Artículo de investigación

Determinants of integration interaction among the subjects of the entrepreneurial innovation ecosystem of macro region

Determinantes de la interacción de integración entre los sujetos del ecosistema de innovación emprendedora de la macro región

Determinantes da interação de integração entre os sujeitos do ecossistema de inovação empreendedora da macrorregião

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Abstract

The purpose of this research paper is to study the essence of the entrepreneurial innovation ecosystem of the Russian Far East as the center for the generation of knowledge, as well as the elaboration of the trends for institutional environment development of the macro region innovation ecosystem, which will allow us to determine the trends of innovative development for RF universities of Far East. The article describes the content and the main features of innovative ecosystems, based on the comparative analysis of scientific approaches to the characterization of ecosystems, their key components and interaction features are characterized. From the point of view of the system approach, they formulated the interpretation of entrepreneurial innovation ecosystem category as an open dynamic self-

Resumen

El objetivo de este trabajo de investigación es estudiar la esencia del ecosistema de innovación empresarial del Lejano Oriente ruso como centro de generación de conocimiento, así como la elaboración de tendencias para el desarrollo del entorno institucional del ecosistema de innovación de la macro región, que nos permitirá determinar las tendencias del desarrollo innovador para las universidades de RF del Lejano Oriente. El artículo describe el contenido y las principales características de los ecosistemas innovadores, basados en el análisis comparativo de los enfoques científicos para la caracterización de los ecosistemas, se caracterizan sus componentes clave y características de interacción. Desde el punto de vista del enfoque sistémico, formularon la interpretación de la categoría de ecosistema de

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organizing and self-developing system consisting of organizational, structural and functional components (institutions) and their interrelations, creating, consuming and transforming scientific knowledge and ideas into innovative products within a complex matrix of relations between its constituent elements. They traced the process of information transformation into innovative products within the entrepreneurial innovation ecosystem. Using the decoding of the entrepreneurial innovation ecosystem by the method of two-level triadic decoding, it is revealed that the ecosystem unites the educational, scientific and entrepreneurial spheres, is based on the processes of generation, transfer and commercialization of knowledge, information and technologies. They gave the characteristics of some elements of the intellectual component of the economy of Russia and the Far East. The problems are identified that negatively affect the state of the innovative ecosystem of the Far Eastern Federal District of Russia. They proved the need to develop the methodological approaches to the evaluation of innovative territorial formation - the territorial innovation ecosystem of the macroregion. It was indicated that in order to develop the model of the entrepreneurial innovation ecosystem of the macroregion it is necessary to create a modern network system of university science on the basis of "digital production" concept. They formed the priority trends of innovative development of universities for the Russian Far East and the innovation ecosystem of the macroregion in the article.
The novelty and the originality of the conducted research is to identify the integration interrelations of the entrepreneurial innovation ecosystem subjects of the Far Eastern Federal District of Russia and it is reflected in the development of innovative development trends of the universities in the Russian Far East and the institutional environment of the macroregion innovation ecosystem. This article is of particular value for the subjects of the entrepreneurial innovation ecosystem, which need to carry out a targeted integration interaction with each other and the external environment, which is the actual problem of the macroregion ecosystem management.

Keywords: entrepreneurial innovation ecosystem, innovative products, commercialization, entrepreneurial structures, interaction, macroregion, knowledge, information, technology, innovative product.

