as a whole. The evaluation system itself should be based on multidimensional details of evaluation objects according to various criteria: adaptability for the market and territory, sociality of actions, convenience and profitability of doing business from the standpoint of the direct implementation of specific projects, attractiveness for the residence of participants, innovation, etc. At the same time, innovation is a decisive factor in assessing the work of territories with a special economic regime. As a result, the evaluation of business innovation can

[1] The RF Government resolution «On the procedure of assessment of efficiency of functioning of special economic zones» No. 643 dated 07.07.2016.

be proposed by the authors of the model of six units (blocks) – MSU.

II. METHODS

The model of evaluating the effectiveness of innovative activity of the subjects of a special spatial organization is abbreviated as the model of six units (blocks) – Model of six units (MSU). MSU - is a set of coefficients with weight values (K_n), which calculates an integral indicator (IN-account), which allows to evaluate the effectiveness of innovative activity of subjects of a special spatial organization.

Integral model (MSU) - is a set of coefficients with weight values (K_n), which calculates an integral indicator (IN-account), which allows to evaluate the effectiveness of innovative activity of the enterprise. The integral indicator (IN-account) consists of 9 indicators adjusted by 6 weight coefficients (formula 1).

$$\mathbf{IN} = \sum_{n=1}^{6} \boldsymbol{A_n} = \boldsymbol{A_1} + \boldsymbol{A_2} + \boldsymbol{A_3} + \boldsymbol{A_4} + \boldsymbol{A_5} + \boldsymbol{A_6} = \boldsymbol{K_1} * (\boldsymbol{X_1} + \boldsymbol{X_2}) + \boldsymbol{K_2} * \boldsymbol{X_3} + \boldsymbol{K_3} * \boldsymbol{X_4} + \boldsymbol{K_4} * (\boldsymbol{X_5} + \boldsymbol{X_6}) + \boldsymbol{K_5} * \boldsymbol{X_7} + \boldsymbol{K_6} * (\boldsymbol{X_8} + \boldsymbol{X_9}) \quad (1)$$

Weighting factors (K_n), seeking to bring the indicators to one – the average value. Weighting factors (K_n) are individual for each industry. To determine the K_n, reference values of the most important indicators (X_n coefficients) that diagnose the effectiveness of innovation are taken. The coefficients (X_n) are arranged in descending order of importance of the coefficients in the evaluation of the effectiveness of innovation.

The situation means the overall normal efficiency of innovative activity of the enterprise, when IN-account ≈ 6.

$$\mathbf{IN} = \sum_{n=1}^{6} \boldsymbol{A_n} \rightarrow \mathbf{6}$$

The integral indicator (IN-account) gives the characteristic of innovative activity on 6 blocks of the analysis:

$\mathbf{A_1 = K_1 * (X_1 + X_2) \rightarrow 1}$ – profitability of innovation;

$\mathbf{A_2 = K_2 * X_3 \rightarrow 1}$ – effectiveness of implementation in innovation activities;

$\mathbf{A_3 = K_3 * X_4 \rightarrow 1}$ – the level of total costs in key innovation activities;

$\mathbf{A_4 = K_4 * (X_5 + X_6) \rightarrow 1}$ – the intellectual level of expenditures in innovation activities;

$\mathbf{A_5 = K_5 * X_7 \rightarrow 1}$ – the degree of motivation of personnel involved in the development of innovations;

$\mathbf{A_6 = K_6 * (X_8 + X_9) \rightarrow 1}$ – the degree of use of fixed assets in innovation.

The considered method (the method is a sequence of actions) of complex assessment of efficiency of innovative activity of the enterprise covers key components of the investigated characteristic of innovative activity – at first result, then resource.

