

# Innovation economy: A study of the influence of international experience on the Russian economic system

## Economía de la innovación. Un estudio de la influencia de la experiencia internacional en el sistema económico ruso

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### ABSTRACT:

Scientific and technological progress and the level of innovation (intellectualization) of the main factors of production have a significant impact on the development of the national economy, its growth and competitiveness, in addition to factors of globalization, geopolitical and financial instability, stability of the world macro policy. The dynamism of the innovation sector, provided by the symbiosis of science (knowledge-intensive industries, the creation of new technologies), the education system and intellectual resources in the modern world, that determines the importance and place of the state in the emerging international relations and the level of economic security. The innovative development of the national economy, according to numerous researches and practice in developed countries, depends not only on the quality of human capital and life, significant investment, high standards of society security and business, the attractiveness of the investment and entrepreneurial climate, but also on the prerequisites of a fundamental nature, which include the level of development of science and the economy of knowledge (digital economy) in the country, the availability of highly developed intellectual centers,

### RESUMEN:

El progreso científico y tecnológico y el nivel de innovación (intelectualización) de los principales factores de producción tienen un impacto significativo en el desarrollo de la economía nacional, su crecimiento y competitividad, además de factores de globalización, inestabilidad geopolítica y financiera, estabilidad del macro política mundial. El dinamismo del sector de la innovación, proporcionado por la simbiosis de la ciencia (industrias intensivas en conocimiento, la creación de nuevas tecnologías), el sistema educativo y los recursos intelectuales en el mundo moderno, que determina la importancia y el lugar del estado en el internacional emergente. Las relaciones y el nivel de seguridad económica. El desarrollo innovador de la economía nacional, según numerosas investigaciones y prácticas en los países desarrollados, no solo depende de la calidad del capital humano y la vida, las inversiones significativas, los altos estándares de seguridad de la sociedad y las empresas, el atractivo de la inversión y el clima empresarial. pero también sobre los requisitos previos de naturaleza fundamental, que incluyen el nivel de desarrollo de la ciencia y la economía del conocimiento (economía digital) en el

effective state regulation., the presence of powerful innovation systems and developed venture business. In the global economic system, competitive advantages are given to states with the most suitable conditions for the development and commercialization of innovations. The presence of these circumstances leads to the formation of a macro-competitive paradigm of innovative development of the national economy, including the creation of effective mechanisms for generating innovation and venture investment. In the article discussed questions about the prerequisites for the development of innovative economies of developed countries, the modern paradigm of innovative development, trends in interaction «science-state-business» in high-tech industries. Features of innovative economy and problems of innovative development are highlighted. New technologies, criteria and approaches to the evaluation of innovative development and the relationship «science-state-business» require effective regulation and management.

**Keywords:** Innovation, Innovation economy, Innovation development, Education, Science, Company spin-off

país, la disponibilidad de centros intelectuales altamente desarrollados, la regulación estatal efectiva, la presencia de poderosos sistemas de innovación. y desarrollado negocio de riesgo. En el sistema económico global, se otorgan ventajas competitivas a los estados con las condiciones más adecuadas para el desarrollo y la comercialización de innovaciones. La presencia de estas circunstancias lleva a la formación de un paradigma macro-competitivo de desarrollo innovador de la economía nacional, que incluye la creación de mecanismos efectivos para generar innovación e inversión de riesgo. En el artículo se discutieron preguntas sobre los requisitos previos para el desarrollo de las economías innovadoras de los países desarrollados, el paradigma moderno del desarrollo innovador, las tendencias en la interacción «ciencia-estado-empresa» en industrias de alta tecnología. Se destacan las características de la economía innovadora y los problemas de desarrollo innovador. Las nuevas tecnologías, los criterios y los enfoques para la evaluación del desarrollo innovador y la relación «ciencia-estado-empresa» requieren una regulación y gestión eficaces.

**Palabras clave:** Innovación, Economía de la innovación, Desarrollo de la innovación, Educación, Ciencia, escisión de la empresa

## 1. Introduction

In developed countries, the level of innovation of the economy is determined by a significant amount of new knowledge and the capacity of the market of high-tech products. In their share of participation, they account for more than 90% of the scientific potential of the world economy, as well as more than 80% of the global high-tech market.

The innovation system and knowledge economy, and the development of venture business in developed countries are the basis for the formation of the model of innovative development of developing countries. At present, Russia has a low innovative potential, which is caused by a number of circumstances, including the availability and use of outdated equipment in certain industries, low level of technology and significant costs for their development, and weak investment activity of domestic enterprises.

