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Forms and Methods of Interaction Between Subjects of Innovation Activity in Regional Innovation Systems

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Abstract: В данной статье рассматриваются основные направления инновационного развития национальной экономики, формы и методы взаимодействия национальных субъектов инновационной деятельности, компоненты национальной инновационной системы и виды (подсистемы) инновационной инфраструктуры. А также изучены основные условия эффективного взаимодействия субъектов инновационной деятельности.

Keywords: инновационной деятельность, инновационный процесс, национальная инновационная система, инновационная инфраструктура, модели инновационного развития.

The process of globalization of the world economy, as well as the crisis phenomena associated with the change of technological structures in the world and national economies, make it relevant to create conditions conducive to the transition of the national economy to an innovative development path.

In particular, to achieve this goal, there is a need to develop such mechanisms and organizational forms that would contribute to the further development of the innovation process, allowing national enterprises to create not only organizational, process or marketing innovations, but also new innovative products that can compete in international markets. In this regard, the main barriers hindering the innovative development of the national economy include absent or weak cooperative ties between scientific organizations and business structures, low involvement of the university community in the development of their own innovation networks, as well as legal and administrative barriers to innovation.

Positive phenomena in the economy that contribute to the development of innovative processes include the growing role of venture capital financing of innovative projects, as well as the development of infrastructure elements for conducting innovative activities, which include business incubators, business accelerators, technology parks, etc. Therefore, for further improvement of the national innovation system, it becomes extremely important to solve problems related to the development of forms and mechanisms that stimulate the demand of subjects of economic relations for innovative developments.In particular, it becomes extremely necessary to develop forms and methods of interaction between national subjects of innovative activity in order to create new innovative products that can compete in international and national markets. This research work is devoted to the problems of developing forms and methods of interaction between the subjects of innovation activity in regional innovation systems for the creation of new innovative products.

The National Innovation System (NIS) is a network of entities and institutions of the country whose activities are aimed at implementing and supporting innovation activities (ID) of national entities of innovation activity.

NIS includes the following components:

1. Normative-legal base of ID, allowing to carry out operations with objects of innovative activity (OID) both inside and outside national borders.
2. Subjects of ID - organizations and individuals involved in the creation, promotion, sale and

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purchase of innovative products.

3. Innovation infrastructure - a set of all subsystems that provide access to various resources that provide certain services to participants of innovative activity.

The process or method of interaction between the subjects of innovation activity (SIA), as a rule, is aimed at solving the following main tasks: the creation, development and transfer of objects of innovation activity.

In turn, the main conditions for effective interaction of LEDs include:

1. active relations between production and science;
2. close relationship between production and consumption;
3. close contacts between innovative enterprises and financial and credit institutions;
4. Informal interactions between government structures and innovative enterprises.

In relation to infrastructure, the following types (subsystems) of innovation infrastructure should be singled out:

- financial: various types of funds (budgetary, venture, insurance, investment), as well as other financial institutions, such as, for example, the stock market, especially in terms of high-tech companies;
- production - technological (or material): technology parks, innovation and technology centers, business incubators, technology transfer centers, etc.;
- information: databases and knowledge, access centers, analytical, statistical, information centers;
- personnel: educational institutions for the training and retraining of personnel in the field of scientific and innovation management, technological audit, marketing, etc.;
- Expert consulting: organizations engaged in the provision of services on intellectual property, standardization, certification, as well as consulting centers, both general and specialized in certain areas (finance, investment, marketing, management, etc.).

Analysis of existing national innovation systems in the world allows us to distinguish four types of NIS. The first of these is conventionally called "Euro-Atlantic" model, the second - "East Asian", the third - "alternative", the fourth - the "triple helix" model.

The Euro-Atlantic model is a model of a complete innovation cycle - from the emergence of an innovative idea to the mass production of a finished product. In countries using this model, as a rule, all components of the structure of the innovation system are represented: fundamental and applied science, research and development, creation prototypes and launch them into mass production. This model is used by developed countries leading in the global competitiveness ratings of national economies (Great Britain, Germany, France, etc.).