The calculation of the weight coefficients K_n is presented in the formula 2.

$$\left.\begin{aligned}
\boldsymbol{K_1} &= \frac{\mathbf{1}}{(\boldsymbol{X_1} + \boldsymbol{X_2})} \\
\boldsymbol{K_1} * (\boldsymbol{X_1} + \boldsymbol{X_2}) &\rightarrow \mathbf{1} \\
\boldsymbol{K_2} &= \frac{\mathbf{1}}{\boldsymbol{X_3}} \\
\boldsymbol{K_2} * \boldsymbol{X_3} &\rightarrow \mathbf{1} \\
\boldsymbol{K_3} &= \frac{\mathbf{1}}{\boldsymbol{X_4}} \\
\boldsymbol{K_3} * \boldsymbol{X_4} &\rightarrow \mathbf{1} \\
\boldsymbol{K_4} &= \frac{\mathbf{1}}{(\boldsymbol{X_5} + \boldsymbol{X_6})} \\
\boldsymbol{K_4} * (\boldsymbol{X_5} + \boldsymbol{X_6}) &\rightarrow \mathbf{1} \\
\boldsymbol{K_5} &= \frac{\mathbf{1}}{\boldsymbol{X_7}} \\
\boldsymbol{K_5} * \boldsymbol{X_7} &\rightarrow \mathbf{1} \\
\boldsymbol{K_6} &= \frac{\mathbf{1}}{(\boldsymbol{X_8} + \boldsymbol{X_9})} \\
\boldsymbol{K_6} * (\boldsymbol{X_8} + \boldsymbol{X_9}) &\rightarrow \mathbf{1}
\end{aligned}\right\} \quad (2)$$

The integral indicator (IN-account) consists of 9 indicators, adjusted by 6 weight coefficients in the normal efficiency of innovation should have a value of about 6 (formula 3).

The integral indicator (IN-account) consists of 9 indicators, adjusted by 6 weight coefficients in the normal efficiency of innovation should have a value of about 6 (formula 3).

$$\mathbf{IN} = \sum_{n=1}^{6} \boldsymbol{A_n} = \sum_{n=1}^{N} \boldsymbol{K_n} * \boldsymbol{X_n} \rightarrow \mathbf{6} \quad (3)$$

$\mathbf{A_n}$ indicators characterize the effectiveness of 3 processes of innovation: implementation, implementation and development.

Indicator $\mathbf{A_1}$ characterizes the effectiveness of the process of innovation.

Indicator $\mathbf{A_2}$ describes the effectiveness of the process of introduction of innovative activities (activities for the development (implementation) of innovative projects, production technologies, etc.).

Indicator $\mathbf{A_3}$, $\mathbf{A_4}$, $\mathbf{A_5}$, $\mathbf{A_6}$ describes the effectiveness of various aspects of the development of innovation (scientific

activities; work to bring completed research and development and technological works (R & d) to the level of innovative projects (products, goods, technologies, etc.)).

If $\mathbf{A_n = 0}$, then this situation indicates either the absence of operations for innovation or zero effectiveness of innovation activities in a certain area.

If $\mathbf{A_n \approx 1}$, then this situation means the normal efficiency of innovation.

If $\mathbf{A_n > 1}$, then this situation means good innovation performance. The higher the $\mathbf{A_n}$, the more effective the innovation.

If $\mathbf{A_n < 1}$, then this situation means unsatisfactory efficiency of innovation.

If **IN < 6**, it means the overall poor innovation performance of the enterprise, and may indicate operations on a particular field of innovation.

If **IN ≈ 6**, this situation means the overall normal efficiency of the innovation activity of the enterprise.

If **IN > 6**, then this situation means the overall good efficiency of the innovation activity of the enterprise.

Optimize the values of these parameters, i.e., achieve acceptable desirable values, will contribute to the achievement of the financial goals of the company. On the basis of comparison of **IN-accounts** of companies it is possible to estimate competitiveness in innovative activity with the main competitors or with the average industry companies.

The MSU model is an algorithm for integrated assessment of the efficiency of innovative activity of the enterprise, based on a comprehensive accounting of the most important indicators ($\mathbf{X_n}$ coefficients) that diagnose the effectiveness of innovative activity. The MSU model includes an optimal set of indicators that allows to objectively measure the components of innovation (Table 1).

Calculation and significance of the coefficients of X_n are represented in formulas 4 through 12.

The profitability of innovation (X_1) is calculated by the formula 4.

$$\boldsymbol{R_{in}} = \frac{(\boldsymbol{P} * \boldsymbol{K_i})}{\boldsymbol{SI}} \tag{4}$$

where: $\boldsymbol{P}$ – net profit (profit after income tax, profit to be distributed); $\boldsymbol{SI}$ – the cost of R & d (research and development) for innovation (innovation); $\boldsymbol{Ki} = \frac{\boldsymbol{Vi}}{\boldsymbol{V}}$ – coefficient of innovation sales (the ratio of revenue from the sale of innovative products $\boldsymbol{Vi}$ to total revenue $\boldsymbol{V}$); $\boldsymbol{V}$ – net revenue, revenue from the sale of products, goods, works, services, in other words, all revenue received by the company minus taxes calculated from it (VAT, excise duties and similar mandatory payments); $\boldsymbol{V_i}$ – net revenue from the sale of innovative products.

