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Problems of forming a national innovation system in the Republic of Kazakhstan

***Annotation.** This article discusses the main directions of development of innovative processes in Kazakhstan. The main problems in the implementation of state efforts to create conditions for the development of an innovative economy are shown, the main reasons for the low level of innovative activity of most enterprises in the real sector are identified. The article concludes that the current state policy contribute to the creation of some organizational and legislative framework of the national innovation system.*

Key words: *innovation, modernization, innovative activity, innovative economy, national innovation system, financing of innovations*

In a market economy, the development of innovation and the formation of national innovation systems are becoming one of the most important tools for the competitiveness of the national economy.

Modern studies of the processes of formation and development of national innovation systems (NIS) are aimed at identifying the relationships and interactions between the state, business, research organizations and universities.

It should be noted that any economic system is a multitude of elements that are ordered in a certain way, which fully applies to national innovation systems. The main differences between national innovation systems are the degree of development of their infrastructure.

The Republic of Kazakhstan carries out social and institutional transformations, which involve the intensification of innovation through the development of state innovation policy, an integral part of which is the formation of a national innovation system taking into account international experience.

In Kazakhstan, a national innovation system is just being formed and in recent years a search has been made for effective models in the regions and much has already been done in this direction.

Meanwhile, it is undoubted that the role of regional innovation systems as structural components of the national innovation system should be significantly higher. All this dictates the need to strengthen government support for the systematic deployment of innovative processes at various levels of government in order to ensure the economic security of the country.

The dynamism of the national innovation system (NIS), its full functioning, largely depends on the strengthening of innovation processes in specific regions. The practice of the developed countries of the world shows that at present the quality of the country's economic space is largely determined by effective regional systems in the innovation sphere.

Considering the regional problems of the domestic economy, it is necessary to take into account the priorities of the elements of the innovative vector of economic growth of territories, which is especially important for regions with a low level of innovative development. They, unlike innovatively active regions, are able to compete mainly in scientific developments and / or educational activities. However, the weak innovation activity of the real sector of the economy leads to the fact that the implementation of the created innovations is insignificant.

In modern conditions, when developing measures to increase innovative activity in the country, including in the regions, it is necessary to analyze the diverse external and internal factors affecting the innovative attractiveness of the regions. The high heterogeneity of the innovation space of Kazakhstan is one of the features of its economy.

The analysis of the current state of innovation processes in the Republic of Kazakhstan showed that innovation activity in the Republic of Kazakhstan over the past five years has been quite active and intensively increasing its scale. Over the past five years, the volume of innovative products in the country more than doubled in comparable prices, the level of innovative activity of enterprises was 4,8–4,3 %, and the volume of domestic expenditures on research and development increased by 34,9 %.

At the same time, the main problems of the national innovation system are as a whole:

- low demand for innovations in the Kazakhstani economy, as well as its inefficient structure - an excess advantage in the direction of purchasing finished equipment abroad to the detriment of introducing its own new developments;
- weak connection between industry and the scientific sector; exclusively vertical system of innovation management in the country; poor innovativeness of the regions;
- lack of qualified personnel, including the aging of scientific personnel;
- low susceptibility of innovation among the population;
- poor integration into world science and the innovation market [1].

It follows that the transition of the economy to an innovative type of development is impossible without the formation of a competitive national innovation system and a complex of legal, financial and social institutions. Ensuring the interaction of educational, scientific, entrepreneurial and non-profit organizations and structures in all areas of the economy and public life. To create an effective national innovation system, it is necessary:

At the first stage, complete the process of industrialization of the country, since innovations can appear only where there is a strong industrial sector.

Increase the demand for innovation from most sectors of the economy; increase the efficiency of the knowledge generation sector (fundamental and applied science).

To overcome the fragmentation of innovation infrastructure, since many of its elements are created, but do not support the innovation process throughout the process of generation, commercialization and implementation of innovations.

Development of horizontal schemes for financing innovative activities, providing for the transfer of capital from one industry to another.

Creating system-integrated and network models of continuous innovation, that is, supporting the development of clusters of interconnected firms and organizations, higher education institutions conducting research and development [2].

Reform in the statistics of measuring the innovation sector in order to provide reliable information that reflects the real picture of everything that happens in this area.