The purpose of this article is to investigate the impact of foreign honey agarics on the development of innovative economy in Russia with the application of the best world practices of interaction between the state and business in the field of innovation.

In the article, the results and conclusions were defined by means of methods of empirical and theoretical cognition with the use of conceptual, logical and operational components.

## 2. Literature Review

In modern science, the attention of scientists focuses not only on solving tactical problems of economic development of the state, but also on the development and justification of strategic activities, which include the national innovation system. Innovative theories in dynamic and evolutionary aspects were developed by Shumpeter (1982), Druker (2003), Mansfield (1970), Mensh (1979), Yakovets (2004), Perez (2005), Hirooka (2006), among others. In a high-tech economy, innovation plays a big role in ensuring the competitiveness of both economic entities and the state as a whole. The category "innovation" is characterized by universality, wide scope of application and complexity of structural elements, having a variety of approaches to the disclosure of its content. Innovation, according to Schumpeter (1982), is the «core of the new type of competition» and cause long cycles of business activity come alive . Scientists have developed an innovative theory of long waves, subsequently integrated into the overall innovative theory of economic development.

Drucker (2003) considers that innovation is a socio-economic concept, defining the goal of

an innovative solution to increase the return on invested resources. Mansfield (1970) studied diffusion (penetration into the market) of innovative products and proved the nonlinear nature of the innovation process.

Hirooka (2006) substantiated the process of clustering of innovations and their synergetic effect, which causes significant complex economic growth and contributes to the intensification of its development. In addition, this author defined the innovation paradigm as a set of three logistics trajectories having a cascade structure: technological (development of key technology), design and development (creation and commercialization) and diffusion (market entry, distribution until saturation) (Hirooka 2006).

Kleiner (1986), Kharin (2009), Fatkhutdinov (2008) made a significant contribution to the study of innovation systems and innovation, as well as factors that have a direct impact on the effectiveness of innovative development.

In conditions of geopolitical instability and economic crisis, the entry of individual states to a new level of scientific and technological development determines the fundamental change in the socio-economical systems of all participants in the world economic relations. Questions of development of innovative economy, innovative infrastructure, and role of innovations in the world economy were investigated by Andreev (2009), Akopova (2012), Yasin (2009), Abramova (2011), Chernyaeva (2016), Shevchenko (2011) and some others.

The economy of the state, in which a significant part of economic entities is engaged in innovative activities, and the volume of innovative products exceeds 1/2 of the total output. In developed countries, 60-80% of industrial enterprises and about 50% of service organizations produce innovative products.

Andreev (2009) believes that, in the context of Russia's transition to an innovative economy, it is necessary to create a national innovation system that ensures effective interaction between higher education, science, business and the state. On the other hand, Shevchenko (2011) substantiates the necessity of formation of innovative economy by cascade principle. It defines the role of regional innovation systems in the overall structure of the state innovation economy and proves the feasibility of their integration into global innovation networks (Shevchenko, 2011).

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### **3. Research Methodology and Results**

Innovative economy is the economy of society based on knowledge, innovations, positive perception of new ideas, and readiness of their practical implementation in various spheres of human activity.

The modern paradigm of innovative development of western countries can be characterized by the presence of appropriate elements and conditions of operation. The elements of innovation economies include education and science, human capital, innovation industry, regulatory and institutional infrastructure (technology parks, business incubators, innovation centers, clusters, spin-off companies, etc.), as well as the infrastructure of the functioning and interaction of all these elements.

The innovative economy in Russia is still in its infancy. Its formation entails global changes in all spheres of human life. The study of the element content and factors influencing the formation and functioning of the innovation economy makes it possible to exploit and develop the existing innovative potential of the country, to create conditions for economic growth and to promote the growth of the common welfare state.

The experience of foreign countries proves that the key indicators of innovative development of the state is determined by the level of innovation activity of regional systems and economic entities. Innovative development in accordance with the postulates of modern scientific theory and practice is considered as the implementation of measures to create and implement innovations that extend to all subsystems of the appropriate level, which determines not only the need for effective use of intellectual potential, but also the formation of a fundamentally new thinking in the interaction of "science – business – state".

The key goal of innovation development is to create chains of relationships and relationships

between participants in innovation activities (spin-off companies, business incubators, small innovative enterprises, educational and research organizations, venture business, the public sector, etc.), creating the conditions for the formation and widespread introduction of innovation. Such relationships and interactions long-term existence and the multi-layered, which is provided by the presence of sufficiently developed innovation infrastructure, accessibility to obtain the requested information, as well as high demand and understanding of the applicability of the subjects of new ideas, knowledge and technology to various application purposes.

