

## **Innovations in Economic Development in the Modern Conditions of Globalization: Experience of Kazakhstan and Foreign Countries**

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### **Abstract**

*In this article, the authors conducted a study and analysis of the impact of innovations on the economies of countries, the current state and development of innovative activities, the introduction of new technologies, characterized by an increase in the role of their results in the life of mankind. The mechanisms of support from the state and business of research work, the creation of special educational programs for young scientists and innovators, and spaces where they could develop innovative technologies are considered. At a certain stage of innovation, the role of innovation, the introduction and widespread distribution of new products, is a key driver of growth.*

**Key-words:** Innovation Activity, Development of Innovations, Inventions, Innovations, National Innovation Systems, Scientific Achievements.

## 1. Introduction

Innovation activity in all countries of the world is one of the leading conditions for modernizing the economy. Thus, according to experts, the creation, implementation and wide distribution of new products, services, technological processes are becoming key growth factors.

Further application and development of innovations depends on support from the state and business for research work, the creation of special educational programs for young scientists and innovators, and spaces where they could develop innovative technologies [1].

The creation of a favorable innovative environment leads to the emergence of special workspaces for young, promising professionals. Such sites are called technology hubs, business incubators, acceleration centers and become centers of innovation if professional communities and start-up communities are formed and developed in them. They often become a practical and research base for students of local universities. Most of these spaces today are in the USA and Europe. Recently, similar projects have appeared in the post-Soviet space, including in Kazakhstan.

To effectively build a national innovation system in Kazakhstan, there is a new general line for the development of innovations, within the framework of which quality support is provided to Kazakhstani innovators. The State Program of Industrial and Innovative Development, developed by the Government of the country, creates conditions for a scientific and technological breakthrough in Kazakhstan.

In different countries, the introduction of new technologies is carried out in different ways. For example, in America, most federal research and development (R&D) is conducted through contracts and grants from non-governmental organizations. In Germany, the experience of developing incubators in the United States, science parks in Great Britain and France was used. Since the early 1980s. in the country, an emphasis was placed on creating a network of regional innovation funds with a gradual transfer of the center of gravity of innovation activities to small and medium-sized enterprises.

According to experts, the countries of the South-East, when implementing innovation policy in Asia, focus on small and medium-sized innovative enterprises. In Japan, they account for 99% of the total number of enterprises, and their share in the country's GDP reaches 52%, or US \$ 3 trillion. As the experience of foreign countries shows, only those developments are financed where there is a

tandem "research institution - small innovative enterprise" and a real prospect of creating a science-intensive product and selling it on the market.

As the first President of Kazakhstan N. Nazarbayev noted, "in less than five years, the volume of the Kazakh economy has doubled. This year alone, 350 new innovative enterprises were built. We started to reform the scientific and innovative sphere" [2].

At the forum "Innovative Kazakhstan - a look into the future after 20 years of independent path", analysts emphasized the importance of bringing science and industry closer together. The government of the country is considering the "Business and Science 2020" Roadmap, which specifies the procedure for the participation of the business community in scientific research. It should be noted that in comparison with 2007, the allocation of funds for the development of science has increased almost three times. So, in 2011, the "Samruk-Kazyna" group of companies allocated 8 billion tenge for R&D. In Kazakhstan, by 2015, funding for research will be increased to 1% of GDP. This will be the largest investment in scientific and technological progress in the entire history of Kazakhstan.

At present, the Higher Scientific and Technical Commission has approved new priorities for Kazakhstani science. These are energy and energy saving, deep processing of raw materials and products, life sciences, information and telecommunication technologies. These priorities are focused on the scientific and technological development of production and human health, and imply a mandatory final output of research into innovation. Within the framework of these priorities, 88 of the most relevant projects were approved for program-targeted and grant funding. Their implementation is carried out on a competitive basis. For the systematic support of innovative activities in the republic, the necessary legislative and institutional framework has been laid. For example, as experts note, the total amount of funds raised from subsoil users from 2015 to December 2020 amounted to about 19 billion tenge. These funds were used to finance 137 projects of participants in the innovation cluster "Park of Innovative Technologies" to solve technological problems of subsoil users in the amount of 9.6 billion tenge [3].

