ИССЛЕДОВАНИЯ РЕГИОНАЛЬНОЙ ЭКОНОМИКИ
REGIONAL ECONOMICS STUDIES

Priorities of the State Policy for the Development of the Knowledge-Intensive High-Tech Sector of Kazakhstan in the Conditions of the Eurasian Economic Union

Приоритеты государственной политики развития наукоемкого высокотехнологичного сектора Казахстана в условиях Евразийского экономического союза

DOI: 10.34130/2070-4992-2020-4-55
УДК 336.027:330.352.3

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The article deals with topical issues of determining the priority directions of the state policy for the development of the knowledge-intensive high-tech sector of the Republic of Kazakhstan within the framework of the Eurasian economic Union. The main purpose of the study is to recommend public policy measures in accordance with certain priority blocks that are adequate to the existing classification of subjects of the knowledge-intensive high-tech sector and the main trends in the development of indicators in the EAEU countries. The theoretical and methodological basis of this research is the identification of the subject component of the knowledge-intensive high-tech sector in order to develop adequate measures of state support. It has been established that at the present stage, the knowledge-intensive high-tech sector has become more active and includes entities that provide knowledge-intensive services, which is generally typical for developed countries, where the non-material sphere is developing dynamically. The main results of this study are aimed at developing the existing theoretical, methodological, organizational and economic aspects of the development of the high-tech sector in the EAEU countries, and in particular in the Republic of Kazakhstan. It is established that it is the state that plays the most important role in creating conditions and regulating, as well as adjusting the activities of the knowledge-intensive high-tech sector. The potential and efficiency of the entire sector and each individual subject depends on the effectiveness and quality of targeted state program documents that form the basis of state policy in the field of high-tech development. Therefore, within the framework of this study, the key priorities for improving the state policy for the

development of knowledge-intensive high-tech industries in Kazakhstan are formulated: legal, administrative, financial, informational and motivational. According to these priority areas, activities that create favorable conditions for the activities of subjects of the high-tech sphere to achieve productive performance are grouped. The results of the study can be used by authorized state and supranational structures to improve the state policy for the development of high-tech industries.

Keywords: *knowledge-intensive high-tech sector, high-tech industries, state policy priorities, the Eurasian economic Union, Kazakhstan.*

В статье рассматриваются актуальные вопросы определения приоритетных направлений государственной политики развития наукоемкого высокотехнологичного сектора Республики Казахстан в рамках Евразийского экономического союза. Основной целью исследования выступает рекомендация мероприятий государственной политики в соответствии с определенными блоками приоритетов, адекватными существующей классификации субъектов наукоемкого высокотехнологичного сектора и основным тенденциям развития данных отраслей в странах ЕАЭС. В качестве теоретико-методологической основы данного исследования выступает идентификация субъектной составляющей наукоемкого высокотехнологичного сектора для выработки адекватных мер государственной поддержки. Установлено, что на современном этапе в составе наукоемкого высокотехнологичного сектора выделились и активизировались субъекты, предоставляющие наукоемкие услуги, что в целом характерно для развитых стран, где нематериальная сфера динамично развивается. Основные результаты данного исследования направлены на развитие существующих теоретико-методологических и организационно-экономических аспектов развития наукоемкого высокотехнологичного сектора в странах ЕАЭС, и в частности в Республике Казахстан. Установлено, что именно государство играет важнейшую роль в создании условий и регулировании, а также корректировке деятельности наукоемкого высокотехнологичного сектора. От результативности и качества целевых государственных программных документов, составляющих основу государственной политики в области развития наукоемкой высокотехнологичной сферы, зависит потенциал и эффективность функционирования всего сектора и каждого отдельного субъекта. Поэтому в рамках данного исследования сформулированы ключевые приоритеты совершенствования государственной политики развития наукоемких высокотехнологичных отраслей в Казахстане: правовые, административные, финансовые, информационные и мотивационные. По данным приоритетным направлениям сгруппированы мероприятия, формирующие благоприятные условия деятельности субъектов наукоемкой высокотехнологичной сферы для достижения продуктивной результативности. Результаты исследования могут быть использованы уполномоченными государственными и наднациональными структурами для совершенствования государственной политики развития наукоемких высокотехнологичных отраслей.

