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PROBLEMS AND PROSPECTS OF THE TECHNOLOGICAL ENTREPRENEURSHIP: EXPERIENCE OF THE REPUBLIC OF KAZAKHSTAN

Abstract

Today, in order to develop the innovation and technology sector in Kazakhstan, work is underway to create favorable conditions for the development of technological entrepreneurship. The development of technopreneurship implies the existence of an effective national innovation system transforming new knowledge into new technologies, products, and services. The volume of innovative products is declining; one of the main reasons is the lack of connection between science and production. Innovative entrepreneurship is underdeveloped, hence technological entrepreneurship is underdeveloped. Innovative passivity is 89.5% that is the result of internal and external factors. In the scientific community, most studies focus on external factors, but in this study, the authors recommend paying attention to the importance of in-depth study of internal factors (personal experience and cultural characteristics). The purpose of the scientific article is to identify problems and prospects for the development of technological entrepreneurship in the Republic of Kazakhstan. To conduct the study, the authors used the method of descriptive statistics, based on data from the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. The authors applied basic statistical procedures for data analysis, analysis of basic statistics and logical analysis. The key aspects of the development of technological entrepreneurship in the Republic of Kazakhstan, highlighted by the authors, are the development of innovative ties, the knowledge economy and high-tech production. Thus, the article analyzes the level of development and factors hindering the development of technological entrepreneurship and offers recommendations that contribute to their minimization.

Key words: technological entrepreneurship, innovation system, basic statistics, logical analysis, strategic planning.

Introduction

Knowledge is becoming the most important source of competitive advantages for post-industrial economies. It also represents a commodity and is the embodiment of the production process. Any economy cannot exist without a strong manufacturing sector, and for this, it is necessary to establish a link between science (knowledge) and business. One of the first steps in establishing strong communication in this area is to support the idea at the start-up stage and bring it to the level of a finished product.

Entrepreneurship and innovation are the tools that allow the country to get rapid and high-quality development. Entrepreneurship plays a significant role in the growth of new jobs and the development of new industries. Interest in entrepreneurship has risen following global financial growth as a means of increasing quantity and wealth in the economy. Entrepreneurship is the driving force behind the application of innovation and sophisticated technology [1]. Particularly relevant is the growing interest in technological entrepreneurship, which has a high value added [2]. According to Dorf

R.C. and Byers T.H., technological entrepreneurship is a high level of potential opportunities for the commercialization of high technologies [3].

At the same time, commercialization occurs by pooling resources based on structured decision-making skills [4]. Bailetti T. defines technopreneurship as a process by which entrepreneurs seek opportunities and combine organizational resources, technical systems, and strategies. However, the term “technology entrepreneurship” is still often recognized as only applicable to early technology start-ups or is often used to refer to the very act of creating a technology startup. This understanding is especially relevant for Kazakhstan. Bailetti T. explains that there are three biases when discussing technology entrepreneurship: the first is the focus on startups, the second is the focus on individual entrepreneurs, and the third is an excessive obsession with exploring opportunities [5]. According to that, Bailetti T. analyzed 93 studies of technical startups and identified six representative definitions, which are clearly indicated in Figure 1.



Figure 1 – Representative definitions of technological entrepreneurship by T. Bailetti

Note: Compiled by the authors based on [5].

Based on this analysis, Bailetti T. suggested, that technology entrepreneurship is a series of projects aimed at integrating and effectively using personal and collective assets that are inextricably linked with advances in scientific and technical knowledge in order to create and maintain corporate entrepreneurship. According to this definition, technology entrepreneurship focuses on the use of technology assets for the survival and competitive advantage of a company, the concept that can be applied equally to a start-up or a large company [5]. Technopreneurs are different from inventors; inventors come up with ideas, and technopreneurs bring them to life [6].

Based on the above, we can conclude that the technology entrepreneur (technopreneur) is the entrepreneur who understands technology and uses technology opportunities for business through talent, monetary investment, and real-time decision-making skills for the purpose of entrepreneurship.

Today, as an example of the increasing role of the production processes intellectualization, the increase in the intensity of the use of intangible factors of production and intellectual capital, one can cite the actual results in the USA, the EU and Japan. So, in the US Senate in June 2021 the document “United States Innovation and Competition Act of 2021” was adopted (draft US Development strategy in the field of innovation), which has many initiatives that are estimated to cost 110 billion US dollars [7].

In the European Union, increased attention is paid to the strategy and practice of technological and innovative development at both the country and regional levels. The role of technological entrepreneurship in economic growth is significantly higher in countries and regions with high scientific and inventive potential.