For Kazakhstan, the creation and development of a competitive innovative economy, especially in the context of the globalization of the world economy, is one of the main and priority tasks. However, the current indicators of innovation development show weak dynamics: over the past 10 years, the share of R&D expenditures in the GDP structure has decreased to 0.12% (table 1).

Table 1 - The Share of Expenditures on Research and Development Work in GDP in the Context of Regions of Kazakhstan for 2010-2019

Internal expenditures on R&D,% of GDP	Years									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
across Kazakhstan	0,15	0,15	0,17	0,17	0,17	0,17	0,14	0,13	0,12	0,12
Akmola	0,10	0,06	0,08	0,08	0,08	0,10	0,06	0,06	0,10	0,08
Aktobe	0,05	0,04	0,04	0,03	0,04	0,04	0,04	0,04	0,04	0,03
Almaty	0,07	0,08	0,06	0,06	0,04	0,05	0,04	0,04	0,04	0,05
Atyrau	0,08	0,08	0,10	0,05	0,04	0,06	0,05	0,06	0,06	0,06
West Kazakhstan	0,02	0,03	0,03	0,05	0,03	0,04	0,09	0,01	0,03	0,04
Zhambyl	0,27	0,03	0,20	0,12	0,13	0,07	0,04	0,08	0,05	0,04
Karaganda	0,05	0,06	0,12	0,13	0,14	0,12	0,12	0,08	0,07	0,08
Kostanay	0,03	0,02	0,03	0,03	0,04	0,04	0,04	0,06	0,04	0,03
Kyzylordinskaya	0,01	0,01	0,02	0,01	0,02	0,02	0,05	0,04	0,02	0,01
Mangystau	0,21	0,28	0,29	0,25	0,25	0,36	0,32	0,24	0,26	0,27
South Kazakhstan	0,04	0,03	0,05	0,05	0,05	0,05	0,04	0,03	...	...
Pavlodar	0,02	0,03	0,03	0,02	0,02	0,02	0,02	0,01	0,01	0,04
North Kazakhstan	0,02	0,02	0,03	0,03	0,03	0,03	0,02	0,02	0,02	0,02
Turkestan	...	...	...	...	...	...	...	...	0,02	0,01
East Kazakhstan	0,41	0,26	0,22	0,18	0,13	0,14	0,12	0,16	0,15	0,17
Nur-Sultan	0,25	0,43	0,39	0,28	0,25	0,28	0,29	0,28	0,21	0,26
Almaty city	0,34	0,34	0,33	0,43	0,42	0,35	0,25	0,21	0,22	0,19
Shymkent	...	...	...	...	...	...	...	...	0,05	0,05

Compiled on the basis of materials of the Committee on Statistics of the Ministry of Justice of the Republic of Kazakhstan, <https://stat.gov.kz/>

Financial support instruments have been expanded specifically for innovations, new tax incentives and preferences have been introduced for the development of small and medium-sized businesses in the field of high technologies. In addition, the "Park of Innovative Technologies" is being created - a "smart" city of high-tech industries. Expansion of R&D is ensured by reducing the taxable base for corporate income tax by 150% of the cost of implementing R&D results.

The report "Global Innovation Index" (GII, Global Innovation Index) dated September 2, 2020 presented the next results of a comparative analysis of the innovation systems of 131 countries and their rating by the level of innovative development [4].

Note that the Global Innovation Index is a study of countries in the world by the level of innovation development. It has been compiled since 2017 by a consortium of Cornell University (USA), INSEAD Business School (France) and the World Intellectual Property Organization. When calculating the innovation index, 80 different indicators are taken into account in 126 countries, ranging from the number of applications for intellectual property rights to the creation of mobile applications, education costs and the number of scientific and technical publications.

Thus, Switzerland is again the leader in this year's ranking. Together with it, the top 10 included such countries as Sweden, USA, Great Britain, the Netherlands, Denmark, Finland, Singapore,

Germany and the Republic of Korea (Fig. 1). The position of the country in the GII in 2019 is given in brackets.

If we talk about the indices of the leading countries, then Switzerland has the first place - 66.08 points, Sweden - 62.47 points, the USA - 60.56 points. As we can see from the research data, Switzerland, Sweden and the United States have been among the first three GII leaders for the second year.