innovación empresarial como un sistema dinámico de autoorganización y autodesarrollo que consiste en componentes organizativos, estructurales y funcionales (instituciones) y sus interrelaciones, creando, consumiendo y transformar el conocimiento y las ideas científicas en productos innovadores dentro de una compleja matriz de relaciones entre sus elementos constitutivos. Trazaron el proceso de transformación de la información en productos innovadores dentro del ecosistema de innovación empresarial. Utilizando la decodificación del ecosistema de innovación emprendedora por el método de descodificación triádica de dos niveles, se revela que el ecosistema une las esferas educativa, científica y empresarial, se basa en los procesos de generación, transferencia y comercialización de conocimiento, información y tecnologías . Dieron las características de algunos elementos del componente intelectual de la economía de Rusia y el Lejano Oriente. Se identifican los problemas que afectan negativamente el estado del ecosistema innovador del Distrito Federal del Lejano Oriente de Rusia. Demostraron la necesidad de desarrollar los enfoques metodológicos para la evaluación de la formación territorial innovadora: el ecosistema de innovación territorial de la macrorregión. Se indicó que para desarrollar el modelo del ecosistema de innovación empresarial de la macrorregión es necesario crear un sistema de red moderno de ciencia universitaria sobre la base del concepto de "producción digital". Formaron las tendencias prioritarias del desarrollo innovador de las universidades para el Lejano Oriente ruso y el ecosistema de innovación de la macrorregión en el artículo.
La novedad y la originalidad de la investigación realizada es identificar las interrelaciones de integración de los sujetos del ecosistema de innovación empresarial del Distrito Federal del Lejano Oriente de Rusia y se refleja en el desarrollo de las tendencias de desarrollo innovadoras de las universidades en el Lejano Oriente ruso y el entorno institucional del ecosistema de innovación macrorregional. Este artículo es de particular valor para los sujetos del ecosistema de innovación empresarial, que necesitan llevar a cabo una interacción de integración específica entre sí y con el entorno externo, que es el problema real de la gestión del ecosistema macrorregional.

Palabras clave: ecosistema de innovación empresarial, productos innovadores,

comercialización, estructuras emprendedoras, interacción, macrorregión, conocimiento, información, tecnología, producto innovador.

Resumo

O objetivo desta pesquisa é estudar a essência do ecossistema de inovação empresarial Extremo Oriente russo como um centro de geração de conhecimento e a tendência de desenvolvimento para o desenvolvimento do ambiente institucional do ecossistema de inovação da região macro, nós permitirá determinar as tendências de desenvolvimento inovador para as universidades de RF do Extremo Oriente. O artigo descreve o conteúdo e as principais características de ecossistemas inovadores, com base na análise comparativa de abordagens científicas para a caracterização de ecossistemas, caracterizando seus componentes-chave e características de interação. Do ponto de vista da abordagem sistêmica, que formulou a interpretação da categoria de inovação empresarial ecossistema como um sistema dinâmico de auto-organização e auto consistindo em componentes organizacionais, estruturais e funcionais (instituições) e suas inter-relações, criar, consumir e transformar conhecimento e idéias científicas em produtos inovadores dentro de uma complexa matriz de relações entre seus elementos constituintes. Eles rastrearam o processo de transformar informações em produtos inovadores dentro do ecossistema de inovação nos negócios. Usando decodificação ecossistema de inovação empresarial através do método de decodificação triádica dois níveis, é revelado que o ecossistema une educacionais, esferas científicas e de negócios, é baseado na geração, transferência e comercialização de conhecimento, informação e tecnologias. Eles deram as características de alguns elementos do componente intelectual da economia da Rússia e do Extremo Oriente. Os problemas que afetam negativamente o estado do ecossistema inovador do Distrito Federal do Extremo Oriente da Rússia são identificados. Eles demonstraram a necessidade de desenvolver abordagens metodológicas para a avaliação da formação territorial inovadora: o ecossistema de inovação territorial da macrorregião. Foi indicado que, para desenvolver o modelo de ecossistema de inovação empresarial da macrorregião, é necessário criar um sistema moderno de rede científica universitária, baseado no conceito de "produção digital". Eles formaram as tendências prioritárias do desenvolvimento inovador das universidades para o Extremo Oriente Russo e o ecossistema de inovação da macrorregião no artigo.
A novidade e originalidade da pesquisa feita é identificar as inter-relações integração de disciplinas ecossistema de inovação empresarial Far Eastern District Federal da Rússia e se reflete no desenvolvimento de tendências de desenvolvimento inovador de universidades no Extremo Oriente e o ambiente institucional do ecossistema de inovação macrorregional. Este artigo é um valor especial para assuntos ecossistema de inovação empresarial, eles precisam para realizar uma interação integração específica entre si e com o ambiente externo, que é o verdadeiro problema de gestão de ecossistemas macro-regional.

Palavras-chave: ecossistema de inovação empresarial, produtos inovadores, comercialização, estruturas empreendedoras, interação, macrorregião, conhecimento, informação, tecnologia, produto inovador.