As the most significant concept of innovative and technological development in the European Union we can note the concept of “three O” (open innovation, open science, openness to the world). Within this concept there were developed strategic goals and a set of measures to implement these goals; in Japan, the government is convinced that supporting innovation and technology through the collaboration of universities and industry is of great importance for the development of the economy [8]. Such cooperation stems from the number of joint research projects, the amount of money received within the framework of joint research projects, the number of contracts for R&D, the amount of money received by universities for the implementation of R&D and the number of student start-up projects.

All this suggests that the constraining factors of the intellectualization of the economy as a technological innovation process in these countries have been partially overcome, which gives them the opportunity to become leaders in the scientific and technological field.

The efficiency of technological entrepreneurship in the Kazakhstani modern economy can be assessed by analyzing the dynamics of innovation indicators, which is a defining feature of this type of entrepreneurship. According to official data, innovative activity in Kazakhstan was recorded in 11.5% (3.2 thousand companies) at the end of 2020 and 10.5% at the end of 2021 [9]. As of December 1, 2022, the number of enterprises registered in Kazakhstan is 512,465, which is 6.9% (35,216) more than in 2021 (as of January 1, 2022).

Today, the Republic of Kazakhstan is doing a great work to create an effective ecosystem of technological innovation culture, with paying much attention to technological entrepreneurship. The development of a start-up culture among the youth of the country is of a particular emphasis. Venture financing is actively developing, which is one of the priority areas of the State innovation policy. The Republic of Kazakhstan is a unique business context, combining the uniqueness of the Eurasian region. This feature should not be limited to allegations of institutional gaps, funding difficulties, underdeveloped technology transfer or insufficiently trained entrepreneurs.

The statements listed above are true and have been highlighted by many scientists as a field for improving the innovation and technological environment in the country. However, in this article, the authors suggest that there is a possibility of the influence of types of entrepreneurs by cultural and historical grounds, on the introduction of innovations and the development of technological entrepreneurship. Moreover, researchers Baron R.A., Chandler G.N., Hanks S.H. proved that the technological capabilities, education, and experience of entrepreneurs are directly related to the technical and managerial indicators of a technological project [10, 11].

Thus, as the result of the study, the authors concluded that venture financing is becoming one of the leading areas in the country with the development of an innovation ecosystem and the growth of entrepreneurial competencies of market participants in Kazakhstan. As a result, Kazakhstan, which is actively developing this market today, is quite attractive for foreign investment, but vulnerable in the implementation of techno-entrepreneurial projects based on innovation. In addition to institutional gaps, the authors note the lack of information about the socio-cultural characteristics of entrepreneurs in Kazakhstan, which in turn significantly affect the introduction of innovations and the development of technological entrepreneurship. From these positions, it is necessary to find effective ways to increase the efficiency of the development of technological entrepreneurship in the Republic of Kazakhstan.

Materials and methods

The methodology of the article lies in the application of content analysis of existing foreign literature related to the theory of technological entrepreneurship and its development. The theoretical and methodological basis of the study are hypotheses and concepts formed within the framework of the theory of innovation and innovative development, neoclassical, neo-institutional and resource theory of firms, the theory of the “bundle of rights” of property, the theory of state regulation of the economy, the theory of technological structures, the theory of innovation and innovative development.

The authors have used general scientific and concrete-subject methods to solve the problems posed in the study. In accordance with the goal of the study, methods of statistical observation, comparative analysis, probabilistic and prognostic methods, methods of graphic representation were used.

The basis of the study were the works of foreign economists, several works of Kazakhstani scientists, data from the The World Intellectual Property Organization, Unesco Institute of Statistics, Internet sources and other articles.

To conduct the study, the authors used the method of descriptive statistics, based on the data of the Bureau of National Statistics Strategic Planning and Reform Agencies Republic of Kazakhstan. The authors have used basic statistical procedures for data analysis, basic statistics analysis, and logical analysis. To determine the rating of Kazakhstan for innovation, the authors have used the results of the Global Innovation Index Report for 2022.

According to the innovation statistics of the of the Bureau of National Statistics Strategic Planning and Reform Agencies Republic of Kazakhstan, at the end of 2021, it was carried out the statistical observation of the innovative activity enterprises.

The basis of the study were the works of domestic economists, several works of Kazakhstani scientists published in Russian, Russian textbooks, data from the World Internet and other articles.

Literature review

The theoretical understanding of the term “entrepreneurship” has evolved with the development of economic relations, in collaboration with the foundation of science, technology and innovation. R. Cantillon in his works laid the beginning of the understanding of the term in the XVII–XVIII centuries. The scientist understood entrepreneurship as a risky activity. With the development of the market in the 19th century, the theory of entrepreneurship was seen as an activity that rationalized the factors of production.

J.B. Clark, A. Marshall, J.B. Say and F. Walker carried out the study of entrepreneurship from this point of view. Karl Marx considered entrepreneurship as an activity employing workers in order to obtain surplus value. In addition, M. Weber and W. Sombart considered as an activity for the realization of the goals of society.

