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Creation of Modern Region Innovation Infrastructure Development Management Technologies

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Creation of Modern Region Innovation Infrastructure Development Management Technologies

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Abstract. The article highlights the main problems and features of the innovation infrastructure development within the regional management. Innovative infrastructure in modern conditions of development is one of the strategic directions of development of science, the equipment and production in the country. Thus, one of the key problems concerning the development of innovation infrastructure in the regions is the lack of a single coordination mechanism that performs service functions between all the parties in the innovation process. The authors propose the introduction of a single Coordination center for the development of innovation infrastructure at the levels of management, performing the functions of planning and forecasting innovation processes, analysis and evaluation functions, information and coordination support, methodological support, control in the field of innovation. Introduction of the Coordination center of development of innovative infrastructure in the Russian Federation is based on integration approach and will allow participants of innovative process to increase the level of efficiency, effectiveness and commercialization of innovative activity, to create the uniform platform of management of innovations in the country. Development of uniform integration processes in the sphere of innovations is directed to interaction on three levels of management: federal, regional, local it is also focused on development of both small, and large innovative business.

1. Introduction

It is known that the regional innovation subsystem is derived from the subsystems of higher levels. Naturally, the Federal purpose-oriented programs in the field of innovation, state programs and integrated program development within the framework of program-oriented approach are transmitted to Russian Federation subject in order to achieve established targets and obtain a synergistic effect. In addition, today, regional science and technology are developing in the areas of advanced world research in the field of information, telecommunication technologies, nuclear power and other alternative energy sources, biotechnologies, new materials with desired qualities, etc. Thus, the regional innovation subsystem plays an important role in shaping the prerequisites for the formation of the Russian Federation on the innovation path of development in the context of globalization and digitalization of modern society.

In this sense, innovation is a priority for science, technology and production development in the Russian Federation. It should also be noted that the innovation sector is accompanied by high risks and uncertainties, which contributes to the need to develop appropriate tools in the field: the policy of innovation development of the country; the methodology of state support for the development, the implementation and commercialization of innovations; the improvement of normative and legal support



of the innovation business environment, etc. The main problems of the innovation sphere functioning at the level of the country and regions are considered by the researchers [4, 7, 8].

2. Main aspects of innovation infrastructure of the region

2.1. Functions and forms of realization of innovation infrastructure of the region

In addition, the development of complex economic systems necessitates the creation of an effective platform focused on the maintenance and improvement of the processes that ensure their functioning. Such role, concerning innovation, is played by innovation infrastructure. In accordance with the current normative and legal support, innovation infrastructure refers to a set of subjects of innovation activity (research institutions, Higher Education institutions, innovation and technology centers, technology parks, special economic zones, collective use centers, development funds and other specialized organizations), resources and funds that provide material and technical, financial, organizational and methodical, informational, consulting and other innovation services. The development of the region's innovation infrastructure is an important element in the innovation process of the country.

In this connection, the authors identified the main functions of the innovation infrastructure of the region (see Table 1).

Table 1. Main functions of the innovation structure of the region.

Main functions of the innovation structure of the region	Key aspects
Scientific and technical support	determination of the conditions of access to research and development; ensuring the need for scientific, technical and technological resources; forming the scientific and technical reserve in the subjects of the innovation process, etc.
Financial support	providing preferential conditions for the financing of research and development; determining the tax benefits available to the innovation process participants; forming a list of possible forms and methods of integration of innovation, etc.
Informational security and support	protection of intellectual property rights; development of a single center for the collection and analysis of information flows of the innovation process subjects; protection of information flows of innovation process participants, etc.
Staff assistance	forming the human capacity of researchers; assessment of the level of human resources innovation activity; provision of staff in accordance with the needs of specific subjects of innovation, etc.
Consulting support	legal and regulatory support; support concerning certification of innovation products (works, services); support concerning insurance of export deliveries of innovation goods (works, services), etc.
Commercial support	definition of markets for the results of research and development; search for the suppliers concerning innovation products manufacture (works, services); commercialization of research and development, etc.
etc.	

Let's consider the main forms of implementation of the innovation infrastructure of the region in the functional areas described above:

1. Scientific and technical support (business incubators, technological parks, scientific and technical clusters, innovation and industrial complexes, etc.).
2. Financial support (venture funds, financial and innovation groups, regional funds for innovation support and development, banking structures, insurance companies, etc.).
3. Informational security and support (innovation statistics centers, innovation information and analytical centers, regional information and innovation networks, etc.).
4. Staff assistance (centers of training and professional training of specialists in the field of innovation activities, higher and secondary education institutions, centers for the recruitment in the field of innovation, etc.).
5. Consulting support (innovation consulting centers, innovation training centers, regional associations of Industrialists and entrepreneurs, etc.).
6. Commercial support (innovation products exhibitions, innovation export centers, intermediary companies promoting innovation products, etc.).

