Effectiveness of Management of Innovative Activities in Regional Socio-Economic Systems

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Abstract:

Development of innovative activities in Russia's economy is determined by its character in regional socio-economic systems, as a basis of national economy. Increased attention to regional management is caused by the fact that various problems and tasks of a certain area cannot be solved at another level. Basic problems of modern management include the development of innovative activities which ought to form favorable conditions for positive dynamics of innovational sphere that influences the competitiveness of the area and, consequently, of economic development. Orienting at the specifics of business activities, regional authorities, while taking into account the level of innovational activity of their area, should form effective tools for managing innovational processes. At present, management of innovational development of regional socio-economic systems requires paying attention to peculiarities and factors of external and internal environment, according to economic, social, and political aspects of development of a territory and country on the whole. The authors offer the indicator "effectiveness of management of innovative activities in regional socio-economic systems" and substantiate its content as a meaningful feature for managing innovative activities of an area, which is formed under the influence of endogenous and exogenous factors. Effectiveness of management of innovative activities in regional socio-economic systems is determined by tandem usage of two values of "controllability of innovational process in region" and coefficient of effectiveness of management of innovative activities in regional socio-economic systems.

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1.   Introduction

Scientific and business society's acknowledgement of the role of innovations in successful economic development determined the swiftness of various processes in this sphere, the support for which became one of the national priorities several years ago. Experts often pay attention to certain examples of dynamic development of territories and substantial increase of expenses for innovational development. However, in view of positive processes in this sphere, there are no quantitative and qualitative changes in macro-economic situation yet. The problem of determination and evaluation of effectiveness of management of innovative activities in regional socio-economic systems is one of the most complex and disputable ones; unfortunately, it remains unsolved.

According to scientists, effectiveness of management is aimed at evaluation of efficiency of this process. International standards of quality say that this is the level of implementation of planned activities and achievement of planned results. That is, the more precise is the achievement of the planned goal, the better is the efficiency (Raizberg, Lozovskiy & Starodubtsev, 2005). Russian scientists use the notions of performance and efficiency as synonymic ones. Thus, under these conditions, it is possible to speak of evaluation not of performance, but of efficiency of management of innovative activities in regional socio-economic systems.

Performance of management of innovative activities in regional socio-economic systems is the basis for innovational development of the country, under the condition of taking into account the specifics of natural & geographical, industrial & technological, and scientific resources of territories, i.e., initial conditions for transformation and changes.

Efficiency of the system of management of innovative activities in regional socio-economic systems is reflected in the indicators of innovational development and region's potential. Thus, evaluation of performance of management of innovative activities in regional socio-economic systems is brought down to evaluation of quantitative and qualitative indicators, characterizing the efficiency of the use of innovational potential.

As of now, there is no single approach to evaluation of indicators of performance of management of innovative activities in regional socio-economic systems, which reduces the performance of evaluation of efficiency of state innovational policy both at regional and federal level, as well as analysis of spending the budgetary provisions.

2. Research Methods

The whole methodological instrumentarium as to evaluation of effectiveness of management of innovative activities in regional socio-economic systems, offered by economists, is developed according to classical principles of analysis:

1) unity of analysis and synthesis, where it is offered to divide the analyzed complex phenomena and items into components, for the purpose of thorough research of their individual features and then study the existing interconnections and interrelations between them;

2) determining leading link (factors ranking), where the goal is set, and possibilities for achieving this goals are determined. At that, it is necessary to determine the main (basic) link;

3) comparability of analysis (volume, quality, time, risk factor, methodologies for receiving information, conditions for the use of analysis objects);

4) timeliness and speed of performance;

5) possibility of quantitative certainty.

When evaluating the results of innovative activities, a special role belongs to the following data: time factor, expenses, life cycle of object, multivariance of innovations and comparability of alternative variants as to sales volumes, quality, term of investments, results, methodologies of receiving information, and risk factors (Pilipchuk, 2000).

Methods of evaluation of efficiency of innovative activities include:
– non-formalized, which are based on characteristics of the procedure and logical conclusion, without building analytical dependencies. As a rule, these methods allow determining and generalizing the opinions of experts and using their experience and non-traditional approaches to analysis of activities;
– formalized, which are based on previously set strict dependencies and rules. These methods include: economic & mathematical (their use is based on the selection of the best and the most optimal variant which determines business solution under the planned or existing economic conditions), the most popular of which are analytical, statistical, graphical, balance, and other methods;
– complex, which include combinatorics, situational modeling, topology, graphical semiotics, etc. These methods were formed through integration of expert and formalized methods.