In the XX century, approaches were formed from the essence of entrepreneurship as innovation (J. Schumpeter), as an activity that ensures the optimization of exchange operations (I. Kirzner, L. von Mises, F.A. von Hayek), as an activity to predict the main parameters of production development under conditions of uncertainty (M. Dobb, F. Knight, I. Tyunen).

Adam Smith, the founder of economic theory, argued that the division of labor is the source of wealth, thus describing the phenomenon of technological entrepreneurship. With the growth of the scale of world trade, the growth of potential markets is growing, where an entrepreneur appears, initiating the production of new innovative goods. At the same time, the entrepreneur asks the question of minimizing costs while maintaining quality and meeting demand.

The concept of entrepreneurship originated from theatrical enterprise (private theatrical and other entertainment enterprises (traveling theaters)), as the experience of the first entrepreneurship. Theaters were forced to constantly improvise to meet demand, while constantly being in touch with real demand and looking for solutions to meet that demand. After this, the understanding of the term entrepreneur moves into the construction industry. In the first dictionaries of the middle of the 18th century, the term is associated with construction. In English, entrepreneurship is associated with the East India Company (a joint-stock company created in 1600, and received privileges for trading in India), because trading entrepreneurship prevailed, profiting from the difference in potentials between the price in one place where it was possible to purchase, and the price where it could be sold. In other words, the entrepreneur made money from exclusive knowledge. After the start of the industrial revolution, entrepreneurship arises those profits from the growth of labor productivity (technological entrepreneurship). The cheaper the goods or services are produced, the greater the potential added value and the entrepreneurial profit embedded in it.

The Austrian School of Economics, in particular its representative Joseph Schumpeter, developed the theme of creating new systems of division of labor. Representatives of this school in the late 19th and early 20th centuries put forward the hypothesis that the entrepreneur is the figure that contributes

to the creation of new systems of division of labor. Joseph Schumpeter developed the idea that the function of entrepreneurial activity is the configuration of factors of production, because of which new systems of division of labor are created.

However, large cycles of development imply creative destruction, where economic development formed the basis of the theory of large cycles proposed by N.D. Kondratiev. The main contribution to the development of N.D. Kondratiev's theory was introduced by J. Schumpeter. According to J. Schumpeter's opinion, the economy grows thanks to entrepreneurship [12]. So, according to Schumpeter, the function of the entrepreneurial community is creative destruction. Economic development is revolutionary changeable.

G. Mensch's model of socio-economic development shows that "the cycle begins with a technological impasse because of stagnation in the previously most developed industrial areas. This situation generates the cultural, political, social, economic, and technological conditions necessary for the emergence of a cluster of basic innovations" [13].

Some aspects of technological entrepreneurship are presented in the works of Kwon M., Jung H., Dorf R.C., Byers T.H., Shane S., Bailetti T. A significant role in all processes of technological entrepreneurship development is played by entrepreneurial policy instruments studied by Smallbone D., using which the authorities reduce transaction costs by improving the business environment, removing barriers, developing infrastructure, etc. On the need to understand and realize direct financial support in combination with private capital, Cumming D.J.

In economic science of Kazakhstan, A.E. Assenov, A. Tulepbekov, N.N. Kulbatyrova, R.N. Asanova, F.M. Dnishev, D.S. Musabalina, A.A. Kireeva and others studied in their works entrepreneurial activity in conjunction with innovations.

Despite a significant number of works devoted to certain aspects of entrepreneurial activity and its role in the implementation of the strategy of innovative development of the national economy, it should be recognized that there is no single interpretation of the essence of technological entrepreneurship and the factors of its development, the topic of technological entrepreneurship as a separate phenomenon in the Republic of Kazakhstan has not been sufficiently studied. The need for a comprehensive study of technological entrepreneurship in the relationship determined the purpose, objectives, and structure of the study.

Main provisions

Technological entrepreneurship is a type of entrepreneurship that makes a profit by increasing labor productivity, by increasing the efficiency of using all factors of production. The emergence of this type of entrepreneurship is the embryonic form of industrial revolutions. The technological entrepreneur assembles a complex system of activities from simple elements. Using a vertical system of division of labor, the entrepreneur accumulates all knowledge and, subsequently, a horizontal form of division of labor.

Today, human capital is quite such a significant subject of competition between countries, since the use of high-quality human capital, in the form of talents, in conjunction with education and science, creates capital (commercialization of the results of the activities of technology entrepreneurs). Today, the Republic of Kazakhstan aims to create an innovative ecosystem where technological entrepreneurship could develop and grow on a scale. The development of technological entrepreneurship in the Republic of Kazakhstan is directly affected by the development of the national innovation system, which today has several gaps in the system of functioning and assistance in the accumulation of innovations.