It must be borne in mind that in order to achieve high rates of annual growth of indicators of innovative development in market conditions, a focused state policy is needed not only in innovation and scientific-technical, but also in the socio-economic sphere. The growth of incomes, the level of education and qualifications of consumers can become the basis for the development of production of high-tech products and services in the country.

It is necessary to strengthen interregional coordination in the formation of new industrial and innovative projects within the framework of the Industrialization Map, by developing a warning mechanism for the feasibility of their implementation at the time of the development of the feasibility study and design and estimate documentation. This is confirmed by the initiatives of the regions to build 8 cement plants in various regions of Kazakhstan or a significant number of projects for the production of plastic pipes.

In matters of increasing the innovative activity of the regions, it is necessary to use a differentiated approach in developing innovative policies for the development of regions.

The results of the analysis of the identification of levels of innovative activity in the regions of Kazakhstan showed that areas such as East Kazakhstan, Karaganda and the city of Almaty are more preferable for the implementation of innovative activities.

Regions with an average level of innovation activity include Pavlodar, Zhambyl, South Kazakhstan, Aktobe, Atyrau, Mangistau, West Kazakhstan regions and Astana.

With a low level: North Kazakhstan, Akmola, Kyzylorda, Kostanai and Almaty regions.

The main problem of the development of the regions is the significant imbalances in their development that persisted in the country as a result of the collapse of the Soviet Union. In this regard, many enterprises in Kazakhstan remained divorced from the production chain of the final product.

An important element of the resulting imbalance is the low level of coordination between the center and the regions and regions. In particular, on the one hand, in many regions there are characteristic signs of a significant increase in the cost of research and development, while the innovative activity of enterprises and the production of innovative products are carried out at a slow pace, and sometimes even a decline in these indicators. That is, these works have no practical significance for the manufacturing sector and are often declarative in nature [3].

On the other hand, the lack of own funds in the regions does not allow us to fully coordinate, attract and focus the existing internal potential on the development of innovative activity of enterprises. This restrains the process of involving both small and medium-sized businesses and the scientific and research potential of the development of regional universities, technology parks, and development institutions in innovation.

A vivid example of increasing the regional activity of entrepreneurship is the effectiveness of the implementation of the Government's Road Map program of anti-crisis measures with the transfer of financial resources to the regions. Thanks to which, the uninterrupted operation of domestic enterprises is ensured, unemployment is reduced and the conditions for the growth of entrepreneurial activity are created.

Thus, in order to solve the problem of low innovation activity in the regions, the following recommendations should be taken into account.

According to the experience of the United States, Japan and other countries in the management of innovation, in order to achieve a balanced and coordinated activity between the governing bodies, it is necessary that each of them have their own legal, political and financial powers. At the same time, the Administrations of the regions should be more active in the innovation sphere, since they know more about the needs of their regions. It is necessary that various initiatives of the regions in the field of innovations develop further into republican programs. In this regard, the regions should play an experimental and educational role in the country's innovation policy.

It is necessary to develop inter-regional competition in obtaining budget financing, as a result of which the development of the innovative potential of the regions will take place. Due to the existing imbalances in the level of innovative development of the regions, it is necessary to develop differentiated principles of regional innovation policy, taking into account their characteristics.

To identify missing or weak elements of a regional innovation system by developing regulations for the interaction of its elements.

Make the most of the potential of Socio-entrepreneurial corporations to attract national and international companies capable of accelerating the technological re-equipment of regional enterprises as residents of technology parks and industrial parks. To do this, it is necessary to ensure a further analysis of the effectiveness of their work for testing and developing effective support mechanisms.

Regular monitoring of the effectiveness of implemented measures to support innovative development, in order to carry out the necessary corrective measures and the effectiveness of all elements of the innovation system, especially development institutions. There is a need to develop a special program to support regional researchers, including through practical knowledge and advanced training in commercialization centers, enterprises, universities, internships in foreign research organizations and factories of leading world manufacturers, participation in international scientific and practical conferences.

To intensify information support for the development of innovation in regions, industries and national companies, aimed at increasing the prestige and attractiveness of innovation. To ensure the formation of databases of technological and organizational innovations in relevant areas, the creation of the necessary Internet resources for their publication and discussion [4].