Ключевые слова: *наукоемкий высокотехнологичный сектор, высокотехнологичные отрасли, приоритеты государственной политики, Евразийский экономический союз, Казахстан.*

Introduction

The science-based high-tech sector is essential to the progressive development of the country's future, namely, to improve the quality and standard of living of the entire population, through commitment and active action to achieve a high level of significant progress in the following sectors: engineering, information, medicine, defence and navigation technology. This, in general, contributes to more efficient and productive activities of the national economy, strengthening its competitiveness and affecting the improvement of all economic and social indicators. The development of a knowledge-intensive high-tech sector also contributes primarily to ensuring economic, technological and, most importantly, national security. In most developed countries, it is the knowledge-intensive high-tech sector that is the element that determines the efficiency of economic growth and drives innovation in all sectors of the national economy. Therefore, measures aimed at stimulating knowledge-intensive and high-tech development, coupled with the systematic formation of an enabling environment, should become the main orientation of government policy in any country. At the same time, it is necessary to move away from the old foundations, namely, to view the high-tech sector only as an integral part of the country's overall modernization policy, based on the maintenance and development of industry.

The science-intensive high-tech sector is a synthesis of productive economic activities and those that, through the skillful use of knowledge and human capital, produce services that cover the most important areas of human life and science. The distinguishing feature of these economic activities is that they have a high intensity of knowledge and a high level of technological development. Therefore, in the cost or added value of the products of this sector, the cost of scientific work is usually higher. These products also have a high level of technological sophistication; they are unique because they are created in connection with innovative demand and are associated with higher risks than other products [1-3].

The study of foreign sources on the functioning and state stimulation of the high-tech sector of the economy allows us to formulate the main key trends that prevail at the present stage. In particular, Amoroso, S. and others [4] consider topical issues related to the resource support of high-tech companies, including the issues of financing the activities of such organizations and ensuring the effectiveness of investments made in them. A whole set of studies [5-9] is devoted to the identification and functioning of the science-intensive services sector at the present stage. As far back as 2006, the OECD developed a sectoral methodology for activating the sphere of knowledge-intensive services [10]. Based on the identification of such a sector in the services sector, the knowledge-intensive high-tech sector itself is classified into knowledge-intensive production and knowledge-intensive services. Thus, the area of knowledge-intensive services, as the most high-tech part of today's creative economy, should in the near future become a separate object of detailed study and development of adequate state support and regulation measures.

Theory/methodology of research

The theoretical and methodological basis for this study is the identification of the subject component of a knowledge-intensive high-tech sector in order to develop adequate government support measures. As we have already noted, entities providing knowledge-intensive services have been identified and activated within the knowledge-intensive high-tech sector, which is generally the case in developed countries where the intangible sector is developing dynamically.

On this basis, the subjects of a knowledge-based high-tech sector are all those who are directly involved in the sector's activities by carrying out their specific functions and benefiting from them. The development of a knowledge-based high-tech sector undoubtedly attracts the greatest interest from the state, which is why it performs the most complex functions, ensures and tries to maintain a positive environment and implements measures to improve the efficiency of the sector. Other participants, in turn, take advantage of the opportunities provided, establish business activities and contribute to the further development of the high-tech sector.

In foreign literature, the equivalent of this definition may be the term "knowledge and technology-intensive (KTI) industries", introduced by the Organisation for Economic Co-operation and Development (OECD). In its latest report, the OECD notes that knowledge-intensive and technology-intensive industries consist of those industries that have a relatively high proportion of business research and development (R&D) expenditure to their value-added products[1]. These industries invest heavily in research and development and produce technologically advanced goods and services. Following the OECD classification, key high-tech industries use or develop modern trends such as artificial intelligence, robotic automation of technological processes, computer security, etc.

This classification has now been revised and, while only two years ago, "knowledge-intensive and technology-intensive industries" included five high-tech manufacturing industries (those that spend a significant proportion of their revenues on research and development) and five knowledge-intensive service industries (those that include high technology either in these services or in the provision of these services). The first group included aviation and spacecraft; pharmaceuticals; computers and office equipment; semiconductors and communications equipment; and measuring, medical, navigation, optical and testing instruments. The second group included business, education, finance, healthcare and information. The reason for revising this classification was that the high-tech service industries were highly aggregated compared to the high and medium-tech manufacturing industries and consisted of numerous detailed industries[2].

Thus, such a subjective theoretical and methodological approach will allow further research to develop a more appropriate classification of participants in the high-tech sector, which is more appropriate to the existing priorities of government support and regulation policy.

[1] Production Patterns and Trends of Knowledge- and Technology-Intensive Industries. Available at: https://ncses.nsf.gov/pubs/nsb20205/production-patterns-and-trends-of-knowledge-and-technology-intensive-industries (Accessed 03.08.2020).

