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Influence of the Infrastructure Support for the Innovative Development of the Region on the Efficiency of the Implementation of Innovative Strategies

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***Abstract* — The article analyzes the degree of the impact of infrastructure provision of innovative development of the region on the effectiveness of implementing innovative strategies. The essence and content of the innovation infrastructure of the region is studied. The most important principles of functioning of the innovation infrastructure of the regional economic system are determined. The most important reasons for the expediency of forming the innovation infrastructure of the region in the context of its basic structural and functional elements are noted. Mechanisms of stimulating innovation activity carried out by regional innovatively active subjects of market relations are investigated. The mechanisms of interaction of the main participants of the innovation process at the stage of implementation of the innovation strategy of the region are reflected. The content and essence of the innovation strategy of the region, the principles of its formation and implementation are studied. The most important goals and tasks of the innovative development of the regional economic system have been singled out, the formulation and solution of which should be ensured in the process of implementing the innovation strategy of the region on the basis of favorable innovative and investment conditions created in the process of functioning of the innovation infrastructure. The influence of a group of factors of internal and external genesis on various aspects of the implementation of innovative strategies of the region was noted. The main problems and opportunities to stimulate the effective functioning of the region's innovation infrastructure are presented.**

Keywords* — *Region, innovative infrastructure, innovative strategies, efficiency, implementation.

I. INTRODUCTION

Nowadays the realities of the world economy are such that the high competitiveness of developed countries is provided by new technologies, the development of innovations and human capital. The Russian economy today strives for the transition to an innovative development model, the basis of which is the national innovation system, its structure. Therefore, the solution of the issues of modernization of the Russian economy should be accompanied by a search for new ways to realize the existing potential of individual regions and the state as a whole, as well as the formation of innovative infrastructure facilities [1, 2].

As a consequence, in the short term, regional innovation systems should be formed on the basis of which a national innovation system is created. Therefore, the development of the innovative sphere in the regions, the formation of a regional innovation strategy, the improvement of the mechanisms for federal and regional support of innovation activities and the existence of a favorable economic and legal environment for the operation of innovative enterprises are fundamentally important. It should be noted that in order to solve the set tasks it is necessary to systematically create and develop the innovative infrastructure of the regions [3].

The concept of innovative development of the state currently being implemented is a subject of great discussions in the scientific community. Discussed are questions about who is the subject of innovative development, what is the role

of the state in innovative development, what mechanisms will allow to form an integrated innovation system [4].

According to this Strategy of innovative development of the Russian Federation, the balanced development of the innovation system will be conditioned by an increase in the efficiency of the use of acting innovative structures, as well as the further formation and support of the created innovative clusters. Continuity of the innovation cycle is supposed to be provided with the help of an innovative infrastructure capable of promptly and flexibly implementing the necessary innovations based on high production technologies and meeting market requirements. Its development is seen as a condition for bringing to the market competitive products that appear as a result of the innovation process [5].

The study of the theoretical and methodological foundations of innovative development allows us to conclude that the innovation sphere, which is an integral part of the economic sphere and having its own internal specifics, must also have its own infrastructure, which has both typical and specific features.

As the activity of innovative development is determined by the degree of infrastructure development that allows to form the needs for innovation and provide the necessary range of innovative proposals on the market, the issues of infrastructure development and development of innovations play a very important role in the formation of the knowledge economy, the latest technologies and innovations.

Solving the problems of formation and development of innovative infrastructure requires consideration of such economic categories as innovation infrastructure, innovation strategy, their impact and interrelations with the innovation environment.

II. Methodology

The most important methodological aspects of the investment and innovation processes of the regional economic system were proposed by foreign and domestic scientists J. Schumpeter, R. Cantillon, P. Draker, A. Marshall, G. Markowitz, N.D. Kondratiev, S.Yu. Glazev, I.G. Andreeva, R. Cantillon, A. Marshall, V.Ya. Gorfinkel and others.

Principles and prospects for innovative development are presented in the works of the scientists M. Miller, F. Modigliani, S. Ross, B. Terborg, V.V. Bocharova, Yu.A. Doroshenko, D.A. Endovitsky, I.V. Somina, A.G. Ivasenko, N.V. Kiseleva, A.A. Rudycheva, P.P. Taburchak and others.

Within the framework of the research, the following methods of scientific knowledge:

The method of system analysis, the use of which allows for a comprehensive study of internal structural-functional, causal, hierarchical, direct and inverse relationships, which is necessary to identify complex processes of developing relations in the formation of a regional segment of the national innovation system.

The method of analysis and synthesis, in which a combination of quantitative and qualitative analysis provides the scientific, theoretical and methodological basis for a new approach to the pace of economic development; setting concrete practical problems of economic development; involves identifying the qualitative characteristics of the process and the identification of such elements that can be measured quantitatively; studying the dynamics of the innovation process; Identification of factors that pour on the connections of elements in the common system.