Figure 1 - Top 20 Leading Countries Global Innovation Index - 2020

1 Швейцария (2019 г.: 1-е место)	11 Гонконг (Китай) (13)
2 Швеция (2)	12 Франция (16)
3 Соединенные Штаты Америки (3)	13 Израиль (10)
4 Соединенное Королевство (5)	14 Китай (14)
5 Нидерланды (4)	15 Ирландия (12)
6 Дания (7)	16 Япония (15)
7 Финляндия (6)	17 Канада (17)
8 Сингапур (8)	18 Люксембург (18)
9 Германия (9)	19 Австрия (21)
10 Республика Корея (11)	20 Норвегия (19)

Compiled on the basis of materials from the web-site LSM.kz

Thus, Switzerland mostly invests in technologies with R&D expenditures from 2% to 5% of turnover, and 40% of their expenditures on high technologies (more than 5% of turnover) in private investments are in pharmaceuticals. This is due to the fact that most of the research in Switzerland is carried out by private companies.

In the Netherlands, according to Eurostat, expenditures on R&D in the private and public sectors are approximately equal (45.1% to 40.9%, the source of the remaining R&D expenditures are foreign entities. The fact is that the Netherlands does not need such high costs as in the USA and Japan: the share of spending on high technologies is small compared to other countries. This is due to their focus on other areas in which the Netherlands are specialists [5].

As the research data show, there is a steady strengthening of positions in the GII of individual Asian countries. For example, according to the results of the 2020 analysis, the Republic of Korea was among the leaders for the first time. Countries such as Singapore, China, Hong Kong have consistently shown steady progress in the Global Innovation Index ranking over the past few years. Thus, they are in the GII-2020 in the group of 20 leading countries.

In the list of "Global Innovation Index" Kazakhstan received 28.56 points with a median level of 30.94, getting 77th place. Compared to 2019, Kazakhstan has risen by two points, because last year, the country was in 79th place.

According to experts, in the ranking of 2020 Kazakhstan is below Russia (47th place), Belarus (64th), Armenia (61st), Mongolia (58th), Iran (67th), Jamaica (72 -e), Panama (73rd), etc. The study shows that Kazakhstan has raised its rating, ahead of neighboring countries - Kyrgyzstan and Uzbekistan.

It should be noted that the Republic of Belarus has a positive trend in innovation activity and has climbed eight steps in the Global Innovation Index.

Note that in the report, Kazakhstan was placed in the top 3 countries of Central and South Asia, along with India and Iran. At the same time, in 2020 Kazakhstan returned to the "Bloomberg Innovation Index" rating (top 60 countries), taking 59th place.

The Global Innovation Index consists of several indicators. Among them are human capital, in which Kazakhstan ranks 68th, as well as infrastructure (66th), development of the domestic market (53rd), business development (71st), progress in technology and the knowledge economy (112th), development of creative activity (87th).

The Republic of Kazakhstan faces such problems as insufficient funding for R&D, problems of protection, preservation, support, development, competent use and skillful commercialization of intellectual potential. The national system for the protection of intellectual property objects should have a sufficiently extensive legal framework capable of meeting the requirements of agreements to which Kazakhstan is a participant.

In Kazakhstan, the synthesis of science and production, the introduction of scientific achievements into the business environment is also the main direction of the development of innovations. At the same time, in Kazakhstan, there is a positive trend towards a decrease in the share of the public sector in R&D. Thanks to ongoing reforms in the scientific and technological sector of the country, Kazakhstan is gradually moving towards the development of an innovative economy.

The state, by supporting fundamental and applied research, creates conditions for the emergence of new scientific and technological ideas, which, not being demanded by national economic entities, may become necessary in the event of changes in the internal and external market conditions, and thus innovation-oriented business entities invest.

To increase the efficiency of innovation activities in Kazakhstan, not only traditional forms of state support (concessional lending, subsidies and taxation) are needed, but also forms of support widely used in world practice, provided to innovative enterprises. At present, the demand for the results

of innovative activities from the production and social spheres lags behind the capabilities of the country's scientific and technological potential. The main reason for this situation can be called a poor knowledge of the principles of commercialization of innovative technologies by domestic inventors and scientists.