Profitability of innovation shows what percentage of net profit the company receives from each ruble (or other currency) invested in the creation of innovation.

TABLE I. THE COMPOSITION OF INDICATORS OF THE MODEL MSU

Indi-cator	Coef-ficient	Name / originality	Calculation formula
A_1	X_1	R_{in} the profitability of the innovation (author)	$P * K_i$ / SI
	X_2	RPR_{in} return on sales innovation	$P * K_i$ / Vi
A_2	X_3	N_{in} effectiveness of innovation	NVin / NSin
A_3	X_4	IN_{SI} the ratio of innovation costs (author)	SI / SS_P
A_4	X_5	IN_{SSO} coefficient of innovative training and retraining of personnel (author)	SSO_{IN} / SSO
	X_6	IN_{NA} coefficient of innovation of intangible assets (author)	NA_{IN} / NA
A_5	X_7	W_{ZP} salary level of employees engaged in innovation	ZP_{IN} / ZP
A_6	X_8	K_{UOPF} the coefficient of flexibility of the equipment	OPF_U / OPF
	X_9	IN_{OPF} the innovative factor of progressivity of the basic production assets (author)	OPF_{OIN} / OPF_O

Return on sales of innovation (X_2) is calculated by the formula 5.

$$\boldsymbol{RPR_{in}} = \frac{(\boldsymbol{P} * \boldsymbol{K_i})}{\boldsymbol{Vi}} \tag{5}$$

Return on sales of innovations shows what percentage of net profit the company receives from each ruble (or other monetary unit) sold innovative products.

The effectiveness of innovation (X_3) is calculated by the formula 6.

$$\boldsymbol{N_{in}} = \frac{\boldsymbol{NVin}}{\boldsymbol{NSin}} \tag{6}$$

where: $\boldsymbol{NVin}$ – the number of innovations introduced as a result of their own R & d (inventions, know-how, innovative solutions, ideas) for the t – period (in years); $\boldsymbol{NSin}$ – the number of created (developed) innovations as a result of their own R & d (inventions, know-how, innovative solutions, ideas) for the t – period (in years).

An indicator of the effectiveness of the introduction of innovations shows the ratio of embedded to the developed innovation. The innovation cost ratio (X_4) is calculated by the formula 7.

$$\boldsymbol{IN_{SI}} = \frac{\boldsymbol{SI}}{\boldsymbol{SS_P}} \tag{7}$$

where: $\boldsymbol{SS_P}$ – the total cost of production.

The innovation cost ratio shows the proportion of R & d costs for innovation in the overall cost structure of production.

The coefficient of innovative training and retraining of personnel (X_5) is calculated by the formula 8.

$$\boldsymbol{IN_{SSO}} = \frac{\boldsymbol{SSO_{IN}}}{\boldsymbol{SSO}} \tag{8}$$

where: $\boldsymbol{SSO_{IN}}$ – the sum of the costs of training of creation of innovations; $\boldsymbol{SSO}$ is the sum of the costs of training, retraining of workers.

The coefficient of innovative training and retraining of personnel shows the proportion of training costs to create innovations in the overall structure of the cost of training, retraining of employees.

The coefficient of innovation of intangible assets (X_6) is calculated by the formula 9.

$$\boldsymbol{IN_{NA}} = \frac{\boldsymbol{NA_{IN}}}{\boldsymbol{NA}} \tag{9}$$

where: $\boldsymbol{NA_{IN}}$ – types of intangible assets related to innovation; $\boldsymbol{NA}$ – total amount of intangible assets.

The coefficient of innovation of intangible assets shows the proportion of intangible assets associated with the introduction of innovation in the overall structure of intangible assets.

The salary level of employees engaged in innovation (X_7) is calculated by the formula 10.

$$\boldsymbol{W_{ZP}} = \frac{\boldsymbol{ZP_{IN}}}{\boldsymbol{ZP}} \tag{10}$$

where: $\boldsymbol{ZP_{IN}}$ – the average salary of employees engaged in research and development of innovations in the enterprise per month; $\boldsymbol{ZP}$ – the average salary of employees per month.