According to the Global Innovation Index, developed by Cornell University, INSEAD Business School and the World Intellectual Property Organization, and reflecting the potential of innovation and its results, the leaders in innovation in 2022 are Switzerland, the USA, Sweden, the UK, the Netherlands, South Korea, Singapore, Germany, Finland, and Denmark. The Republic of Kazakhstan ranks 83rd among 132 countries and territories of the world (75th place in 2021). Such a decrease in the Global Innovation Index indicates the vulnerability of the country in the implementation of innovative, techno-entrepreneurial projects [14]. The Global Innovation Index includes seven analytical blocks. The strongest country positions of Kazakhstan are observed in such blocks as Institutions and Infrastructure (52 and 58 places). The weakest links in the national ecosystem of

innovation development are the results of creative and scientific activities (118 and 81 places). Things are also bad with the development of the market – only 90th place [14].

Table 1 – Rating of the Republic of Kazakhstan in the Innovation index, 2022

Criteria	2021	2022
Institutions	45	52
Human, capital, and research	66	60
Infrastructure	58	58
Business sophistication	78	68
Knowledge and technology outputs	86	81
Creative outputs	110	118
Note: Compiled based on the source [14].		

Table 1 shows that the criterion “Institution” ranks 52nd in the global index 2022 (45th in 2021). In this section, the political climate, regulatory factors (such as “the role of the law”), and the business climate were assessed. In view of the current political events over the past year, the decrease in this indicator becomes logically clear. Business Environment is ranked 68 (78 in 2021), reflecting such data as the number of knowledge workers, the percentage of women employed, gross domestic expenditure on research and development, gross domestic expenditure on research and development funded directly by businesses, innovative communications, research and development cooperation between universities and industry, the number of patents, the assimilation of knowledge, payments for intellectual property, imports of high-tech goods. Here we can observe an improvement in performance.

Based on the analysis of the above data, it can be concluded that, according to the global ranking in the Republic of Kazakhstan, the most lagging behind and hindering the development of the business environment is a rather low level of innovative ties. “Knowledge and Technology Outcomes” is ranked 81 (86 in 2021), where the weakest link is the knowledge impact factor (productivity growth, new businesses, software spending % of GDP, ISO 9001 quality certifications, high-tech manufacturing). As a result, it becomes clear that, according to the data presented, the top 3 factors hindering the effectiveness of the results of knowledge and technology include insufficient spending on software, certification of teaching staff and high-tech production.

Analyzing the indices of innovative development of foreign countries, we can notice a slowdown in the dynamics of technological progress and the introduction of technologies. Compilers of the 2022 Global Innovation Index note a slowdown in labor productivity growth. As the authors of the Global Index note, a more careful and attentive attitude to innovative ecosystems can open the doors to a new era of innovative development, the impetus for which will be set by innovative waves determined by digital technologies and “deep science” [14].

The Kazakhstani practice of improving the performance of technological entrepreneurship has its own characteristics. For these purposes, the country uses a program-targeted approach, which provides for effective interaction between scientific organizations and business in the innovation sphere, through the implementation of joint technological programs. Such programs are being developed to enhance cooperation between the state, science, and business in order to develop promising areas of technology, ensure a continuous flow of funding for companies conducting research, and improve the system for providing grants and maintaining innovative partnerships. Today the effectiveness of the practical implementation of state programs remains extremely low. At the heart of everything is the development of the national innovation system.

The Republic of Kazakhstan sets itself the goal of technological development through the development and growth of digitalization, science, and innovation. For 2021, the growth in the contribution of science to the development of the country is 25%. This indicator includes the share of commercialized scientific developments in the total amount of applied scientific research financed from the budget. According to the national project “Technological breakthrough through digitalization, science and innovation” for 2021–2025, this indicator should reach a growth of 10% and reach 35% in 2025 [9].

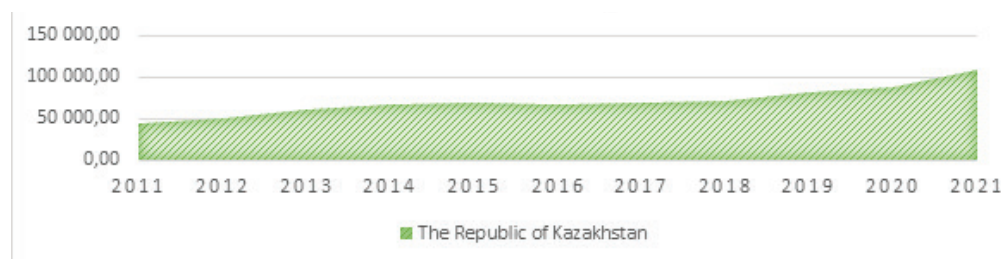


Figure 2 – Internal R&D Expenditures (KZT millions)

Note: Compiled based on the source [9].