In our country, for many years, a traditional technology-based approach to commercialization was used at the heart of the process, when the role of the state was to help the inventor develop the technology further. In this case, the lack of his entrepreneurial skills is compensated by a professional expert who is able to evaluate the idea, give a green or red light, thus removing risks. However, with this approach, too often, even very good technologies with potential in the market did not bring economic success due to insufficient study of consumer demand and the lack of specific management skills of the inventor.

Successful commercialization requires something more than an assessment of the potential of ideas, namely, a practical vision of the development of a business that is primarily demand-driven, including global, is required.

As a rule, a scientist is not an entrepreneur and is poorly oriented in the process of identifying a scientific development into a product or new product. Therefore, the key figure at the heart of the commercialization process is not the inventor, but the entrepreneur, or rather the team that manages the commercialization process.

That is why the mechanisms for supporting commercialization in Kazakhstan should be focused, in our opinion, not on the further development of technology, but first of all on the study of demand, on the development of entrepreneurial competencies to create an innovative business based on technology demanded by the market. At the same time, the technology commercialization policy should be closely interconnected with the support of entrepreneurship in the country.

Thus, it is necessary to move away from the traditional approach to the commercialization of technologies and, taking into account the specifics of Kazakhstan, it is necessary to create a practical and customer-oriented commercialization process. Only such an approach can guarantee quick results and the creation of a critical mass of innovations in the commercialization system.

Currently, Kazakhstan is actively creating an infrastructure to support the commercialization of technologies. As world experience shows, only 10% of scientific developments of research institutes and universities reach the market, and economic success most often comes from business. Therefore, when it comes to the process of commercialization, it should not be considered only as a process from the technology of scientific organizations and universities to the creation of a new company, but also as the launch of new products and services on the market by existing firms.

According to analysts, in 2017, the National Agency for Technological Development (NATD), together with the MOST business incubator, compiled a rating of the most innovative Kazakhstani companies in Kazakhstan. In total, there are 10 companies among them: Eurasian Group, KunTech, Samruk-Energo, Kazatomprom, SAPA, Beeline Kazakhstan, Tau Innovative Solutions, VVS Engineering, Mercury Properties and PolyTech Electronics. Beeline Kazakhstan, for example, annually invests up to 20% of its income in the creation of innovative products. In 2017, the company tested the NB-IoT (Narrow Band Internet of Things) communication standard for the Internet of Things. The technology allows automatic transmission of data from gas meters through the cellular network of the management company. Its task is to improve the gas supply service, making it safer. The innovative system is designed for the Smart Home and Smart City projects [7].

For Kazakhstan, support for the commercialization of technologies of existing enterprises is especially important, since the share of innovative companies is quite low, and therefore there are many hidden opportunities for using new knowledge to obtain commercial success of existing enterprises.

The undeveloped nature of the Kazakhstani "open market" makes it difficult, almost impossible for small and medium-sized high-tech enterprises to work in this market. A thorough study of the interest and compatibility of company sizes, adequate funding and competent management are a necessary and inevitable condition for success. But, at the same time, it is almost impossible to implement in Kazakhstan.

The commercialization of the market, the close connection between the international technology market and the world financial market is especially attractive for Kazakhstan, the unacceptably low share of which in the international market of high-tech goods is a tiny percentage.

The state, by supporting fundamental and applied research, creates conditions for the emergence of new scientific and technological ideas, which, not being demanded by national economic entities, may become necessary in the event of changes in the internal and external market conditions, and thus innovation-oriented business entities invest.

To increase the efficiency of innovation activities in Kazakhstan, not only traditional forms of state support (concessional lending, subsidies and taxation) are needed, but also forms of support widely used in world practice, provided to innovative enterprises. At present, the demand for the results of innovative activities from the production and social spheres lags behind the capabilities of the country's scientific and technological potential. The main reason for this situation can be called a poor knowledge of the principles of commercialization of innovative technologies by domestic inventors and scientists.



According to international agencies, Kazakhstan has the necessary conditions for the development of innovations - in particular, human resources, promising higher educational institutions, measures of state support, the presence of industrial facilities, etc. However, in fact, Kazakhstan demonstrates weak results of innovative development.

## 2. Conclusion

According to experts, Kazakhstan with a resource-based economy needs to develop science-intensive production and technologies, because the reserves of mineral resources are not unlimited, and with the development of renewable energy sources, the demand for oil may fall.

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