Introduction

In modern conditions, only innovation, that is, the high technology-intensive economy, can be competitive. In conditions when the competitiveness of the economy directly depends on scientific and technological achievements and the creation of new knowledge, and information and communication technologies penetrate all spheres of economic activity, a special importance is acquired by mobile, plastic, integrated network structures. Such structures can be concentrated in one territorial place, where a direct contact is established between the subjects of entrepreneurial activity and a constant exchange of information and knowledge takes place. In our opinion, the most effective network structure of a new model of socio-economic development in which knowledge plays a particular role is represented by entrepreneurial innovation ecosystems that have a unique opportunity to generate new knowledge, business ideas, scientific and technological developments and technologies, using a productive partnership of scientific, educational and entrepreneurial structures. In this regard, the issues of entrepreneurial innovation ecosystem development are relevant and timely, both in terms of theoretical research and in practical terms. The growth of labor intellectualization level in modern conditions is one of the factors of the world

economy development. Intellectual capital of the country, as the combination of knowledge and their carriers, has become a determining factor in the process of new competitive goods and services creation with high surplus value. At the same time, an effective process of knowledge commercialization is possible only if there is an enabling environment - an entrepreneurial innovation ecosystem that includes all resources and integration interrelations between subjects. The creation and the development of such an innovative ecosystem that can provide financing for structures that generate innovations, provide financial support to innovators, is one of the state priorities.

Materials and methods

The theoretical base of the research was represented by the scientific works in the field of development concerning territorial innovative ecosystems, the theories of economic system management, the integration of market subjects and knowledge economy. Factual and statistical basis of the study was represented by the analytical data of RF Ministry of Education and Science, the Federal Service of State Statistics of Russian Federation. In the process of research, they used general scientific methods: theoretical (general - analysis, synthesis, induction, deduction), metatheoretical (system analysis, two-level triadic decoding method), empirical (comparison, description). The object of the study is the process of interaction in the entrepreneurial innovation ecosystem as a single whole. During a study object selection - the determinants and the tools of integration interaction in the entrepreneurial innovation ecosystem - the method of scientific abstraction was used. The obtained results are based on the principles of dialectics.

Results

The fundamental works in the field of ecosystem development are the works by G. Chesbro (the concept of open innovations) (Chesbrough, 2003); G. Itskovich (the concept of the triple helix) (Etzkowitz, 1995; Itskovits, 2010); M. Russell (ecosystem concepts) (Russell, 2011), I. Maxwell (university ecosystem) (Maxwell, 2009), etc. The following types of innovation systems are distinguished in world science: national (Lundvall, 1994; Ivanova, 2002), regional (Cooke, 1992), sectoral (Breschi, 1997), technological (Carlsson, 1991), corporate innovation systems (Sverker, 2000) and innovative ecosystems. The works of such foreign scientists as S. Borras, H. Bračik, L. Lidesdorf, F. Cook, K. Sable are devoted to the issues of regional innovation system development.

The concept of the national innovation system is covered in the scientific literature rather deeply, and the types of innovation systems are considered as the derivatives of the national innovation system. At the same time, the phenomenon of the innovation ecosystem is in the stage of cognition and identification. The preconditions of an innovative ecosystem development should be the fact that in the XXIst century the world has moved to a new network structure based on horizontal interactions and cluster-network structures (Smorodinskaya, 2015).

The current stage of the global economic system development is characterized by transformational changes, starting from the innovative economy through the knowledge economy to the creative and digital economy. Today the concept of innovative ecosystems is formed and based on the concepts of economic theory:

1) a new theory of growth, according to which the investment in scientific discoveries and developments, human capital is a necessary, but an insufficient condition for technological development. Along with this, an important condition is the exchange of knowledge and technology between institutions and the representatives of business structures;
2) an evolutionary theory that studies the regularities and the historical heredity in technological and innovation dynamics;
3) neoinstitutional theory, analyzing the development and the coordination of institutions, the relationship between market and non-market institutions.

J. Schumppetter's model of innovative economic development is used in the modern world economy, during the formation of national strategies and socio-economic programs. The methodological core of this model is the principle of awareness that the country ability to generate new knowledge and to

commercialize it in the form of technological and product innovations becomes the central factor of its competitiveness. Proceeding from this, the economically developed countries carry out the transformation of institutions that promote the development of knowledge-innovative potential. This process affects the institutions of education and science, the creation of an infrastructure for the transfer of innovative technologies, the support of innovative activities, and the provision of large-scale international integration of the country into the educational, scientific and innovative world space.