As can be seen from Figure 2, over the past 10 years there has been a significant increase in R&D spending. In 2021, the Republic of Kazakhstan spent 109,332.7 million tenge on R&D. Despite the dynamic growth of this indicator, the R&D costs of the Republic of Kazakhstan lag those of developed countries, which indicates the existing barriers to the development of the national innovation system.

As mentioned above, Kazakhstan faces the number of challenges on the path of innovation and technological development, where the National Innovation System is an important component and basis for the functioning of technology entrepreneurs. The solution of the listed problems indicated in Figure 2, requires a revision of all the principles and indicators of the development of the country’s system.

Results

Kazakhstan has a developed infrastructure for the cultivation and introduction of innovations, the development of technological entrepreneurship, which will further contribute to improving the competitiveness of the country. The innovation ecosystem consists of many institutions (“Astana Hub” international techno park of IT startups, “Park of Innovative Technologies” autonomous cluster fund, JSC “QazTechVentures”, JSC “National Agency for Innovation Development “Qazinnovations”) that contribute to the development of technological entrepreneurship. The World Bank “Stimulating Productive Innovations” project is being implemented [15]. NURIS innovation cluster of Nazarbayev University, Fintechhub at the AIFC, the International Center for Green Technologies and Investment Projects, the Center of the Fourth Industrial Revolution, opened in 2021, are functioning. It is also worth mentioning the institute of Baiterek Foundation, SEC, FEZ, industrial zones, development centers under akimats.

However, despite the developed infrastructure, its efficiency does not quite reach the best indicators.

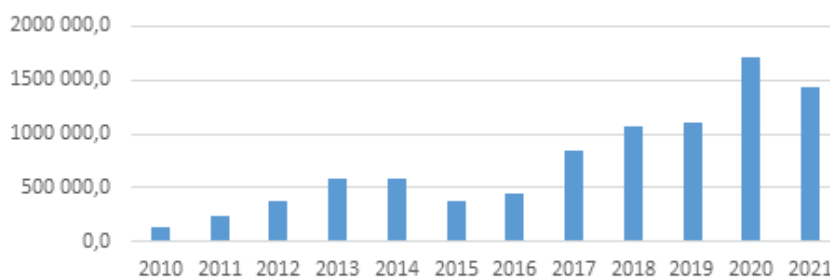


Figure 3 – The volume of innovative products, million tenge

Note: Compiled by the authors based on the source [9].

Figure 3 shows the greatest growth in innovative products for the period from 2010 to 2020. This decade is characterized by an increase in the volume of innovative products by almost 10 times. However, the volume of innovative products in 2021 compared to 2020 decreased by 16.1% and

amounted to 1,438,708.5 million tenge. Innovative products were sold in the amount of 1318106.1 million tenge. Analyzing the current KAZ DATA information we can see that the second half of 2022 is more stable compared to the analyzed period of 2021 [16]. During the reporting period of 2021, 2960 enterprises in the country had innovations. Compared to 2020, the number of enterprises with innovations decreased by 9.3%. According to the official data of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan published in May 2022 for the reporting period of 2021, innovation spending prevails in the following regions:

- ◆ Astana – 116 582,8 million tenge;
- ◆ Karaganda – 140 569,2 million tenge;
- ◆ Aktobe – 102 282,0 million tenge.

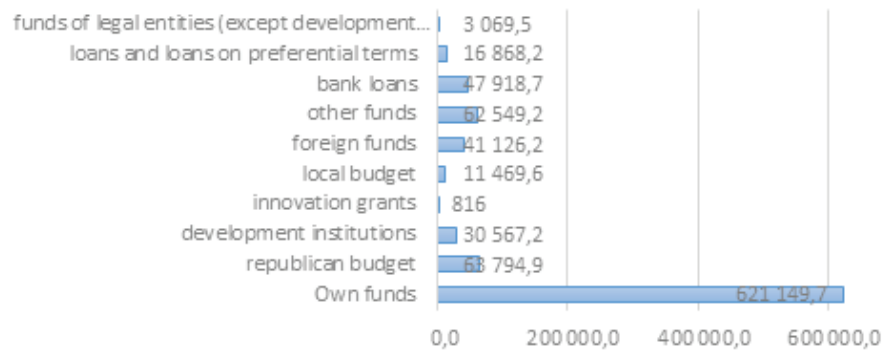


Figure 4 – Innovation spending by funding source in the Republic of Kazakhstan, 2021

Note: Compiled by the authors based on the source [9].

In general, in Kazakhstan, out of the total amount of innovations of 800,089.5 million tenge, the largest costs are borne by enterprises (77.6% of their own funds). Funds in the amount of 63,794.9 million tenge (7.97%) are allocated from the state budget for the development of innovations. The smallest share in the cost structure is made up of innovative grants provided to enterprises – 816.0 million tenge (0.1%).