The world economy is actively forming the paradigm of innovative development, the basis of which is recognized as the most important economic resources of the modern world – knowledge (information) and innovation, which is a strategic factor of economic growth (Akopova, 2012). The historical perspective of the world economy proves the high efficiency of innovations. The most actively developed countries of the European continent during the last centuries, which were joined by the United States of America and a number of other countries.

Progressive economic development of European countries is mainly due to the introduction of innovations created in the framework of the industrial revolution, which entered an active phase in the XVIII century. Great Britain played an important role in this, because it was in this country that machines and innovative equipment were created and introduced into production, which radically changed the production process at enterprises. Until the end of the first half of the nineteenth century, technical superiority of the European countries relative to other countries, giving the economic advantage was due rather than the advancement of science (which gave the original impetus to scientific and technological revolution), and separate from it development equipment (technology developed independently of science). Conditions for the realization of new opportunities for economic growth were provided by the optimal combination of scientific knowledge, commercial calculation and reasonable labor organization. This has contributed to major technological breakthroughs, scientific discoveries and their wide application.

The second half of the XX century is characterized by a significant accumulation of new knowledge, with a significant increase in the speed of dissemination of information, actively carried out diffusion of innovations and multidisciplinary technologies.

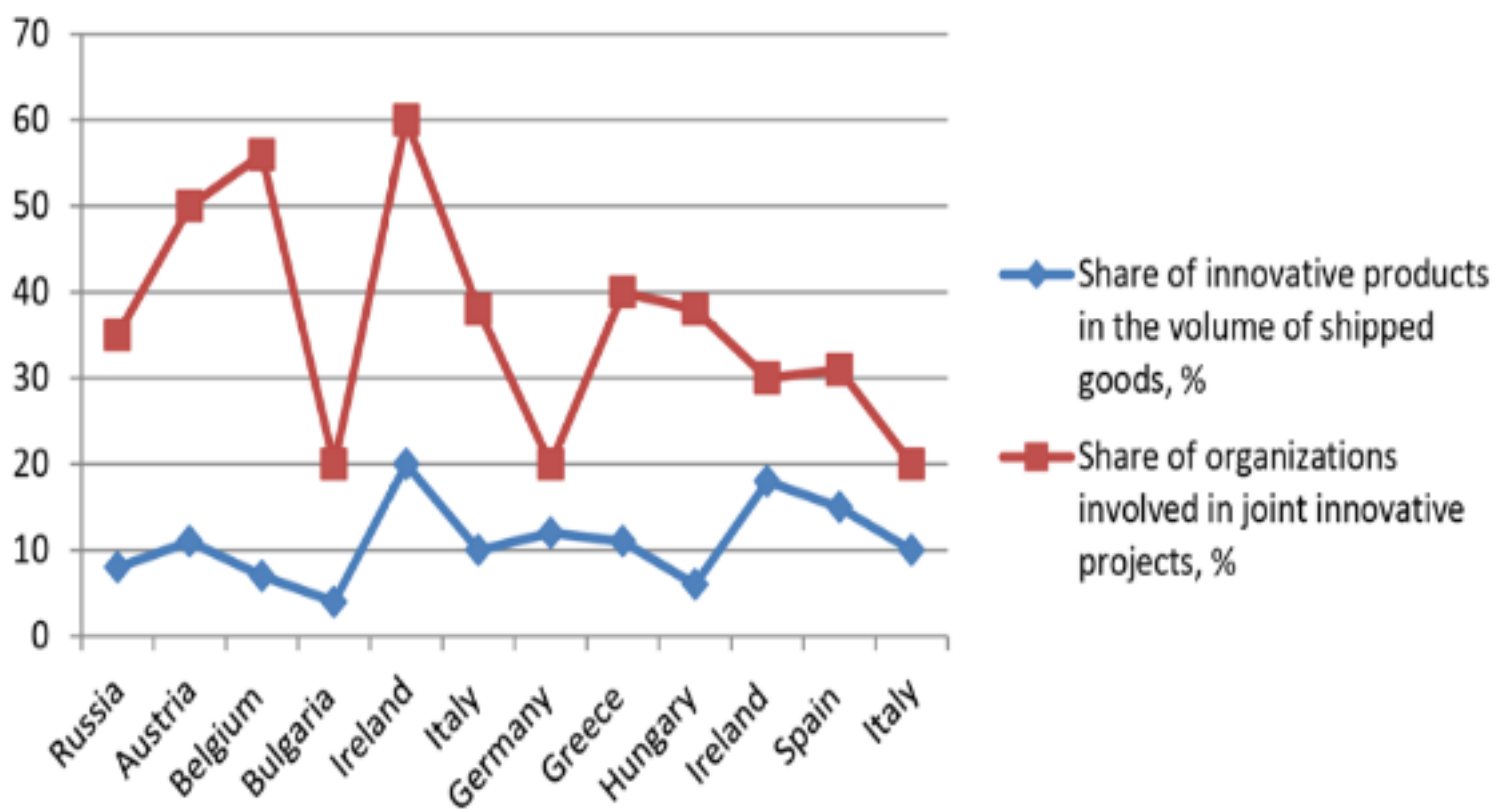
The mechanisms and tools for the application and dissemination of knowledge in the conditions of the functioning of national innovation systems formed and tested in industrialized countries create conditions for the progressive growth of the economy, bringing its elements into an optimal state (adequacy to the existing realities), improving the level and quality of life of the population (Nikitenko, 2011).