[2] Industry, Technology, and the Global Marketplace. Available at: https://www.nsf.gov/statistics/2018/nsb20181/report/sections/industry-technology-and-the-global-marketplace/introduction (Accessed 03.08.2020).

Science-intensive high-tech sector of the Eurasian Economic Union countries

Despite the existing variety of classifications of high-tech industries [11], most of the high-tech industries in Kazakhstan are at a very low level of development. According to data from 2019, pharmaceutical production accounted for only 0.3% of total industrial output; chemical production for 1.6%; motor vehicles, trailers and semi-trailers for 1.2%; and computers, electronic and optical production for 0.2%. The largest share in the structure of the mining and processing industry was occupied by: extraction of fuel and energy minerals (42.9%); metallurgical production and production of finished metal products (17.8%); production of food products, including beverages and tobacco (7.5%); extraction of minerals other than fuel and energy minerals (6.5%) [12]. Thus, it turns out that three out of the four industries with the highest proportions are low-tech by nature of the industries and one is low-tech by technology. This trend has been observed for a long time and despite the implementation of government programmes and other measures, the situation remains unchanged.

Russia is the country with the most developed high-tech sector among the countries that make up the ENES because, historically, "traditional industries", namely, the defence industry, aerospace and nuclear industry, have formed the basis of NHS [13]. Together, the United States, the European Union and Russia account for over 80% of arms exports. According to the Centre for Analysis of the World Arms Trade, between 2016 and 2019, the top five world arms suppliers included such countries as the United States: The United States, Russia, France, Germany and the United Kingdom were among the top five world suppliers of arms between 2016 and 2019. At the end of 2019, the USA was the first supplier of arms, with revenues of 38.8 billion US dollars, or 42.1%. Russia rightfully took second place with arms sales and military equipment worth USD 14.1 billion, accounting for 15.4% of the total share. Russia is also the main exporter of armaments for the EEU countries, for example, in Kazakhstan the share of deliveries reaches 90%, the export leaders with the highest demand are helicopters and fighter jets[1],[2].

According to data from 2018, Kazakhstan was 47th out of 129 countries in terms of high-tech exports. Total exports of high-tech goods in the country amounted to 1,762 million USD, down 24.7 million USD compared to the previous year.

Table 1 below provides information on high-tech exports of the member states of the Eurasian Economic Union (EEU) for the period from 2016 to 2018.

Table 1

High-tech exports of the UAE countries, thousand US dollars

EAEC countries	*2016*	*share in total exports, %*	*2017*	*share in total exports, %*	*2018*	*share in total exports, %*
Armenia	21 845	1,3	28 310	1,3	36 293	1,5
Belarus	625 774	2,7	687 613	1,9	716 991	1,7
Kazakhstan	2 076 559	5,6	1 787 720	3,7	1 762 977	2,9
Kyrgyzstan	67 844	4,4	88 959	4,9	40 023	2,2
Russia	11 290 145	4	10 483 802	2,9	10 183 007	2,3

Source: compiled by the authors for — Eurasian Economic Commission. Socio-economic statistics. Science and innovation. Available at: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/econstat/Pages/science.aspx (Accessed 03.08.2020). (In Russian).

As can be seen from Table 1, despite the weak level of development of the scientific and high-tech sector, Kazakhstan is not showing the worst results. However, such relatively high performance among the UAE countries can be attributed to a reduction in total exports, e.g. in 2016 exports amounted to $36 billion and the year before $46 billion. Over the next two years, exports increased to $48 billion and $61 billion, respectively. This led to a reduction in the share of the high-tech sector in total exports. The downward trend in the share of the high-tech sector is also observed in countries other than Armenia — indicators for 2018 have slightly

[1] Following the results of 2019, Russia took second place on the world arms market. Available at: https://regnum.ru/news/polit/2841245.html (Accessed 03.08.2020). (In Russian).

[2] What kind of weapons Russia supplies to CIS countries. Available at: https://ru.sputniknews.kz/infographics/20200610/14201275/Kakoe-oruzhie-Rossiya-postavlyaet-v-strany-SNG.html (Accessed 03.08.2020). (In Russian).

increased, but the total exports have also shown growth. In Belarus, the share of the high-tech sector declined 1.6 times over the period under analysis, in Russia 1.7 times, and in Kazakhstan and Kyrgyzstan 2 times.