An important element of increasing innovative activity in the future is to ensure the promotion of innovative entrepreneurship in the media, creating an atmosphere of "tolerance" to risk in society [4]. The creation of modern exhibition complexes, circles and training centers in various fields of science and high technology, the distribution of publications and materials of popular science books and magazines that contribute to increasing the interest of society and especially children and youth in innovation.

In improving the competitiveness of the national economy of Kazakhstan, technological transformations are key - overcoming technological degradation, mastering the technology of the modern fifth and future sixth technological structures, developing a long-term, coordinated innovative technological and structural strategy focused on innovative breakthroughs and progressive structural changes. Kazakhstan has set the task of transitioning to an industrial-innovative type of economic development, focusing on a strategy to support high-tech industries, the innovation sector and entrepreneurship.

Key factors influencing technological development are production efficiency and technical re-equipment, the speed of development of new types of products and the attraction of the latest production technologies. The special influence of these factors on the technological development of the country is due to the structure and condition of Kazakhstani industry, the situation in the scientific and technical sphere, the global conjuncture on commodities, the growth trend of the domestic economy and such historically established factors as the quality of staffing and the raw material orientation of the industrial structure. However, the state of these factors at the moment does not correspond to the required level and does not provide a steady growth in the products of these sectors, the development and introduction of new goods, and their entry to a high level of competitiveness [5].

To increase the level of technological development of the Republic of Kazakhstan in the conditions of the existing industry structure and the current state of scientific and technological potential, special attention should be paid to the following factors:

1. The use of innovative technologies in industry;
2. The level of scientific and technical infrastructure;
3. The state of fixed assets of enterprises;
4. The introduction of modern management technologies [6].

For a number of reasons, both substantive and purely organizational in nature, the effectiveness of innovative and technological development in the country is not high enough, therefore, effective innovative and technological development of the Republic of Kazakhstan will lead to:

First, the implementation of the strategic course towards diversification of the structure of the economy, based on overcoming its raw material one-sidedness. Economic priorities represent the accelerated development of innovative technological and investment sectors, primarily domestic engineering, in order to carry out technological updating of obsolete fixed capital mainly on its own basis;

Secondly, to the development of the consumer sector, creating conditions for improving the level and quality of life of the population. Priority national projects and relevant strategic measures implemented in Kazakhstan are aimed at this;

Thirdly, to increase the competitiveness of products and improve the structure of the economy and foreign trade of Kazakhstan and other countries through the implementation of an innovative breakthrough strategy;

Fourth, to develop integration ties with other countries in order to join efforts to achieve an innovative breakthrough and implement progressive shifts in the structure of the economy and foreign trade in the CIS. It is

advisable for Kazakhstan to develop a common promising interstate strategy with various countries and implement effective integration projects to modernize the economy;

Fifth, to a qualitative breakthrough and successful industrialization of the country, to an increase in the technical and technological level of enterprises through modernization of production, since technological leadership is the key to the competitiveness of the state economy;

Sixth, to increase the efficiency of Kazakhstani enterprises through the introduction of modern management technologies [7].

Adapting the experience of other countries to the conditions of Kazakhstan requires the development of a national innovation system, including a R&D system. The development of the R&D system requires the state to form the necessary conditions that support its effective functioning. Knowledge is often difficult to control and sell, so the private sector does not seek to invest in education and science. All the best innovative systems in the world receive government support, in many cases significant.

The experience of the formation and functioning of various innovative systems both in the near and far abroad countries has shown that success in this area is due to the mandatory presence of three factors: rational infrastructure; qualified management; reasonable financing scheme.

One of the possible options for the formation of the innovation infrastructure of the region is the creation of an innovation center, which can also exercise control over financial flows. When selecting innovative projects, priority should be given to projects focused on the modernization of existing industries based on modern technologies and improving product quality.

Innovative approaches provide the opportunity to move from predominantly price competition to non-price competition, the basis of which is "universal quality" and novelty. Only a quality product can compete in the market and conquer new segments.