An important factor for understanding the level of development of the innovation economy is the type of innovation in enterprises.

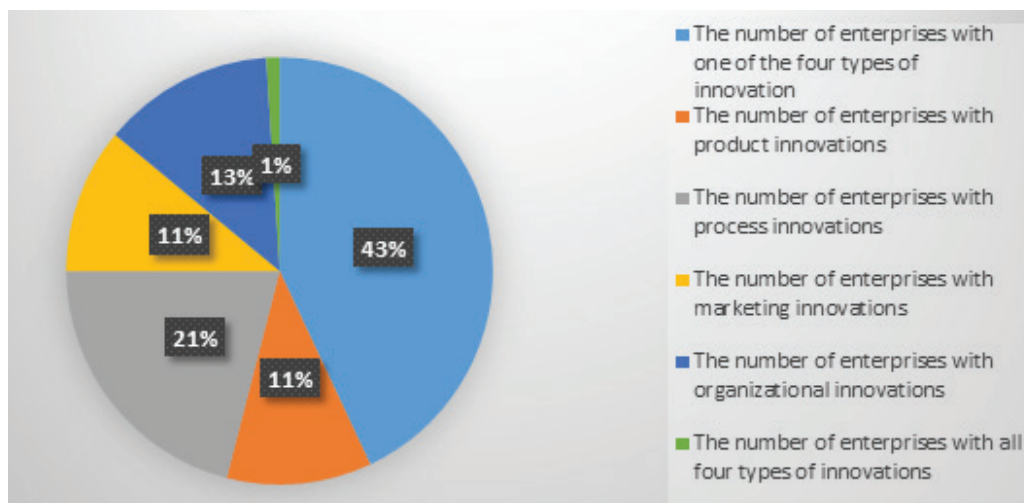


Figure 5 – Number of enterprises by type of innovation (units), 2021

Note: Compiled by the authors based on the source [9].

According to a study by the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan for 2021, the largest number of enterprises with all four

types of innovations operate in Almaty (38.5%), Nur-Sultan (23.1%) and Almaty region (13.5% each). The volume of innovative products in 2021 compared to 2020 decreased by 16.2% and amounted to 1,438,708.5 million tenge. Innovative products were sold in the amount of 1,318,106.1 million tenge.

One of the main reasons for the decrease in indicators, which can be called remaining relevant for a long time, is the problem of the lack of connection between science and production. Innovative entrepreneurship is underdeveloped, hence technological entrepreneurship is underdeveloped. It clearly demonstrates the indicator of innovative passivity for 2021, which is 89.5%.

Innovative passivity can be the result of both personal reasons and external ones. In the scientific community, to a greater extent, all studies are focused on the study of external factors affecting innovative passivity. However, as a result of the analysis of the materials listed above, and the work done by the state to improve the NIS, the authors come to the conclusion that the development of innovative activity, minimization of innovative passivity, and further development of the economy can be influenced by the personal experience and cultural characteristics of entrepreneurs. For example, in a 2022 study by Wu J., Si S., Liu Z., the authors note the differences between European and Asian social classes of entrepreneurs. In the post-industrial countries, many entrepreneurs come from the middle class and wealthy families. However, most entrepreneurs in Asian countries come from low-income families. Low-income entrepreneurs face very different challenges than their wealthy counterparts in the West [17].

Nevertheless, it is worth noting that incentives are being created in Kazakhstan to increase the interest of companies in the development of innovative products, services, and the introduction of new technologies. At the legislative level, enterprises are provided with conditions that provide for the prospects and benefits of their long-term investment in R&D and innovation. Work is also underway to increase interest in entrepreneurship among young people.

Discussion

No need to deny that for the real and full development of technological entrepreneurship in Kazakhstan, it is necessary to significantly increase the key indicators of the scientific and technological development of the country.

In Kazakhstan, there are only 690 R&D professionals per million inhabitants. For example, in Russia there are 2.7 thousand such specialists. In the ranking of the Global Innovation Index, the Russia occupies 47th place. It is also possible to trace the difference in R&D spending at the global level.

Table 2 – Research and development expenditure (% of GDP)

№	Country	% of GDP
1	Israel	5,44
2	South Korea	4,81
3	Sweden	3,53
4	Japan	3,26
5	China	2,40
6	Russia	1,10
7	Uzbekistan	0,14
8	Kazakhstan	0,13

Note: Compiled by the authors based on the source [18].

The National Development Plan of the Republic of Kazakhstan until 2025 notes the expected and planned increase in R&D costs to 1% of GDP. The State Program for the Development of Education and Science of the Republic of Kazakhstan for 2020–2025, approved in 2019, also outlines the goal of achieving 1% of GDP by 2025. Meanwhile, according to the results of 2020, domestic spending on R&D reached only 0.13% of GDP. Undoubtedly, there is a positive growth trend of 8.1% more

than in 2019. However, the share of expenditures in relation to GDP lags and is miserable. According to the planned parameters of the State Program, the indicator for 2020 of 0.13% is appropriate since significant growth can be obtained no earlier than 2023–2024.