Ranking is an actual and popular methods, allowing evaluating the results of management of innovative activities of regional socio-economic systems which takes into account multifactor nature of phenomena and processes and qualitative content. Ranking methods is a quantitative evaluation of qualitative state of studied objects in aggregated form.

Review of informational environment shows that as of now, the niche of informative representative rankings of innovational development is not occupied. The main drawback of this circumstance is nontransparency of innovational development of regional socio-economic systems for wide audience.

Among the modern methodologies, the ranking of regions as to the levels of innovational development, offered by Gusev A.B. (Gusev, 2008) should be mentioned. The methodology includes parameters which determine the level of innovational development of regions and tracking the results of state statistics, as well as economic & mathematical instrumentarium of receiving the aggregate ranking evaluations. When determining ranking, it is necessary to pay attention to criteria of innovational development of territory, which should be divided into two groups: first – factors describing the level of territory susceptibility to innovations; second – parameters of innovational activity of territory (Fig. 1).
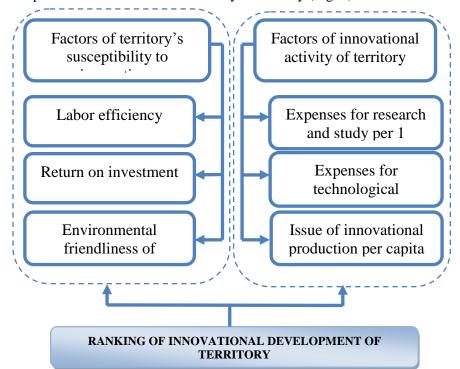
Fig 1. Factors of innovational susceptibility of territory to innovations and innovational activity

The methodology of ranking, offered by the authors, is relatively simple and transparent. According to each criterion, the maximal value is determined which corresponds to indicators of territory activities. Then it is necessary to determine the values of these indicators as to regions in per cent, as ratio to maximum found value. As, according to the authors, each of enumerated criteria has similar share in final indicator, indices of innovational susceptibility and activity of the territory are calculated as arithmetic mean of their criteria components (Gusev, 2008).

Overall estimate of ranking of innovational development of territory is arithmetical mean of weighted coefficients of innovational activity and innovational susceptibility. Obvious advantages of proprietary instrumentarium are subject to criticism from economists, as ranking has limited efficiency, being limited by specific set of factors which are taken into account during the study. This aspect can be referred to analytical models and approaches, but it can be either significant, or non-significant – depending on the used set of factors.

Modern economics offers various methodologies which allow evaluating innovative activities of region and his potential from the position of possibility for formation of innovational and active economy. As a rule evaluation of innovational potential supposes the use of set of indicators which is characterized with different components. In this case, the compatibility of the used indicators is very important (Alekseev, 2009).

Thus, T.V. Pogodina offers a functional model which evaluates innovational activity and competitiveness of regions with the use of statistical indicators, including (Pogodina, 2004):
- determining internal expenses for research and development as a percentage of gross domestic product or gross regional product;
- determining expenses for technological innovational as a percentage of gross domestic product or gross regional product;
- determining the share of main funds for research and development as a percentage of total cost;
- determining the share of employed population in research and development as a percentage of total number of employed.

Functional model of T.V. Pogodina has the following form:
$R = 0,3X_1 + 0,2X_2 + 0,2X_3 + 0,3X_4$.
This model is the basis for ranking of the analyzed territories. Drawbacks of this model includes the fact that it uses limited set of indictors and that it is based on

general regularities of development of innovational activity in one specific region, which leads to inaccuracy during determination of the results of innovational activity of other regions.

The author E.V. Skurikhina states that "complex of measures for evaluation of investment & innovational potential of a region supposes the presence of scientifically reasoned and practice-oriented system of indicators, as well as presence of statistical database. It is very important and significant fact that the indicator of investment & innovational potential of territory not only predetermines the perspectives of territory development but determines the level of readiness for creation, management, and distribution of various types of innovations, for implementation of the results of innovative and investment activities" (Skurikhina, 2012).