Many countries developed special national (Nelson, 1993) and regional (Regional Innovation Scoreboard, 2014) innovation systems, and innovation process control is performed. In 2005, Charles Wessner developed the concept of an innovative ecosystem based on the notion of innovation as the process of an idea turning into a market product or a service that requires the collective efforts of such actors as universities, research companies, venture funds, and business environment representatives. An innovative ecosystem allows us to consolidate these efforts to achieve a synergistic effect (Audretsch & Wessner, 2005). Ch. Wessner includes formal and informal institutions in the innovation ecosystem that form social interaction in the process of an idea creation and its commercialization. Another point of view is shared by Stanford University economist M. Russell and K. Devlin, who defined the innovative ecosystem as a complex of political, economic, technological and ecological systems that directly participate in the establishment, maintenance and development of an enabling environment for business development (Russell et al., 2011).

Integration of business - business structures, science and education is an effective tool for sustainable development and state competitiveness in the context of globalization, knowledge-based economy development and the construction of an effective national innovation ecosystem. Structurally, this tripartite integration is the development of educational and research-and-production complexes as the centers of innovation. At that, the emerging integrative structures are aimed at the development of applied research and developments, as well as on their quality improvement and the commercialization of ideas. Money capital and high-tech equipment are not enough for business structures in order to withstand a high competition. The need for intellectual capital, capable of obtaining information in a timely fashion, generating it and introducing it into fundamental and applied research comes to the fore (Kuzubov, 2017). The processes of integration interaction between the structures of business, science and education in Russia have been traced since the 1980-ies. One of the first forms of these structures integration in the 1980-ies and 1990-ies was the business parks within which all the necessary conditions were created for the emergence and the development of various types of small business entities that receive good starting conditions in order to turn a new idea into a product, bringing profit. Their structure consisted of an innovative business incubator, a technology park and a scientific park, an educational and a training center. All of them linked science, education and production (business) into a single whole. Technoparks have appeared on the territory of Russia since the 1990-ies (Mukhamedyarov & Divaeva, 2011), and clusters (innovative territorial clusters) have appeared since 2012. The structure of such clusters included design bureaus, research and innovation organizations: aviation plants, engine manufacturers for aviation, rocket and space production and others (Esina et al., 2015).

Despite the fact that the term "innovative ecosystem" is increasingly used in various official documents, it has not been interpreted unambiguously yet. In our opinion, the study of the entrepreneurial innovation ecosystem should be based on the system approach, according to which the entrepreneurial innovation ecosystem is an open, dynamic self-organizing and self-developing system consisting of organizational, structural and functional components (institutions) and their interrelations, creating, consuming and transforming scientific knowledge and ideas into innovative products in a complex matrix of relationships between its constituent elements.

Network theory is one of the tools used in the study of innovative ecosystems. The interaction of institutional structures and technologies occupies an important place in national innovation systems. Their joint role in the development of innovative activities is developed most consistently in the works of the Nobel Prize winner Douglas North. In the process of institutional system evolution in economically developed countries, according to D. North opinion, ramified formal relations and mechanisms have been created that ensure a high level of market efficiency and a relatively low level of transaction costs, as compared with the countries of the "third world". This promotes the competition based on new knowledge

and technologies, and not on the search of different rents or the ways of national wealth redistribution (North, 2000).

The classical innovation ecosystem is based on five elements (Venture investment and the ecosystem of technological entrepreneurship, 2011):

1) the academic, engineering and technical community and higher education institutions, which become the main suppliers of innovative ideas for commercialization and staffing;

2) venture investors, whose competence includes the involvement of financial resources in the ecosystem and business competencies necessary for the establishment of innovative companies and their transformation into full-fledged business structures;

3) infrastructure, which creates favorable conditions for the existence of innovative companies. It can be both material (techno-parks, business incubators, development institutions, etc.), and non-material (various services specially adapted to the needs and specifics of innovative companies);

4) a steady demand for innovation, which is the key to the normal functioning of the innovation ecosystem as a whole. It's not just about the consumer market, but also about the demand of large businesses and other real-sector companies for high-tech products, technologies and innovative companies, along with all their developments and intellectual property;

5) legislative and legal framework that creates comfortable working conditions not only for the innovative companies, but also for all ecosystem participants, and creates favorable operating conditions that allow to develop a reasonable balance of interests between different market players. A balanced and a stable operation of the innovation ecosystem assumes the presence of all the basic elements, and also the corresponding level of all its components development and an effective interaction between them (Figure 1).