A more advanced experience can be traced of the South Korean government, which, efforting to create jobs through technology start-ups, supports various R&D subsidies to stimulate technological innovation. As a result of increased spending on R&D, the share of startups in Korea has increased by an average of 10.9% per year over the past five years [19]. At the same time, it becomes clear why the Republic of Korea is in the Top-10 of The Global Innovation Index in 2022.

An increase in R&D costs, the use of significant incentives for the innovative activity of enterprises and entrepreneurs, priority attention to the training of technical specialists with competent skills, improving working conditions and increasing wages to stop the migration “brain drain” – measures that will raise the technological level of the country. The effects of the efforts made and Kazakhstan’s entry into the ranks of the world’s technologically advanced countries will be achieved only if Kazakhstan’s innovative products, enterprises, knowledge, technologies, labor force and, in general, the national innovation system are competitive.

For a full understanding of the whole picture of NIS (national innovation system) and the development of technological entrepreneurship, it is necessary to have a complete understanding of the objects of NIS, in particular entrepreneurs, about the reasons that encourage or do not encourage them to introduce innovations.

Table 3 – Reasons for not carrying out innovative activities at enterprises (units)

Lack of funds	5839
Lack of funds from external sources of financing	365
Innovation costs too high	1507
Lack of competent staff	453
Lack of information about technologies	306
Lack of information about the markets	446
Difficulty in finding partners for innovation	246
Dominance of existing enterprises in the market	210
Uncertainty of demand for innovative goods or services	1661
Not necessary due to earlier innovations	2459
Not necessary due to lack of demand for innovation	7738
Note: Compiled by the authors based on the source [9].	

Table 3 shows that among the most pressing reasons due to which innovation activity at enterprises was not carried out, we can single out the lack of demand for innovation and the lack of financial resources. As mentioned above, most of the costs of innovation are borne by enterprises. Given the fact that the share of innovatively active enterprises is a small part, it is worth thinking about the need to stimulate innovation in enterprises. The lack of connection between science and production is the result of many reasons. Most of the previous studies of Kazakhstani and foreign scientists make statements that the imperfection of the NIS is the main reason for the lack of communication between science and business, while an important aspect that is the driving force of any economy is lost sight of – entrepreneurs.

Before embarking on any measures, it is necessary to consider not only the external factors mentioned in the article, but also to study the portrait of entrepreneurs of Kazakhstan. Entrepreneurs are the driving force behind the development of the economy, they introduce and commercialize innovations – thereby developing technological entrepreneurship. Entrepreneurs take risks and attract venture capital investments. It is necessary to study in more detail the socio-cultural aspects that drive entrepreneurs in our country. Previous earlier studies have shown that people use economic institutions to create wealth [20]. However, according to Wu J., Si S., Liu Z. study, many entrepreneurs simply seek to feed themselves and their families, and countless businessmen are bosses in local companies known as ant traders [17].

Conclusion

Based on the above analysis, the authors concluded that the national innovation system (NIS) in its development faces several serious problems that hinder its effectiveness:

- ◆ Decrease in the volume of innovative products in 2021 compared to 2020.
- ◆ enterprises bear the greatest costs of the total amount of expenditures on innovation.
- ◆ The smallest share in the cost structure is made up of innovative grants provided to enterprises.
- ◆ The lack of connection between science and production.

Among the factors hindering the development and implementation of innovations, the 3 most significant ones can be distinguished:

- ◆ Low level of innovative ties.
- ◆ Insufficient spending on R&D.
- ◆ High-technological production.

The weakest links in the national ecosystem of innovation development are the results of scientific activity.

The authors suggest paying attention to the South Korean experience, where the government, in an effort to create jobs with the help of technology start-ups, increased R&D spending, as a result of which it received an increase in the share of start-ups.

The above factors have an increased impact on the sustainability of the economy of Kazakhstan (task No. 5 “Building the technological potential of industry” of goal No. 9 “Industrialization, innovation and infrastructure” of the UN international platform for achieving the Sustainable Development Goals (SDGs)).

The Republic of Kazakhstan is making great efforts to create an effective infrastructure for technological entrepreneurship in the country. To solve the problem of increasing national competitiveness in Kazakhstan, a program-target approach is used. It provides effective interaction between scientific organizations and business in the innovation field, through the implementation of joint technological programs. However, today the effectiveness of the practical implementation of state programs remains extremely low.