V.K. Zausaev and others recommend using five groups of indicators which allow evaluating the innovational potential of a region (Zausaev & Bistritskiy & Krivoruchko, 2005):

1st group – macro-economic (gross regional products; number of economically active population; income per capita, etc.);
2nd group - infrastructural (number of organizations using communicational and informational technologies, number of insurance companies, etc.);
3rd group - legal (local laws regulating innovative activities and providing tax and other subsidies for subjects of innovative activities);
4th group - HR (number of employees employed in the sphere of science, R&D, etc.);
5th group - economic (volume of innovational production as to the level of novelty; current internal expenses for R&D, etc.).

This methodology is built and based on expert evaluations, which requires finding coefficients of value for all indicators and finding integral value through summation. However, this methodology has its drawbacks. We think that, while evaluating innovational potential, it is necessary to use indicators of state and usage of main capital. Also, we recommend including indicators of informational & communicational technologies.

Russian scientist P.A. Orekhovskiy understand the evaluation of innovational potential of region as using limited quantity of parameters: internal expenses for R&D (thousand rubles); entry of patent applications and issue of security documents; staff dealing with R&D, etc. (Orekhovskiy, 2007).

These indicators show that evaluation requires many-sided and, to some extent, disparate indicators which are presented in absolute values. This approach is applicable only for practically identical territories – in opposite case, comparison of indicators will be incorrect. We think that this methodology does not provide accurate results as to determining innovational development of territories.

The issues of development of innovative activities of territories are being solved by international organizations which deal with development of their own systems of indicators showing the level of innovational potential of the country (territory) (Lundvall, 1992; Nelson, 1993; Sverker, Staffan, Soren, Christer & Teknlic, 2000). The examples of these developments are the following:

1. Index of scientific & technical potential, offered by the World Economic Forum as a part of integral indicator for evaluation of country's competitiveness. This methodology provides possibilities for sustainable economic growth (mid-term and long-term), depending on the following categories: macro-economic environment, state institutes and technologies. Index of scientific & technical potential is determined by the analysis of the following data: firstly, by the number of patents per 1 million people; secondly, by the country's position as to development of technologies; thirdly, by the volume of foreign investments into development of innovative activities of organizations; fourthly, by the number of the Internet users per 10,000 people, etc.

2. The Commission of European Communities presented the system of indicators for evaluation of innovative activities, which is used for comparing evaluations of development of innovative activities in the EU members, as well as for comparing them to indicators of the USA and Japan (Kazantsev & Leora & Nikitina & Rubwalter & Firsova, 2009).

The offered system of innovational indicators of the Commission of European Communities includes sixteen indicators which are divided into the following groups:
1) labor resources;
2) new knowledge and knowledge generation;
3) use of knowledge and its transfer;
4) financial support for innovations and their effectiveness.

The offered methodology allows evaluating innovative activities through comparison of results of various countries and determining the spheres in which additional efforts are required from commercial structures and the state. However, the given parameters for evaluation of innovative activities do not include the

analysis of investments into human capital, of possibilities and quality of educational systems, acquiring new equipment (new technologies), etc.

3. Indicators which characterize the rate, level, and dynamics of innovational economy for developed and developing countries are published annually by the Organization for Economic Cooperation and Development. The system of indicators of the Organization for Economic Cooperation and Development includes: share of high-tech sector of economy in the production of processing industry and services; innovational activity; volume of investments into the knowledge sphere (public and private), including expenses for higher education, R&D, and development of software; development and issue of informational and communicational equipment, software, and services; number of the employed in the sphere of knowledge, high-tech, etc. (Shevchenko, 2005).

In view of global experience, peculiarities of distribution of innovational potential on the territory of the Russian Federation, formation and implementation of innovational policy by the subjects of the Russian Federation for analysis of innovational activity of the territory, we think that it is necessary to use specific indicators which determine innovational activity of the subjects of the Russian Federation, which is to be adapted to current and accessible statistical information (Table 1).