The main features of the economy of innovative type can be called:

1) Informatization of the national economy. Economic growth is ensured through high-tech production, the expansion of knowledge-intensive sectors, which ultimately leads to an increase in the share of innovative products in the total volume. Cross-country analysis of aggregate innovative activity shows that Russia (the level of innovative activity 9.3 per cent) lags behind in this question, both from European Union countries and from Chile (23.7 percent), Colombia (26,4%), Israel (49%). Russia lags behind the leading western countries, the USA, Latin America in terms of implementation of not only technological (8.3%) innovations, but also marketing (1.8%) and organizational (2.7%) (Indicators of innovation activity – 2017).

Intensity of expenditure on technological innovation is of 2.66%. Russia ranks third in this indicator after Sweden (3.86%) and Germany (2.92%). Indicators of innovation activity in different countries are shown in Figure 1.

**Figure 1**  
Indicators of innovation activity in different countries



Recently, there has been a trend in countries to increase funding for the creation of innovative products, while the level of innovation activity in Russia tends to decrease. This is due to the fact that the creation of innovation is often ill-conceived, there is no information and analytical support of the business plan for the development of the product and a clear algorithm for obtaining information about the feasibility and prospects of its commercialization.

2) Innovative continuity, providing inexhaustibility of the most important economic resources of innovative economy-information and knowledge. Innovative continuity determines the process of innovation, reducing its life cycle by bringing to market other innovations, updated products.

3) Changing the status of a person in the economy, the demand for creative work and creative thinking, not physical capabilities. In Russia, the total number of researchers in 2016 amounted to 370.4 thousand people, and the total number of personnel engaged in research and development (including technology, support staff) amounted to 802.3 thousand people. This figure tends to decrease (as of 2000, the figure is 1 007,3 thousand people). While in China this figure is 3 758.8 thousand people, and in Japan – 875 thousand people (Indicators of innovation activity – 2017).

The basic (key) component of formation of new qualities of the human capital become the knowledge integrated in scientific and educational processes.

The objective necessity of profound transformations in the system of labor management is caused by the intellectualization of economic relations, the need for an innovative type of economy in the training of highly qualified workers. In modern conditions, management technologies, characterized by innovative methods and personnel-oriented approaches, prevail everywhere. At the same time, non-material motivation and stimulation of employees are becoming widespread (Maslyukova, 2016).

4) The predominance of intangible assets in the economy with the simultaneous qualitative transformation of material production. The use of intangible assets as a mechanism for assessing the commercial value of innovation, intellectual work and intellectual property enables economic actors to increase the knowledge of new goods and services (which increases their competitive advantages).

The most important (fundamental) support of innovative economy is represented by the following key elements: science, education system and skills, skills and abilities of employees. The optimal combination of these components is aimed at the formation, distribution and targeted consumption of intellectual resources.

Building an innovative economy should be based on human intelligence, characterized by

high added value. At the same time, it should be taken into account that the objective prerequisites for the creation of an innovative economy is an information infrastructure characterized by well-established and effectively functioning communications that ensure the dissemination and transfer of the required data and knowledge.