The method of a logical and historical approach, which frees the evaluation of historical development from accidents that are not relevant to this process.

The method of hypothesis promotion, which contributes to the problem of scientific research, which is necessary for the effective conduct of scientific research, verification of probable ways of research and selection of the most rational and scientifically grounded.

III. Results and Discussion

In the current economic competition, those territories that provide the most favorable conditions for the creation and implementation of new scientific and technical ideas, the introduction of promising technologies and developments benefit. That is why the study of the problems of the development of the regional innovation infrastructure and the implementation of the region's innovative strategies, which forms the conditions for the generation of innovations and the development of knowledge-intensive industries, is of particular relevance today [6].

The infrastructure of the innovation system develops primarily in regional economic systems with a high concentration of innovative capacity, a high level of innovation activity. However, one should not underestimate the importance of the creation and effective use of the innovation infrastructure and in those areas where innovation activity is not for one reason or another advanced [6, 7].

Thus, a set of external conditions that are conducive to the creation and development of innovations represent a national innovation system and the sphere of internal conditions represents the innovative potential of the subject, the region, the country in general, i.e, the totality of the various resources available for the implementation of innovation activities [1, 8].

Quite interesting for studying the essence of the national innovation system is the systemic-structural approach of A.D. Nefedieva. Thus, the author proposes to understand under the national innovation system a set of institutions and mechanisms for their interaction within which production, storage and distribution of innovations are carried out. The national innovation system unites the efforts of innovative institutions, organizations and individuals, creating a network of mechanisms for their partnership. At the same time, the author develops the concepts of "production of innovations", performing the functions of scientific research, and "innovation infrastructure", consisting of two subsystems, the first of which is responsible for distribution, cooperation and partnership in the field of innovation, and the second - for implementation of innovation policy of the state and the development of innovative capacity [9, 10].

This approach allows to optimally predicting the duration of the innovation process, the formation of new links between agents of the internal and external environment, enterprises and elements of innovation infrastructure, forming the basis for an efficiently operating innovation system [1, 11].

Based on the accumulated experience and knowledge in the field of innovative development of economic entities, we present the author's definition of such a definition as the innovation infrastructure of the region, which represents a combination of subjects of innovation activity, resources and funds that provide material, technical, financial, organizational -Methodical, information, consulting and other services for innovation activities of the regional economic system [12].

Today, scientists identify four approaches to defining the essence and formulating the goal of creating an innovative infrastructure [1, 13]:

- Creating favorable conditions for the production and implementation of innovations;
- providing access to various types of resources;
- implementation of innovation process stages;
- the functioning of elements of the innovation sphere.

The goals of the creation and tasks of the innovation infrastructure determine the functions performed by its elements [1, 14]:

1. The function of providing resources and their effective use - involves ensuring the implementation of the stages of the innovation process by "financial" and "real" resources (material, intellectual, human resources).

2. Organizational and management function - provides for the creation of an ordered set of interrelated elements of the infrastructure.

3. The function of stimulating innovation activity - involves the creation of such favorable conditions for the implementation of the stages of the innovation process, in which the creation of innovation will be as productive as possible.

The most important principles of the formation and development of innovative infrastructure include [1, 15]:

- systemic and multilevel elements of innovation infrastructure - division by levels of the economic system: macro level - institutional level of management, meso level - level of resource allocation and micro level - innovation production;
- interdependence, interdependence and unity of integral components of the implementation of the innovation process: the material, technical, administrative and information and financial components.
- the flexibility of the mechanism of functioning of the elements of the innovation infrastructure;
- conjugation with the stages of innovation activity - each element of the innovation infrastructure contributes to the implementation of the stage of the innovation process coordinated with its activities;
- functionality - clear delineation of innovation functions by elements, avoidance of duplication;
- efficiency - an expedient and optimal combination of constituent elements which brings a certain effect.

At the table 1 presents the proposed by Yu.V. Yerygin and E.V. Borisova classification of basic elements of the innovation infrastructure of the region, creating a favorable climate for the implementation of the innovation process [1].