The authors also face the problem of the lack of a detailed classification of entrepreneurs by socio-cultural aspects in Kazakhstani statistics. The authors suggest the personal experience and cultural characteristics of entrepreneurs can also influence the minimization of innovative passivity and the further development of the economy, which is a topic for further study by researchers.

For development of high-tech production in Kazakhstan, the authors recommend that future research on technological entrepreneurship in Kazakhstan be focused on the study of socio-cultural aspects that affect the motivation of entrepreneurs to engage in innovative and technological activities in our country.

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ТЕХНОЛОГИЯЛЫҚ КӘСІПКЕРЛІКТІҢ МӘСЕЛЕЛЕРІ МЕН БОЛАШАҒЫ: ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ ТӘЖІРИБЕСІ

Андатпа

Бүгінгі таңда Қазақстанда инновациялық әрі технологиялық секторды дамыту мақсатында, технологиялық кәсіпкерлікті дамыту үшін қолайлы жағдайлар жасау бойынша көптеген жұмыстар жүргізілуде. Техно-кәсіптікті дамыту жаңа білімді жаңа технологияларға, өнімдер мен қызметтерге айналдыратын тиімді ұлттық инновациялық жүйенің болуын білдіреді. Инновациялық өнім көлемі төмендеп бара жатыр, негізгі себептердің бірі ғылымның өндіріспен байланысының болмауы болып табылады. Инновациялық кәсіпкерлік төмен деңгейінде дамыған, сондықтан технологиялық кәсіпкерліктің дамуы да нашарлайды. Инновациялық пассивтілік 89,5% құрайды, бұл ішкі және сыртқы факторлардың нәтижесі. Ғылыми ортада зерттеулердің көпшілігі сыртқы факторларға назар аударады, бірақ бұл зерттеуде авторлар ішкі факторларды (жеке

тәжірибе мен мәдени ерекшеліктер) терең зерттеудің маңыздылығына назар аударуды ұсынады. Ғылыми мақаланың мақсаты – Қазақстан Республикасында технологиялық кәсіпкерлікті дамыту проблемалары мен перспективаларын анықтау. Зерттеуді жүргізу үшін авторлар Қазақстан Республикасы Стратегиялық жоспарлау және реформалар агенттігінің ұлттық статистика бюросының деректеріне негізделген сипаттамалық статистика әдісін пайдаланды. Авторлар деректерді талдаудың, негізгі статистиканы талдаудың және логикалық талдаудың негізгі статистикалық рәсімдерін қолданды. Авторлар атап өткен Қазақстан Республикасындағы технологиялық кәсіпкерлікті дамытудың негізгі аспектілері инновациялық байланыстардың дамуы, білім экономикасы және жоғары технологиялық өндіріс болып табылады. Осылайша, мақалада технологиялық кәсіпкерлікті дамытудың негізгі аспектілеріне тежеуіш ретінде әсер ететін факторларды талдайды және оларды барынша азайтуға ықпал ететін бірқатар ұсынымдарды ұсынады.

Тірек сөздер: технологиялық кәсіпкерлік, инновациялық жүйе, базалық статистика, логикалық талдау, стратегиялық жоспарлау.

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ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ ТЕХНОЛОГИЧЕСКОГО ПРЕДПРИНИМАТЕЛЬСТВА: ОПЫТ РЕСПУБЛИКИ КАЗАХСТАН

Аннотация

На сегодняшний день в Казахстане в целях развития инновационно-технологического сектора ведется работа по созданию благоприятных условий для развития технологического предпринимательства. Развитие технопренерства подразумевает наличие эффективной национальной инновационной системы, преобразующей новые знания в новые технологии, продукты и услуги. Объем инновационной продукции снижается, одной из основных причин является отсутствие связи науки с производством. Инновационное предпринимательство слабо развито, следовательно, слабо развито технологическое предпринимательство. Инновационная пассивность составляет 89,5%, что является результатом внутренних и внешних факторов. В научном кругу большинство исследований акцентировано на внешних факторах, однако в данном исследовании авторы рекомендуют обратить внимание на важность углубленного изучения внутренних факторов (личный опыт и культурные особенности). Цель научной статьи – выявление проблем и перспектив развития технологического предпринимательства в РК. Для проведения исследования авторы применяли метод описательной статистики, опираясь на данные бюро агентства по стратегическому планированию и реформам Республики Казахстан. Авторами применялись базовые статистические процедуры анализа данных, анализа базовой статистики и логического анализа. Ключевыми аспектами развития технологического предпринимательства в РК, выделенными авторами, являются развитость инновационных связей, экономика знаний и высокотехнологичное производство. Таким образом, в статье проанализированы уровень развития и факторы, сдерживающие развитие технологического предпринимательства, предлагаются рекомендации, способствующие их минимизации.

Ключевые слова: технологическое предпринимательство, инновационная система, базовая статистика, логический анализ, стратегическое планирование.