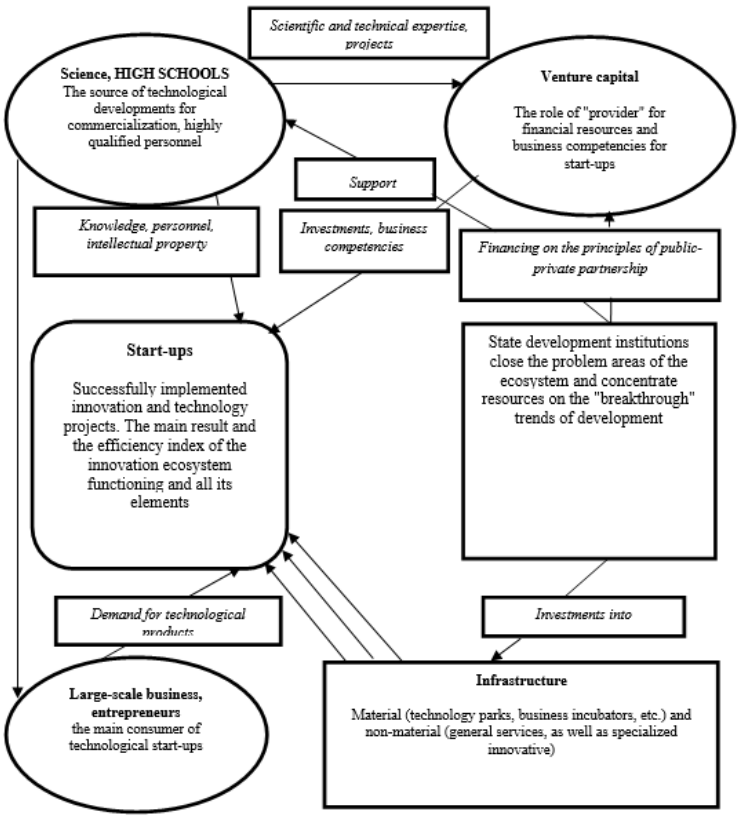


Figure 1 – The elements of the classical innovation ecosystem

The process of information transformation into an innovative product has several stages in the ecosystem (Figure 2): information is transformed into codified knowledge, which is then transformed into innovative ideas that form innovative technologies and innovative products, and the further distribution of a product to a general consumer through commerce.

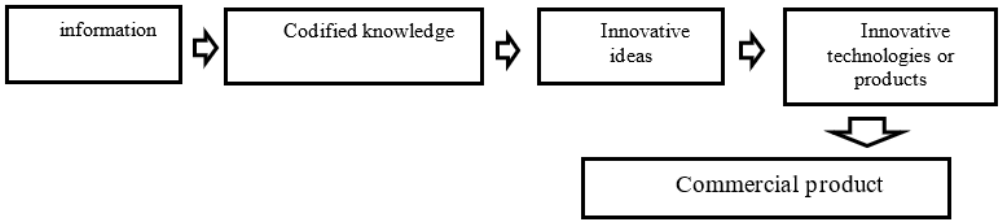


Figure 2 - The process of information transformation into innovative products within the entrepreneurial innovation ecosystem

I.e. not always codified knowledge can be turned into an innovative product, they can remain at the level of fundamental knowledge, the initial stage of the innovation process, which will not always have a practical result and can serve as the basis for the production of other knowledge. The entire illustrated linear process is an innovative process - a consistent transformation of ideas and scientific knowledge into innovation and its commercialization. The first four stages are related to the acquisition of new knowledge, and the fifth stage is the receipt of an innovative product (the second phase of the innovation process: development, production and distribution).

In order to formulate an exact concept that allows us to reflect the fundamental features and the relationships in the entrepreneurial innovation ecosystem, one can use the method of two-level triadic decoding of the basic category, which is one of the first applications for the theory of dynamic information systems. The essence of this method is to distinguish a triad of categories: the universal class (the universe, the set of objects within which a concept is defined), the class (it is associated with the defined concept), the complement (all other elements of the universe not included in the class) (Svetlov, 2017).