Table 1. Adapted system of indicators of innovational activity of the subjects of the Russian Federation

#	Indicator and unit of measurement
I. Innovational potential	
1.	Share of citizens with higher education and employed in the economic sphere of the subject of the RF in total average annual number of the employed on region's economy (%)
2.	Share of employees of state civil service which increase qualification, per 1,000 of employed in region's economy (%)
3.	Internal expenses for scientific research and development from the assets of entrepreneurial sector organization (% of total expenses for innovational developments)
4.	Expenses for technological innovations from own assets of organizations (% of total expenses for innovations)
II. Innovational infrastructure and innovational climate	
5.	Share of organizations of innovational infrastructure in the total number of organizations and enterprises (%)
6.	Expenses for technological innovations from all sources, except federal budget (% of gross regional product)
7.	Share of organizations with cooperative ties for development of technological, marketing, and organizational innovations, in total number of innovational enterprises (%)
8.	Share of organizations in sectors of communication, research, and development, in total number of organizations (%)
III. Effectiveness of innovative activities	

9.	Share of staff employed in sectors of communication, informational & communicational technologies, R&D, in total number of employed in region's economy (%)
10.	Number of created leading production technologies per 10,000 employed in region's economy (item)
11.	Number of patent applications for inventions and useful models per 10,000 employed in region's economy (item)
12.	Share of organizations performing technological, organizational, and marketing innovations, in the total number of organizations (item)
13.	Share of internal expenses for R&D in the total volume of supplied goods, performed works, and services (&)
14.	Volume of innovational goods, works, and services in the total volume of supplied goods, performed works, and services (%)
15.	Share of innovational products, works, and services of innovational nature, exported from the Russian Federation, in the total volume of supplied goods, performed works, and services (%)

The procedure, related to adaptation of the indicators system, reduces the possibility of comparing by the European indicators of regional innovational reviews, but, however, this allows solving another important task of creation of indicators system which will be suitable for comparing and monitoring the analysis of innovational activity of the subject of the Russian Federation.

On the basis of these indicators, it is possible to determine the integral index of innovational activity of the subjects of the Russian Federation which includes: innovational potential; innovational infrastructure and innovational climate; effectiveness of innovative activities.

These indicator systems are aimed mostly at the process of evaluation of innovational potential of developed countries, so the following important factors are not taken into account: firstly, the level of development of innovational potential; secondly, top-priority directions of state authorities as to the issues of innovational development. Lack of elaboration of the above factors, which are peculiar for developing markets, provide limitations for stimulation of innovative activities.
We think that apart from general traditional indicators, it is necessary to evaluate the effectiveness of innovational processes which influence socio-economic development of territory (share of innovative activities of analyzed territory; indicators of socio-economic utility of innovations; share of innovations in budget of region (country) etc.). Calculation and analysis of these indicators in Russia is limited by lack of necessary information (in particular, by the example of region) and lack of methodological instrumentarium of their calculation in view of the main components of innovational potential. There is no scientific substantiation of necessary and sufficient number and content of indicators which allow evaluating innovational potential. We think that these gaps acquire special significance in the globalizing innovational society (Shevchenko, 2005).

The authors of the research offer the methodology for evaluating the effectiveness of management of innovative activities of regional socio-economic systems.In our case, it is necessary to use the principle of unity of analysis and synthesis of evaluation of effectiveness of management of innovative activities in regional socio-economic systems, which would include analysis as of the system itself and of its sub-systems. Thus, the offered methodology consists in separate evaluation of effectiveness of management of innovational processes at regional level on the whole, and particular evaluation of effectiveness of management of innovative activities in regional socio-economic systems. In its turn, innovational processes, which are the objects of management at all levels, would be under the influence of endogenous and exogenous factors.

Determining real factors which hinder and facilitate the development of innovational potential in regional socio-economic systems is the most important vector in management of innovations.

Factors of influence of external and internal environment include four categories:

First category – social, psychological, and cultural factors. They show opposition against various changes and reorganization in socio-economic systems. However, in view of the main endogenous and exogenous factors during the development of methodology for evaluation of effectiveness of management of innovative activities in regional socio-economic systems, it is necessary to determine key indicators of effectiveness of the process of management.

Second category – economic and technological factors. This category arises from the insufficiency of financing of innovational project, aged scientific & technological base, domination of interests of existing production, which influence the development of innovative activities in a negative way.

Third category – polytechnic and legal factors, substantiation of which consists in interconnection of limited development of innovative activities with imperfection of legal system (tax, antimonopoly, patent & licensing, etc.).