The developed countries have accumulated considerable experience in the formation of innovation economy and its infrastructure, taking into account the development of market conditions, opportunities to meet the demand and priority areas of interaction of science, production and management. Currently, each country implements its own innovation strategy. For example, the us innovation development strategy aims to create an innovation environment that is conducive to the creation and commercialization of innovations, the main instrument of which is the mechanism to stimulate the business sector.

Some European countries consider foreign direct investment and integration into production and scientific and technological networks as priority mechanisms for innovative development.

In terms of innovation development in Russia is lagging behind not only from developed but also from developing countries. Russia ranks 43rd in the ranking of the global innovation index in 2016. For comparison, the UK is on the 3rd place, and the US on the 4th. Russia lags behind Greece (40th place), Turkey (42-e a place), Latvia (34th place), Spain (28 th place), China (25-e a place), France (18-e a place) and other countries (Global Innovation Index, 2016).

Currently, Russia is implementing the strategy of innovative development for the period up to 2020 and the state program "Economic development and innovation economy", according to which active development acquires human resources potential in the field of science, education, technology and innovation, business innovation, development of the research and development sector, ensuring the openness of the national innovation economy, and also questions of interaction of Russia with the innovative countries and questions of integration of domestic innovative system in the world processes of creation and introduction of new technologies.

In order to successfully implement the paradigm of innovation development in Russia, it is necessary to develop the information space through interaction with other countries in the field of innovation and information. The strategy of innovative development adopted by the state is designed to preserve innovation security, respond to challenges and threats in the field of innovative development, thereby ensuring a high level of well-being of the population and the quality of life.

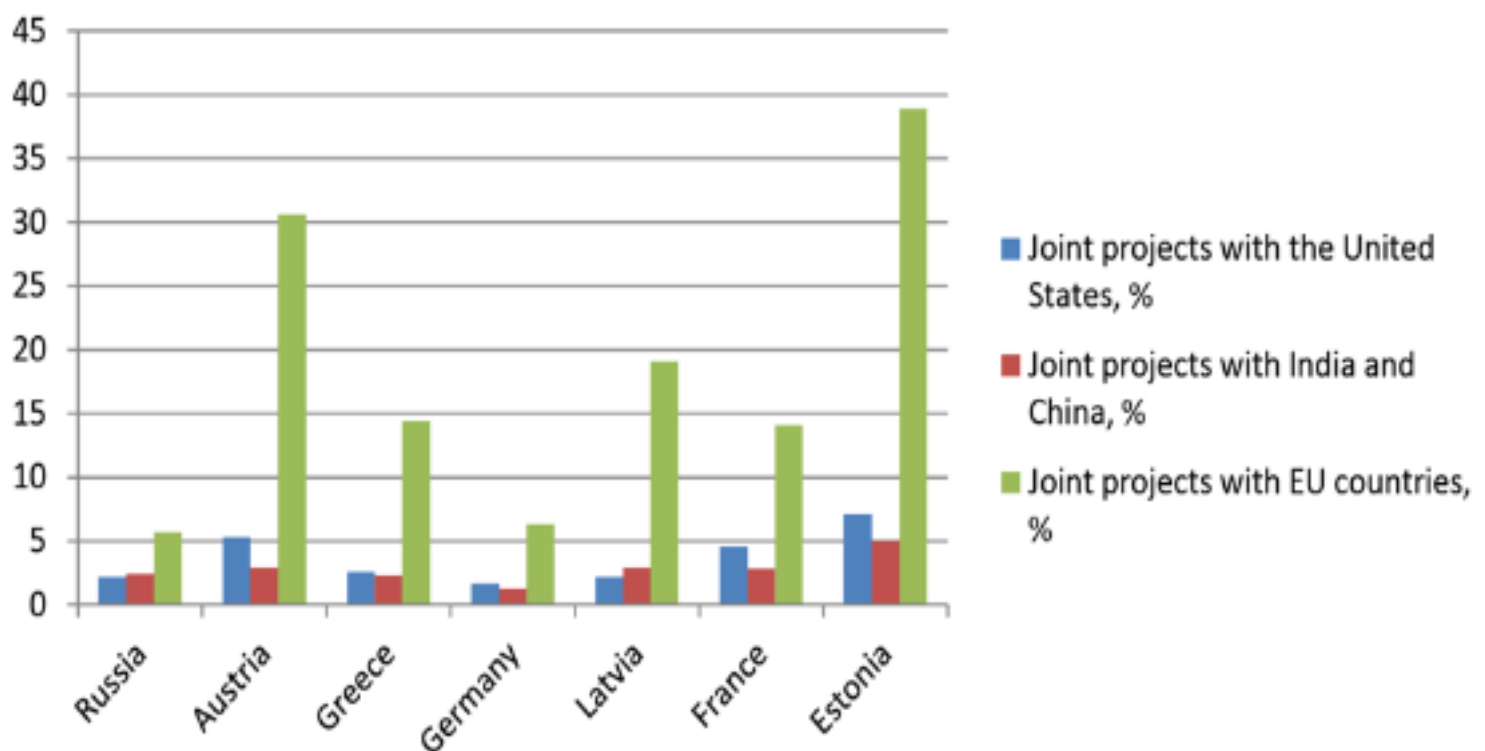
One of the most promising ways to achieve the targets is the use of an innovative development model for the Russian economy (a paradigm shift in economic development), the main instrument of which is to ensure interaction between the main components of the national innovation system: higher education (bachelor's, master's, specialist, highly qualified personnel), science (research and development), public policy in the field of innovation and the business sector (the development of spin-off companies, business incubators, etc.). Russia should take into account the experience of Western countries on this issue, including the formation of a public-private innovation partnership. The state supports science and education, which are sources of knowledge and innovation, creates an innovative infrastructure and regulatory support for innovation, and business takes innovative risks.