The East Asian model is a model of innovative development in the innovation cycle, in which there is no stage of formation of fundamental ideas. The innovative systems based on this model are almost completely devoid of the component of fundamental science (and partly of applied science). This model is used by the countries of the East Asian region (Japan, South Korea, Hong Kong, Taiwan). Being focused on the export of high-tech products, the states of East Asia, as a rule, borrow technology from countries following the "Euro-Atlantic model". The most striking example of this model of innovative development is the innovation system of Japan.

An alternative model of innovative development is used mainly in agricultural countries that do not have significant potential in the field of fundamental and applied science and do not have rich reserves of raw materials, processing technologies, the sale of which could become the basis of national competitiveness. As a result, in such innovative systems, not only a block of fundamental and applied science, but also a high-tech component as such is poorly represented or absent altogether. Not being

able to achieve noticeable results in the creation of new technologies, these countries in their innovation policy focus on training in the fields of economics, finance, management, sociology and labor psychology, as well as on the development of individual sectors of light industry, creative industry and recreation. Much attention is paid to the training of management for local offices of transnational corporations, international banks, international political structures. This model includes the national innovation systems of Thailand, Turkey, Portugal, etc.

And finally, the “triple helix” model, which has received practical implementation in the last decade in the United States, has a fundamental difference from those listed above, not only in the structure of the NIS, but also in the mechanism of interaction of its individual elements. The triple helix model is the latest model for the formation of the NIS, which has been developed on the basis of the Euro-Atlantic model. In its finished form, it does not yet exist in any country in the world. It has received the greatest development in the United States, and its individual elements are being developed in some developed countries of Western Europe, Brazil and Japan.

With regard to innovative development, the triple helix model describes the interaction of three institutions (science-state-business) at each stage of creating an innovative product. This is a dynamic model of interorganizational interactions that arises in the course of the evolution of the economy and society. Its main elements are: 1) three university-state-business institutions that seek cooperation; 2) in addition to traditional functions, each of the three institutions partially takes over the functions of other institutional areas, and the ability to perform non-traditional functions is a source of innovation.

In practice, this is expressed in the fact that universities, engaged in education and research, also contribute to the development of the economy through the creation of new companies in university incubators, business partially provides educational services, and the state, in addition to its traditional legislative and regulatory role, acts as a public entrepreneur and venture investor. In this model, the leading role is given to universities, which turn into entrepreneurial or industrial universities, applying knowledge in practice and investing results in new educational disciplines.

The concept of an innovation ecosystem originated in the United States and has become widespread today. Representatives of the technology business of North America explain all their successes exclusively in terms of the ecosystem of innovative business. For example, it is believed that at MIT (Massachusetts Institute of Technology), as well as in Boston as a whole, such a system has developed. A key and necessary factor for this is the presence of researchers and companies involved in the development of advanced technologies in a particular field of knowledge. In other words, at the center of the ecosystem are researchers - the bearers of ideas - and projects based on these ideas.

The next necessary component of the ecosystem is the business community. People who create technological ideas should be able to get together and discuss them not only with colleagues, but also with business representatives. Therefore, the fundamental condition for creating a successful innovation ecosystem is the presence in it of people with entrepreneurial, managerial and business abilities. Boston, for example, is full of entrepreneurs who have successfully started and sold companies, managers of large companies who are tired of working for big companies and now want to start their own business, and managers who have just completed their business education and want to make big money.

In this paper, we have chosen to use the term “innovative business ecosystem” (IBE), which is as common as “innovation ecosystem” (IES) due to the fact that the term “innovative business ecosystem” contains the word “business”. Emphasizing the word "business", which is directly related to one of the main participants in the innovation ecosystem - the entrepreneur, we emphasize the key importance of the entrepreneur as the main participant in the innovation process. Unfortunately, in the works of a significant number of researchers, the meaning of the entrepreneur is often either lost or not distinguished from other SIAs.