Fourth category – organizational & managerial factors which hinder the processes of development of innovative activities (organizational structure which does not correspond to new requirements; imbalance of goals and interests of main members of innovative activities; priority in short-term policy).

We think that criteria for evaluation of effectiveness of management of innovative activities of regional socio-economic systems should include two sub-groups of indicators: economic and complex.

Economic indicators are the most accessible and utilized for evaluation of effectiveness in terms of money. In order to provide the unity of work of all sub-systems of regional socio-economic system, the process of management should be aimed at determination of top-priority development vectors which are expressed by achievements of economic indicators. However, effectiveness should not be brought down to evaluation of economic indicators. At present, it is important – in economic aspect – to use the complex analysis of efficiency.

Analysis of efficiency is the result of systemic measures as to determining ingoing and outgoing resources, their evaluation and transformation. Elements of this system includes: external environment; form of labor organization; supply; organizational structure; production technologies, etc. (Yampolskaya, 2003).

Key indicators of evaluation of effectiveness of management of innovative activities in regional socio-economic systems are shown in Table 2.

Table 2. Indicators of evaluation of effectiveness of management of innovative activities in regional socio-economic systems

Direction	Characteristics	Calculation tools
Profitability	Characterized by effectiveness – i.e., profitability of activities for the given socio-economic system. The indicator allows determining the percentage of odds of incomes (received profit) over expenses.	Maximal value of ratio of outgoing profit, received as a result of process, and of the volume of all ingoing expenses.
Cost	Evaluation and ratio of various projects as to volume of total costs. Evaluation of structure of costs for determining the direction of spending resources.	Minimal totality of all costs in terms of money.
Productivity	Determining the volume of production of goods (works, services) of the given socio-economic system	Maximal quantity of goods (works, services), received over a certain time period.
Adaptability	The indicator determines the capability to react to all changes in external environment. The indicators supposes the possibility of using flexibility of all economic cycles, measured by multitude of variants, which are used for management of innovative activities in regional socio-economic systems	Minimal time, required for adaptation to transformation of external and internal conditions.
Length	The indicator allows determining the time required for the process performance. That is time period required for finishing the process of transformation from the start till finish.	Minimal time period from start till finish of the process.

Significance of the above indicators of effectiveness of management of innovative activities in regional socio-economic systems was determined by the methods of expert evaluations, the results of which are shown in Table 3.

Table 3. Results of expert evaluations, determining the significance of indicators of effectiveness of management of innovative activities in regional socio-economic systems

Main directions	Priority ranks, assigned to directions by experts					General rank
	1	2	3	4	5	
Profitability	2	1	1	1	1	1
Cost	1	2	2	2	3	2
Productivity	3	4	3	3	2	3
Adaptability	5	3	4	4	4	4
Length	4	5	5	5	5	5

The results of evaluation shows the primary task of implementation of the direction "profitability", as one of the ley indicators for evaluation of effectiveness of management of innovative activities in regional socio-economic systems.

Innovative activities of regional socio-economic systems shows economic sustainability, efficiency, paying capacity, and competitiveness, which is largely determined by intensity of generation of profitability. Profitability is the main sources of operative and strategic development; besides, it is a possibility for the growth of business and capital.

3. Analysis Result

Thus, the procedure of determining the effectiveness of management of innovative activities in regional socio-economic systems should be oriented at acquisition of maximal profit, the best proportion between formed profit and allowable level of risk, and capability for constant growth of system cost. For all decisions of marketing aspect, organization of production processes, development and reorganization, expansion and diversification of activities, HR policy, logistics, financial management, substantiation and implementation of projects which are set for investments are reflected at system's profitability.

The results of conducted expert evaluation shows that indicator of profitability should be a basis for calculation of offered methodology of evaluation of

effectiveness of management of innovative activities in regional socio-economic systems.

Thus, образом, effectiveness of management of innovative activities in regional socio-economic systems is a completely new stage in the system of management of innovations at the level of region, which is based on the influence of endogenous and exogenous factors; it is determined by comparing indicators which, on the one hand, show the results of work of regional authorities as to innovational development of territory, and, on the other hand, show the results of innovative activities in socio-economic systems which function on this territory.

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