Under the existing conditions, innovation usually goes beyond the borders of a single state. The main forms of internationalization are supra-national research centers, complementary research laboratories, strategic alliances between firms from different countries (even competing companies), programs to attract leading scientists and specialists from different countries to priority innovative industries, etc. (Minko, 2004).

The analysis of the practice of creating joint projects for research and development is presented in Figure 2.

**Figure 2**  
Organizations participating in joint research and development





The experience of world economic development allows to draw a conclusion that the States going on the way of ensuring innovative development of human, scientific, technological and production potentials, meeting actual needs of the market in perspective directions of formation of new technological way, create for themselves essentially new and high competitive advantages (Akopova, 2012).

## 4. Discussion

In Russia, the use of the paradigm of innovative development should be multi-vector, taking into account national specifics.

The Russian Federation has a great innovative potential, which consists of a variety of components (for example, scientific and technical potential, personnel potential, the potential of implementing an extensive scientific base). However, at the same time, our country is in a state of implementation of the initial stages of transition to the innovation paradigm of development. This is mainly due to the problems of effective functioning of the innovation environment of internal character, as well as the weak development of infrastructure for innovation. The reasons for the low efficiency of the national innovation system include:

- underdeveloped innovation infrastructure and insufficient legal and regulatory framework, for example, the absence of a well-established and effectively functioning system of venture financing, insurance of innovative investments, leasing, etc.;
- structural economic imbalances (priority is given to the commodity and production sectors, not to investment processes);
- innovative business immunity, low demand for innovative products;
- the absence of a well-established system of relations «state-science-business».

In this aspect, the innovative growth of the national economy should be ensured at the expense of globalization the sphere of high technologies, at the same time, Russia must engage in a meaningful niche in the world market, and also due to the interdisciplinary nature of created breakthrough innovations.

For the domestic economy, the prerequisites for the implementation of the paradigm of innovative development can be recognized as the development of industrial and technological policy based on the principle of multilevel, restructuring the industrial sector and modernization of production, the development of high-tech breakthrough technologies, reforming the education system and the development of the triad of relations "science – business – state".

## 5. Conclusions

The modern development of world economic relations, and the globalization of the economy determine the need for innovative development of the national economy, the main elements of which are knowledge and innovation. The role and importance of intellectual resources and innovation capacity cannot be overemphasized.

The effective action of the modern paradigm of innovative development of the national economy should ensure not only the transition from the export-raw materials orientation of the domestic economy to the priority development of high-tech industries, but also access to existing segments of the global innovation market, the competitiveness of Russian high-tech companies in foreign markets, and strengthening the innovative positions of the state on the world stage.

The strategy of innovative development of the national economy should be aimed at maximizing the resource potential of the state in combination with the use of foreign innovative technologies and investments. It is important to choose the priority sphere of high technologies application and further close attention to their improvement, creation of the national market of innovations and effective infrastructure of innovations (from development, distribution and implementation, to obtaining economic benefit from them), which ensures the transfer of the results of research and development in the domestic world economy, as well as ensuring the interaction of the state and business in the innovation sphere on the principle of partnership.

The results of the study can be useful in making decisions on the implementation of the proposed mechanisms of innovative development of the national economy at the state and regional levels.

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