Thus, we can formulate the main properties of the EIB:

1. The ecosystem of innovative business is a complex of relationships between entrepreneurs, researchers and government institutions, and not a place, not a set of laws and not a set of institutions.
2. For the functioning of the EIB, it is important to have an entrepreneurial culture that is valued in society, namely, society's acceptance of entrepreneurial risk and failure. There is a need for trust between entrepreneurs and government institutions, as well as the existence of success stories as a result of the hard work of the IJU.
3. National laws, programs and policies that define situations in which EIB may exist.

In many countries of the world, start-up technology enterprises (start-ups) face real resistance from society and government institutions. The resistance to technology startups is even greater than to traditional business projects.

The main elements of the organizational model of the innovation ecosystem are: ideas, entrepreneurial experience, sources of funding and a comprehensive organizational system that combines the individual components of the ecosystem into a single whole (convenient laws, a developed infrastructure for conducting innovative business and staffing for innovative activities).

These components should include:

1) The new entrepreneurial ability that IJD acquires in the process of implementing innovative projects in RIS.
2) Specific information resources to reduce the transaction costs of conducting international business by regional innovative companies.3) Success stories, without which no one would have believed in the idea of technological entrepreneurship, because it is very complex and not obvious from the point of view of traditional business.
3) New production resources, which are partially returned to the input of the innovation system, allowing the system at a certain stage of its work not to be strongly dependent on external sources of production resources.

Further, it can be expected that the more startups are organized, the more often successful exits of investors from projects will occur. A well-known empirical statistical formula that reflects the quality of startups says that for ten funded venture projects, three projects fail, out of three other projects, the investor returns money, the next three projects can be considered successful, and the last project can be classified as very successful projects. Therefore, one of the main qualitative indicators that could determine the effectiveness of the functioning of the ecosystem of innovative business is its ability to generate high-quality technological projects for investors. Such an indicator could be an integrated indicator that reflects the number of invested innovative projects at different stages of development per year.

Analysis of the problems of innovative development is directly related to the possibility of conducting qualitative and quantitative assessments of the current state of innovation systems. In this direction, in international practice, considerable experience has been accumulated in constructing indicators of innovative development of countries and regions. Much attention to this issue is due to the fact that the level of innovative development of countries and regions determines the competitiveness of their economies in the global space.

The most famous ratings of innovative development of countries are The European Innovation Scoreboard (EIS, European Innovation Survey), The International Innovation Index (III, International Innovation Index), The Global Competitiveness Index (GCI, International Competitiveness Index), The Global Innovation Index (GII, International Innovation Index).

At the regional level, the monitoring of innovative development is carried out both in the European Union (Regional Innovation Scoreboard, RIS) and in the USA (Portfolio innovation index, PII) using

the indicated tools.

Currently, the innovative activity of the countries of the European Union is measured on the basis of 29 indicators, and 16 indicators are used to assess the innovative development of regions. This difference in the number of indicators is due to the fact that fewer statistics are available at the regional level than at the country level. The imperfection of statistics at the regional levels is the reason that, for example, within the framework of RIS, the absolute ranking of individual regions is not applied, but groups of regions with a similar level of innovative development are identified and ranked. As a result of the assessment of the innovative development of regions in the EU, five types of innovative territories are distinguished - strong innovators (high innovators), medium-strong innovators (medium-high innovators), average innovators (average innovators), medium-weak innovators (medium-low innovators) and weak innovators (low innovators).

The system for measuring the innovative development of territories in the United States is somewhat different from the European one. The composite index of innovative development (PII, Portfolio Innovation Index) of American regions (states and districts) was developed by a number of American research centers at the initiative of the U.S. Commerce Department's Economic Development Administration

This index consists of four blocks, each of which is assigned different weights: human capital (30%), economic dynamics (30%), productivity and employment (30%) and welfare (10%). Each block includes from 5 to 7 indicators reflecting its content.Based on PII, over 3,000 areas within the United States are analyzed, and according to the level of their relative innovative development, five groups of territories are distinguished.

Understanding the goals of the innovation process and the ability to evaluate the effectiveness of RIS in a certain period of time largely determine the success of RIS development. Therefore, the author's proposals for the development of new forms and methods of interaction between the IS are insufficient without the ability to make measurements to assess the innovative potential and activity of RIS.

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