The notion of "integration association", which includes all spheres of economic entities in a large whole is a unified one for any integration process. The first level of "entrepreneurial innovation ecosystem" notion deciphering made it possible to single out the following conceptual triad: elements, processes and products. On the second level, each of three concepts is also deciphered in ts turn. So, the level of "elements" for an entrepreneurial innovation ecosystem can be represented by the following concepts:

- the scientific sphere;
- educational sphere;
- entrepreneurial sphere.

The interaction of presented institutional spheres is of paramount importance for the development of innovation economy, the partnership of scientific, entrepreneurial and educational sectors. The emergence of close relationships between these three elements of an essentially informal nature is the key to the emergence of new knowledge in the ecosystem.
The concept of "processes" is deciphered by the following concepts:
- knowledge transfer;
- knowledge generation;
- commercialization and valorization of knowledge.

These aspects provide a platform for the development of new knowledge, its changes, the transfer to a participant of the ecosystem itself and other interested subjects. This characteristic actually acts as a platform for the emergence of partnerships and cooperation.
The concept of "products", in its turn, is deciphered by the following triad of concepts:
- knowledge;
- technologies;
- information.

The elements of the entrepreneurial innovation ecosystem interact with each other, exchange resource flows and create information (educational sphere), technologies (entrepreneurial structures) and knowledge (the scientific sphere).

Figure 3 shows the operation of "entrepreneurial innovation ecosystem" (the second level) concept deciphering.

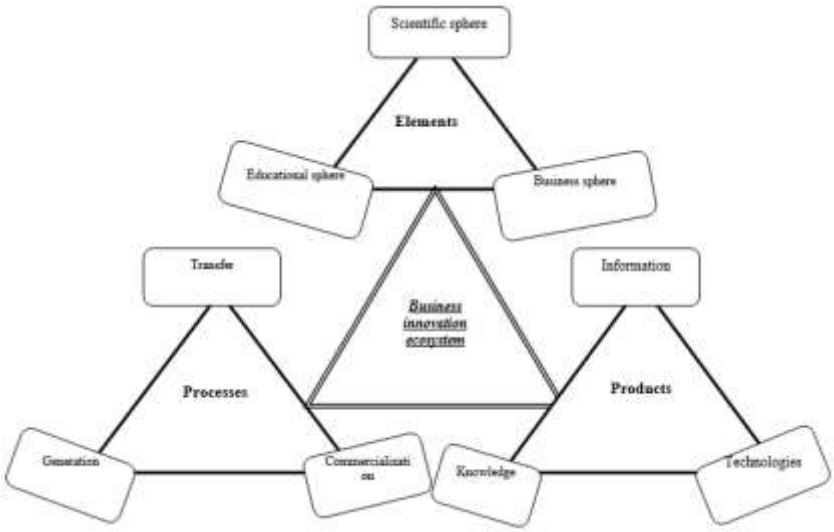
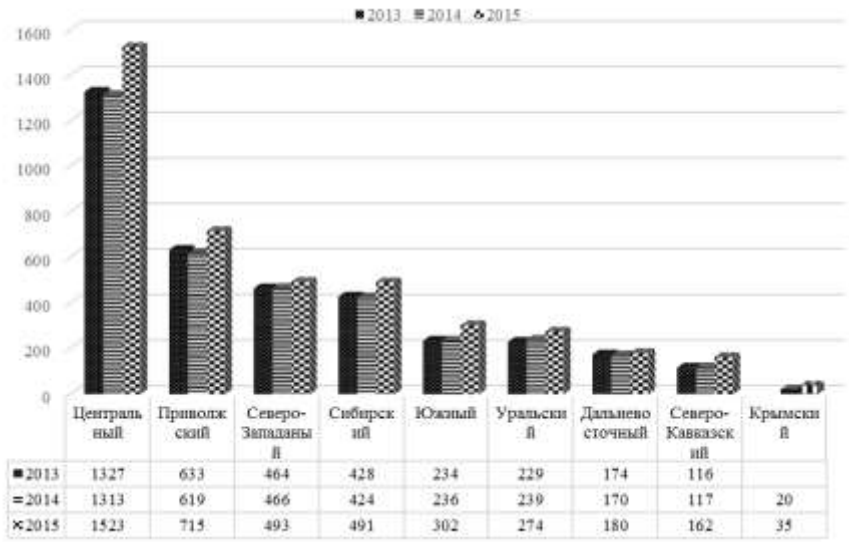


Figure 3 – The decoding of the entrepreneurial innovation ecosystem by the method of two-level triadic decoding

Thus, the entrepreneurial innovation ecosystem unites the educational, scientific and entrepreneurial spheres, it is based on the processes of generation, transfer and commercialization of knowledge, information and technologies.