TABLE I. CLASSIFICATION OF INNOVATION INFRASTRUCTURE'S ELEMENTS [1]

Characteristic of classification	**Classification of innovation infrastructure's elements**
Level of organization of infrastructure elements	Institutional-state (macro-level elements)
	Regional-managerial (elements of meso-level)
	Production (micro-level elements)
Structure type of the organization of elements	Industrial and technological
	Socio-economic
Functions	Organization and management of innovation activities
	Stimulating innovation activity
	Provision of necessary conditions (provision of resources)
The result of activity of the structure element	The materials (product, technology)
	Information (consulting services, financing)
Influence of Infrastructure Objects	Market-oriented (infrastructure-market)
	Process-oriented (infrastructure-process, focused on the process of creating innovations)
	Product-oriented (infrastructure-product)
Scope of resource application	Material-technical (industrial)
	Information
	Financial
	Staffing
	Administrative and management
Role in the innovation process	Elements that regulate and manage information flows (elements of financial, information subsystems)
	Elements that control the flow of flows (elements of the personnel, administrative and management subsystems)
	Elements that control material and technical flows (elements of material and technical subsystems)
Type of ownership	State (federal property)
	Private-state (regional, municipal property)
	Private (venture funds, private business, enterprises)

The process of creating an innovative infrastructure model is based on a system approach that assumes the consideration of an innovation infrastructure as an organizational

management system for interrelated elements, the role in creating a favorable innovation climate of which must be so great that it is the innovation infrastructure that provides the resource base, coordinates and directs the participants of the innovation process, stimulates the implementation of innovative activities.

As Yu.A. Doroshenko notes, a set of the most important structural and functional elements provides resource, material and technical, technical and technological, research and other opportunities for the implementation of the innovation process. At the same time, effectively functioning innovation infrastructure of the region creates conditions for successful implementation of innovative strategies of the region [13].

Analyzing and summarizing the scientific approaches of scientists to the definition of the essence of this concept, we will characterize the concept of the innovative strategy of the region as a set of objective goals and tools for the development of the regional system, tools for their achievement and resources that ensure the effectiveness of innovation processes and stimulate its innovative activity [16].

We will analyze the most important stages in the implementation of the region's innovation strategy [16]:

1. Analysis of statistical data which is reflects the level of innovative activity of subjects of economic relations in the region.

2. Analysis of the degree of demand for the latest information knowledge and technology.

3. Informing the structures engaged in R & D on the results of the analysis of the demand for the latest information knowledge and technologies.

4. Setting strategic goals for the region's innovative development, taking into account the forecast of the scientific, technological and socio-economic development of the region and the experience of innovatively developed regions and countries.

5. Achievement of the strategic goals of the innovative development of the region through the implementation of regional programs and strategic innovation projects of federal significance.

6. Control of indicators within the framework of implemented innovative programs and innovative projects with the possibility of adjusting tasks and tools for achieving goals.

7. Evaluation of the results of achieving goals of innovative development of the region.

One of the most important foundations for the formation of innovative strategies for the development of the region is the creation of prerequisites and conditions for the accelerated development of modern high-tech industries whose products will possess the properties and quality of the highest level capable of competing in the world market of high-tech products [11]. The creation of regional innovation systems that form the national innovation system should be made exclusively on the modern technological base of the industrial sector, the production of which will be oriented towards the introduction and use of the achievements of the knowledge-intensive sector of the economy. Today, this is perhaps the only way to solve the most acute and worrying problem of Russia's economic development, the quality of the solution of which is the possibility of expanding domestic demand for innovative developments and high technology products, as well as stimulating the flow of private investment resources into Russian innovation and investment projects [17, 18].

IV. EDUCTION

In conclusion, we may note that the solution of the problems of the formation and development of innovative infrastructure occupies a central place in the innovative development of the country as a whole and of a particular region in particular.

It is possible to single out several general principles, which should be guided when creating an innovative infrastructure of the region. First of all, it should be comprehensive, that is, provide services at all stages of the innovation process. Also, the objects of the innovation infrastructure need coordination of activities in their operation, and it is also necessary to interact with similar organizations in other regions to share experiences and expand their own connections and opportunities. Also when forming an infrastructure one should take into account domestic and foreign experience and apply best practices.

It should be noted that the region's innovative strategy, approved and accepted for implementation, will ensure stable and productive relations between state authorities, venture companies, research institutes, technology parks, engineering centers, universities and other participants in the innovative process that form the region's innovation infrastructure. It is important to formulate an innovative strategy, taking into account the role of each of the participants in innovation activity and the resource potential of the region, and also applying the experience of innovatively developed subjects of the innovation process.

V. CONCLUSIONS

Summarizing the main results we may note:

1. Innovative infrastructure performs the organizational function in the economic system.

2. The infrastructure of the innovation system develops in regional economic systems with a high concentration of innovative capacity, a high level of innovation activity.

3. The national innovation system unites the efforts of innovative institutions, organizations and individuals, creating a network of mechanisms for their partnership.

4. The totality of the most important structural and functional elements provides resource, material and technical, technical and technological, research and other opportunities for the implementation of the innovation process.

5. One of the most important foundations for the formation of innovative strategies for the development of the

region is the creation of prerequisites and conditions for the accelerated development of modern high-tech industries.

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