Summarizing the above, we can draw the following conclusions:

- modern approaches to the formation and development of innovative systems take into account the non-linear nature of the innovation process, the close interconnection and interdependence of all elements of the NIS, and the orientation of innovations towards final demand. Moreover, not the elements (participants) of the innovation system, but the forms and intensity of interaction between them are becoming increasingly important;

- mechanisms of innovative development in various forms were implemented in the twentieth century in many countries of the world. However, despite the differences in science and technology policy, the tools of innovative support are largely similar and effectively applied by one or another group of countries.

In market conditions, indirect methods are becoming increasingly popular in foreign countries, as they do not require large one-time costs, unlike direct budget financing, and also create favorable conditions for the development of private innovative entrepreneurship. The most active application among indirect methods of incentives are special tax regimes. In the field of innovation, tax regimes are used to increase financial investments from the business sector and other non-state business entities;

- there is no "reference" NIS. In each case, the strategy for the development of the NIS is determined by the state macroeconomic policy, regulatory legal support, forms of direct and indirect state regulation, the state of scientific, technological and industrial potential, domestic commodity markets, labor markets, as well as historical and cultural traditions and features;

- the effective functioning of the NIS assumes the presence of the following key patterns in the development of innovation: a high level of financial support for R&D (1.5-3 percent of GDP); the predominance of private capital in financing research and development; high innovation activity of enterprises, development of a greater number of innovations in high-tech industries; high innovation activity of large corporations, the creation of their own laboratories and research centers; the historical symbiosis of science and production on the basis of business incubators, technology parks;

- the use of the international methodology for assessing innovation activity allows comparisons of regions not only for individual indicators, but also to characterize the entire innovation system. The grouping of indicators of innovation activity allows you to track the effectiveness of the country's innovative development at various stages. The most complete analysis of innovation can only be represented by a combination of indicators of innovation potential, the innovation process, as well as the resulting innovation indicators.

To support efforts to diversify the economy and promote Kazakhstan to the forefront in the global innovation system, the state will form a national innovation system based on the following principles:

- 1) Creation of world-class universities - the basis for the formation of the R&D system. In other words, universities will be actively involved in R&D, as a result of which university science will be further developed.

- 2) Financing R&D based on a grant system. At the same time, only research and development that is of the highest priority for the state will receive funding.

- 3) Determining R&D priorities in accordance with the priorities of the country's industrialization;

- 4) Introduction of an open and transparent process of expert evaluation of grant applications with the involvement of international experts at the first stage;

- 5) The application in Kazakhstan of the most effective technologies already used in other countries, taking into account adaptation to their own needs.

Thus, the planned system of innovation and technological development of Kazakhstan will lay the foundation for an economic breakthrough, making it possible to successfully implement the tasks set by the Head of State in the Strategic Documents.

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ТҮЙІН

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Қазақстан Республикасындағы ұлттық инновациялық жүйені қалыптастыру мәселелері

Бұл мақалада Қазақстандағы инновациялық процестердің негізгі даму бағыттары қарастырылған. Инновациялық экономиканың дамуына жағдай жасау жөніндегі мемлекеттік күш-жігерді іске асырудағы негізгі мәселелер көрсетілген, нақты сектордағы көптеген кәсіпорындардың инновациялық белсенділігінің төмен деңгейінің негізгі себептері анықталған. Мақалада қазіргі мемлекеттік саясат ұлттық инновациялық жүйенің кейбір ұйымдастырушылық және заңнамалық негізін құруға ықпал еткені туралы қорытынды жасалды.

Түйін сөздер: инновация, модернизация, инновациялық қызмет, инновациялық экономика, ұлттық инновациялық жүйе, инновацияларды қаржыландыру

РЕЗЮМЕ

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Проблемы формирования национальной инновационной системы в Республике Казахстан

В данной статье рассмотрены основные направления развития инновационных процессов в Казахстане. Показаны основные проблемы в реализации усилий государства по созданию условий для развития инновационной экономики, названы основные причины низкого уровня инновационной

активности большинства предприятий реального сектора. В статье делается вывод о том, что проводимая государственная политика способствовала созданию некоторого организационного и законодательного каркаса национальной инновационной системы.

Ключевые слова: инновация, модернизация, инновационная активность, инновационная экономика, национальная инновационная система, финансирование инноваций