The basis, which makes the entrepreneurial innovation ecosystem of the country, is the existence of organizations - the generators of innovations. The intellectual component of the Russian economy has a powerful potential, which is characterized by the concentration of scientific organizations, research institutes and higher educational institutions. The regional features are of great importance in the development of science (Figure 4).



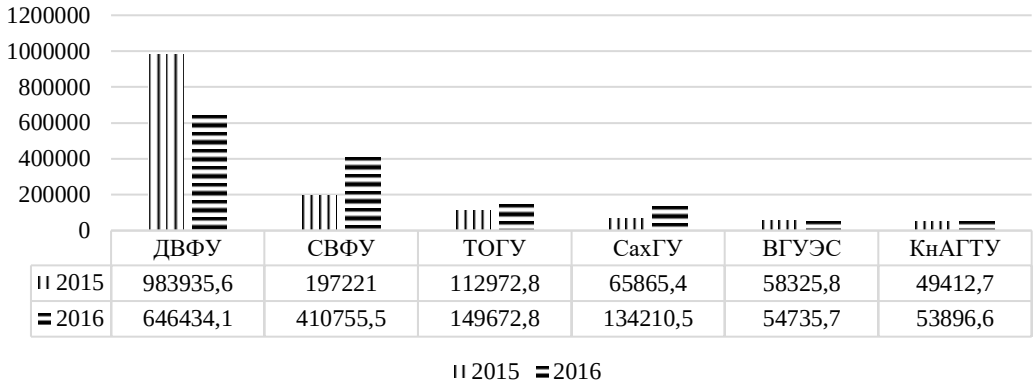
	Центральный	Приволжский	Северо-Западный	Сибирский	Южный	Уральский	Дальневосточный	Северо-Кавказский	Крымский
■2013	1327	633	464	428	234	229	174	116	
=2014	1313	619	466	424	236	239	170	117	20
×2015	1523	715	493	491	302	274	180	162	35

Центральный - Central / Приволжский - Volga region / Северо-западный - Northwestern / Сибирский - Siberian / Южный - Southern / Уральский - The Urals / Дальневосточный - Far Eastern / Северо-Кавказский - North-Caucasian / Крымский - Crimean
Source: (Federal service of state statistics, 2018).

Figure 4 - The dynamics of organizations performing research and development by RF subjects

The largest concentration of scientific organizations is observed in the Central (35.5%), Volga region (17.1%), North-West (11.8%) and Siberian (11.8%) federal districts. At the end of 2015, there were 4,175 organizations performing research and development. Among these 1,040 of higher education institutions are engaged in research and development.

As was noted above, the commercialization of scientific and technological developments is an integral part of the innovation ecosystem. If we compare the commercialization of scientific results by FEFD universities, it can be noted that FEFU is THE leader, but VSUES also has a fairly strong position in the region (Figure 5).



	ДВФУ	СВФУ	ТОГУ	СахГУ	ВГУЭС	КнАГТУ
2015	983935,6	197221	112972,8	65865,4	58325,8	49412,7
2016	646434,1	410755,5	149672,8	134210,5	54735,7	53896,6

Figure 5 - Commercialization of R & D results in the universities of the Far Eastern Federal District, million rubles.

Source: (Federal service of state statistics, 2018).

The universities that form strategic tasks of their development in the conditions of unstable external environment should introduce innovations in education and scientific activity, build effective "road maps" for interaction with business structures. In the context of integration challenges, the mechanism of task solution to improve the status of innovation activities in universities should include two complementary areas: the introduction of new methods for university management, where scientific management occupies a rightful place, the joint development and the implementation of cooperation, integration and partnership mechanisms with all institutions not only of the national innovation system, but also of the world innovation space, including the triad "education - science - production (business)".