2.2. Innovation infrastructure of the Nizhny Novgorod Region

The problems of innovation infrastructure development are considered by the researchers [1, 9-13]. Thus, one of the main problems in the development of innovation infrastructure in a particular region is the chronic lagging behind and uneven adjacent vectors of innovation development, as modern objects of this infrastructure do not meet the requirements of the XXI century, not mentioning the issues of their uneven placement on the territories of municipal districts and urban districts of the region [5]. It is notable that every year more and more largescale planning for the restoration and reconstruction of old and the development of new innovation infrastructures aimed at increasing the level of providing the municipalities with these objects, which should significantly improve the quality of life of the population of the country's regions as a whole.

In this sense, the study suggests a more detailed analysis of the innovation infrastructure on the example of a particular region, for instance, Nizhny Novgorod region. Thus, Nizhny Novgorod region is characterized by a sufficient concentration of scientific organizations of basic, sectoral and University science, high-tech industries, enterprises of military industry complex and the significant intellectual potential. So, on the territory of Nizhny Novgorod region there are more than 100 organizations involved in basic and applied science, perform scientific research and development; 17 public Higher Education institutions, 2 state Higher Educational institutions, 29 branches of state and non-state Higher Educational institutions [5]. In General, according to the study [5], about 7% of the country's scientific potential is concentrated in the region. The basis of the innovation infrastructure of Nizhny Novgorod region is the following: "Sarov" opened technical park, All-Russian Scientific Research Institute of Experimental Physics-Conversion technical park, environmental technopark of Sarov city, Innovation and Technology Center of Lobachevsky University of Nizhny Novgorod, Nizhny Novgorod Agency of knowledge intensive technologies, "Clever" business incubator of innovation orientation, business incubator of Dzerzhinsk, Nizhny Novgorod regional center of nanoindustry, etc [13-16].

On the basis of the express analysis of Nizhny Novgorod region innovation development indicators for the period of 2014-2016 (see Table 2), presented by the Territorial Body of the Federal State Statistics Service of Nizhny Novgorod region, it can be concluded that there are no significant trends to their further growth.

In this regard, during the meeting with the heads of expert groups of developing Strategies for social and economic development of the Nizhny Novgorod region until 2035, the Governor of Nizhny Novgorod region Gleb Nikitin noted that "the priorities of the Strategy-2035 should be improving the quality of life, economic specialization of the region and innovation infrastructure" (February 12, 2012). Thus, the strategic vector in the field of innovation in the region defined the trend in the development of innovation infrastructure as a key platform for the formation of scientific and technical potential of Nizhny Novgorod region.

Table 2. Nizhny Novgorod region innovation development indicators for the period of 2014-2016.

Indicator	Measuring unit	2014	2015	2016
Innovation activity	%	14.3	13.5	12.8
Number of organizations carrying out research and development	un.	93	101	97
Number of organizations providing postgraduate training	un.	26	25	23
Density of innovation goods, works and services in the total volume of shipped goods	%	1.18	1.15	1.15

3. Introduction of the uniform Coordination center for development of innovation infrastructure

3.1. Scheme of introduction of the uniform Coordination center for development of innovation infrastructure

In this sense, the high role of the innovation infrastructure in working out the effective processes for the development of innovation activities in a particular region contributes to the need to develop modern approaches and tools in this field of research. The authors propose a comprehensive innovation infrastructure management in Russian Federation at the federal, regional and municipal levels through the introduction of a single coordination center (see Fig. 1).