This indicator characterizes the degree of motivation of personnel engaged in the development of innovations, by assessing the average level of wages of specialists engaged in research and development, in relation to the average level of wages in the enterprise.

The coefficient of versatility of the equipment (X_8) is calculated by the formula 11.

$$\boldsymbol{K_{UOPF}} = \frac{\boldsymbol{OPF_U}}{\boldsymbol{OPF}} \tag{11}$$

where: $\boldsymbol{OPF_U}$ – average cost of basic production assets of the enterprise purpose; $\boldsymbol{OPF}$ – average cost of basic production assets of the enterprise.

This coefficient characterizes the degree of equipment of the enterprise with universal equipment, the use of which is possible in a wide range of technological operations.

The coefficient of innovation progressiveness of fixed assets (X_9) is calculated by the formula 12.

$$\boldsymbol{IN_{OPF}} = \frac{\boldsymbol{OPF_{OIN}}}{\boldsymbol{OPF_O}} \tag{12}$$

where: $\boldsymbol{OPF_{IN}}$ – the residual value of equipment (fixed assets) involved in the innovation process at the end of the period; $\boldsymbol{OPF_O}$ – the residual value of all equipment (fixed assets) at the end of the period.

This coefficient shows the proportion of equipment (fixed assets) involved in the innovation process in the overall structure of all equipment (fixed assets).

Numerical values of weight coefficients (K_n) for individual industries can be derived, if you assign reference values of indicators (coefficients X_n). Real X_n coefficients can be determined only on the basis of operational and management accounting data of each individual company. Based on the data of financial statements it is impossible to draw conclusions about the effectiveness of innovative activity of the enterprise.

For K_n, the definition of the basic model of MSU (means the overall normal efficiency of innovation activity of a certain sphere of activity) with which the effectiveness of innovation activity of the studied organizations will be compared.

III. RESULTS

The result of the application of the proposed model MSU is the evaluation of each component of innovation, as well as its integral value, which determines the overall assessment of the effectiveness of innovative activity of the enterprise in the analyzed market segment. The formed evaluation system characterizes the main aspects of innovative activity of the enterprise. It includes the optimal composition of indicators that allows you to objectively measure the components of innovation, to establish the dynamics and relationship of General and particular trends in its development, can serve as a tool to identify promising areas of innovative development, as well as to form a sufficient amount of information management accounting of innovation.

Among the main advantages of the proposed model MSU can be attributed to its ease of use in combination with the practical completeness of the information contained therein.

Information on the state of innovative activity of the enterprise helps to increase the validity of management decisions in the direction of innovative development [13; 14].

IV. CONCLUSION

«The strategy of spatial development of the Russian Federation for the period up to 2025» has set, among other things, the task of promoting the development of territorial zones, through a special regime of doing business, while the document is extremely limited to formulate methods and approaches to its solution. Meanwhile, the effective use of such a form of spatial support for the processes of reindustrialization is possible only on the basis of detailed study of legal norms that form the «special legal regimes» of the territories, as well as improving the system of public administration on the basis of modern methods of «quality» regulation. The need to use such a concept in our country is enshrined in the Concept of long-term development of Russia until 2020, which as one of the goals stated «ensuring high quality regulation» [15; 16].

The task of promoting the development of special territorial zones formulated by the policy document is traditionally considered as a system of special actions in the form of a special administrative and economic regime, including financial, tax, customs, administrative, etc. Such regimes include a large number of benefits and preferences, which are currently used in most cases formally and randomly. As a result, the task of revising the mechanism and the objectives of their provision arises. The basis for the provision of benefits and preferences should be the

assessment of the innovative efficiency of economic entities with special conditions for doing business. Namely, the innovative efficiency of economic entities should form the financial and tax mechanism of economic growth of the country. The use of the author's model MSU allows to solve this urgent problem.

The results of innovation embodied in investment, new high-performance production and technological systems, for many EU countries can hardly be considered a significant factor in economic growth. The main source of growth, in General, are the scale of investment activity. At the same time, in a number of European countries, at least a quarter of production in recent years is achieved due to the innovation factor [17].

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