However, Russian universities face the challenges arising from the initial stage of Russian entrepreneurial innovation ecosystem development. Almost all institutes of innovative development (venture funds, business incubators, technology transfer centers, technological and scientific parks, technological clusters, etc.) have been established in the country, but the transition to an innovative economy is extremely slow.

Conclusions and discussions

The conducted research made it possible to identify the problems that negatively affect the state of the entrepreneurial innovation ecosystem of the Russian Far East. Namely:

- The absence of an effective interaction between the key components of the ecosystem: developers, entrepreneurs with the experience of innovative technological project implementation by venture investors, scientific and engineering institutions, as well as by public authorities and the representatives of large scale businesses as the main potential consumers of high technologies;
- an insufficient integration of the entrepreneurial innovation ecosystem into the global one, which makes it difficult to turn domestic venture projects into global businesses;
- an insufficient development of modern infrastructure to support small innovative and technological enterprises (the lack of technological platforms where all key components of the innovation

ecosystem could develop their activity, an insufficient number of service companies - service providers for the enterprises that produce innovation);
- the absence of a sufficient number of innovative and technological projects attractive for investors, which is caused by an insufficient level of business competence among developers, as well as the lack of interaction experience with the representatives of venture capital;
- the lack of a sufficiently effective system for intellectual property rights protection;
- the lack of interest in the development of innovative technology and product market by the state and large-scale business as the main customers. Small innovative and technological companies consider it is rather difficult to find a consumer for their technologies among large companies, and thus there is the outflow of technologies abroad;
- the lack of a specialized legislative support for the activities of private equity, venture capital funds and innovative start-ups (Shashlo & Petruk, 2017).

The most effective mechanism for the development of universities, allowing to respond to these challenges, is an effective implementation of research and innovation activities. This mechanism is based on the concept of investment in innovative developing projects, which can create a basis for the establishment of large companies or will be a brand for universities in the future.

Based on the conducted studies, one can conclude that the most priority areas of innovative development for the universities of the Russian Far East, and thus, the entrepreneurial innovation ecosystem of the macroregion, are the following ones:

- the creation and the development of small innovative enterprises, incl. joint ones (with university and academic research organizations, both in Russia and in Asian countries);
- the implementation of joint innovation projects with key partners;
- the participation in the creation of high-tech clusters;
- the creation of support system for the entrepreneurship of young people in knowledge-intensive areas of activity;
- the attraction of private investments for development of innovative activity (venture funds and companies, enterprises of the region, business angels), the development of the venture market in the Far East;
- the fulfillment of individual orders of business structures;
- the training of foundational staff for innovations and innovators;
- the creation of consulting agency network to provide the services to business structures in the field of innovative product introduction, their support and intellectual property protection;
- the creation of a virtual intellectual site that would contain the databases in the context of the region scientific potential, innovation potential and investment potential, which will enable the ecosystem participants to build effective relationships in the process of innovation and investment activity (Shashlo, 2017).

Thus, in the context of "open innovations" concept, the solution of the above problems and the implementation of priority areas of strategic development is impossible without the search of interaction forms between universities, the IT industry, business and the state.

In the conditions of the Far East macro-region, the need for further development of methodological approaches to the evaluation of innovative territorial formation - the entrepreneurial innovation ecosystem is traced, which will affect an innovative development potential of the macroregion. In order to form a full-fledged model of the innovation ecosystem for the macroregion under study, it is necessary to focus on a modern network system of university science creation on the basis of "digital production" concept. To this end, an appropriate innovative culture must be formed, which includes the spirit of dynamics, innovation, and collective interest to improve the level of scientific research within a university. And, of course, they must develop and introduce the mechanisms of innovation development full cycle (due to the creation of innovative infrastructure and special funds for these purposes), and promote an effective use of tools and institutions for innovation support.

The increase of individual subject role of the innovation ecosystem, the need for their focused interaction with each other and an external environment is an urgent problem of ecosystem management. An effective

management assumes the orientation of marketing, and innovative, investment and production activity of economic entities through it to search for and use the market opportunities in order to achieve some success in competition, maximize current and prospective incomes, with a mandatory consideration of knowledge and innovation consumer needs.

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