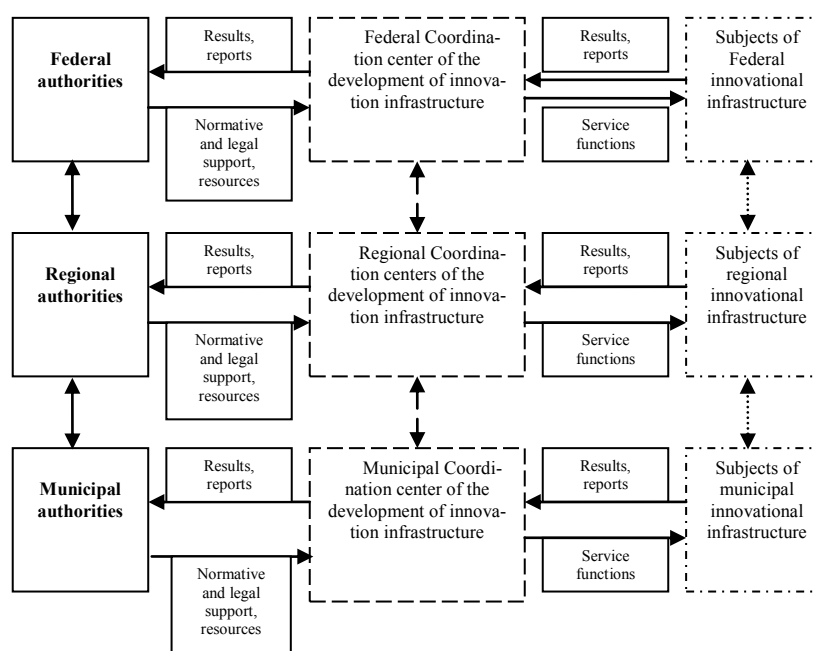


Figure 1. Implementing the single Coordination center of the development of innovation infrastructure on the Federal, regional and municipal levels.

Thus, the proposed model makes it possible to implement the following aspects:

- creating a management structure concerning the development of innovation infrastructure of Russian Federation in accordance with levels, objects and subjects of management;
- allocate the levels of development of innovation infrastructure of Russian Federation (federal, regional and municipal);
- establishing direct and inverse relations between the authorities and the Coordination center of the development of innovation infrastructure and the subjects of innovation infrastructure;

determining the place of the coordination center for the development of innovation infrastructure in the management structure at all proposed management levels;

defining the input and output parameters within the interaction among the participants of the innovation process, etc.

3.2. Major functions of the Coordination center of development of innovation infrastructure in levels of management

The key functions of the proposed implementation of the Coordination center for the development of innovation infrastructure are service ones and presented by the authors in Table 3. Works of the researchers are also devoted to the feasibility of implementing elements of the structure that performs service functions in organizational systems [3,6-8].

Table 3. Major functions of the Coordination center for the development of innovation infrastructure according to management levels.

Func-tions	Key aspects
Forecasting and planning	<p>separate preparation of forecasts and plans concerning the levels of innovation infrastructure development;</p> <p>preparation of consolidated plans and forecasts for the development of innovation infrastructure;</p> <p>carrying out inspections of plans and forecasts for the relevance, completeness, feasibility, efficiency and effectiveness, etc.</p>
Methodical support	<p>methodological support of the formation of a single platform of the development of innovation infrastructure by levels and forms;</p> <p>standardization of the activities of the innovation infrastructure development coordination centre;</p> <p>methodological support of forming forecasts and plans, development of regulations, reporting formats, etc.</p>
Analyzing and assessment	<p>carrying out the plan-fact analysis of plans, forecasts of innovation infrastructure subjects;</p> <p>development of the actions aimed at the achievement of the set targets of innovation infrastructure development;</p> <p>assessment of the level of innovation infrastructure development, etc.</p>
Informational and consulting support	<p>forming and improving the unified information systems to collect data concerning the development of innovation infrastructure;</p> <p>organizing and standardizing the information resources, channels and means of information transfer between subjects;</p> <p>consulting support for the selection of tools for the innovation infrastructure management, etc.</p>
Monitoring and statistics	<p>controlling the progress of plans, forecasts and indicators of innovation infrastructure development;</p> <p>defining the values of the main indicators of the development of innovation infrastructure subjects;</p> <p>determining the monitoring and statistical reporting periods, etc.</p>
Control	<p>controlling the resources, processes and results of innovation activity subjects;</p> <p>monitoring of the achievement of the KPI (Key Performance Indicator) by the subjects of innovation infrastructure;</p> <p>controlling the parameters of external and internal environment of innovation infrastructure entities, etc.</p>
etc.	

The authors note that the introduction of such a coordination center at all levels of management will ensure the effective adoption of strategic and operational management decisions through the development of a unified methodology, coordination and monitoring of actions of all related parties and participants in this process. In addition, their consistent and coordinated actions for the development of innovation infrastructure will not only improve the level of efficiency in the innovation environment of the country, but also increase the level of research and development, improve the innovation climate of regions and municipalities, form the confidence of small innovation enterprises in the current management system and ensure the national innovation competitiveness of the country as a whole.

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