The research and development expenditure indicator should also be considered, as this criterion is important in determining how much interest the government and business itself has in the development of advanced products and innovative technologies. The use of scientific achievements and their further development are currently the main sources of economic growth. Countries with very high levels of research and development funding have the highest level of innovation potential. However, not always, a high expenditure rate means that a new technology or product will be created and released as a result. Table 2 below provides data on research and development expenditure and the number of organisations that have implemented it.

Table 2

Dynamics of costs and number of organizations involved in scientific research of the EEU countries

EAEC countries	*2016*		*2017*		*2018*	
	Internal research and development costs, million USD MILLION USD	*Number of organisations performing research and development*	*Internal research and development costs, million USD MILLION USD*	*Number of organisations performing research and development*	*Internal research and development costs, million USD MILLION USD*	*Number of organisations performing research and development*
Armenia	23,0	69	24,6	69	21,8	63
Belarus	237,7	431	319,5	454	362,4	455
Kazakhstan	194,7	383	211,3	386	209,5	384
Kyrgyzstan	7,6	79	8,2	73	8,3	71
Russia	14 108,8	4 032	17 471,1	3 944	16 441,0	3 950
ЕАЭС	14 571,8	4 994	18 034,7	4 926	17 043,0	4 923

Source: compiled by the authors for — Eurasian Economic Commission. Socio-economic statistics. Science and innovation. Available at: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/econstat/Pages/science.aspx (Accessed 03.08.2020). (In Russian).

Based on the data in Table 2, it should be noted that 96.7% of domestic R&D expenditure comes from Russia, 1.8% from Belarus, 1.2% from Kazakhstan and 0.1% from Armenia and Kyrgyzstan. The same applies to the number of R&D organisations, about 80% of which are in Russia, 9% in Belarus, 7.8% in Kazakhstan and 1.4% each in the remaining two countries. During the period under review, there was a decrease in the number of organizations in Armenia, Kyrgyzstan and Russia. Also in 2018, there was a marked decrease in R&D expenditure in all countries except Belarus, with an increase of 42.9 million USD. Most of these expenses are spent on economic activities such as "research and development" and "education" and are mainly financed from the budget. In Kazakhstan, the largest share of R&D expenditure is spent on applied research, as in Armenia, Belarus, Kyrgyzstan and Russia, when it comes to experimental development. Also in Kazakhstan, costs in the higher education sector are significantly higher than in other countries [14].

As mentioned earlier, Russia has the greatest potential for development and effective functioning in the high-tech sector among the EEU member states, due to the fact that most industries are knowledge-intensive and high-tech. Other countries are also trying to keep up, for example, Belarus has adopted targeted state scientific and technical programmes and has developed measures to support the innovation activities of economic entities. As Kyrgyzstan is in the early stages of developing an innovation economy, most of the activities have been aimed at creating and further maintaining a positive innovation environment. Armenia has formed the legal framework for innovation activity, which has helped to carry out a number of activities to define medium-term R&D priorities.

In Kazakhstan, however, the emphasis is on industrial and innovative development, and from 2010 to the present day, the third state programme is already being implemented, which aims to develop the manufacturing industry through the proper organisation of production of knowledge-intensive products and a higher technological level. During the implementation of the first two programmes, the following positive results have been achieved: two telecommunications satellites are currently in operation, an act on completion of construction of an assembly and testing complex of spacecraft has been signed; thanks to the implementation of the state programme “Digital Kazakhstan”, many industries are actively developing IT-infrastructure, improving

and automating production processes; and with the development of IT-technologies, there is a mass transition to electronic document management systems, as well as the development of electronic document management systems.

However, there are still a number of significant problems hindering the development of the high-tech sector, which are expressed through the lack of in-house developments; the small number of specialists in high-tech industries, which makes it necessary to attract foreign investors; the low interest of investors, both in-house and foreign; the low level of the scientific environment, etc. The development of high-tech industries leads to changes affecting all sectors and areas of the national economy, because new technologies have the ability to be useful and applicable in many industries and for various purposes at once. All these factors indicate that our country does not have a comprehensive approach to the development of the high-tech sector as such.

Priorities of the state policy for the development of a knowledge-intensive high-tech sector in Kazakhstan

The state plays a crucial role in creating the conditions and regulations and in adjusting the activities of the high-tech sector. The potential and effectiveness of the entire sector and of each individual entity depends on the effectiveness and quality of the targeted state programme documents that form the basis of state policy in the development of a knowledge-based high-tech sphere. It would therefore be rational to start by proposing recommendations to the state and the authorities, which have been divided into 5 blocks as shown in Figure 1 below.

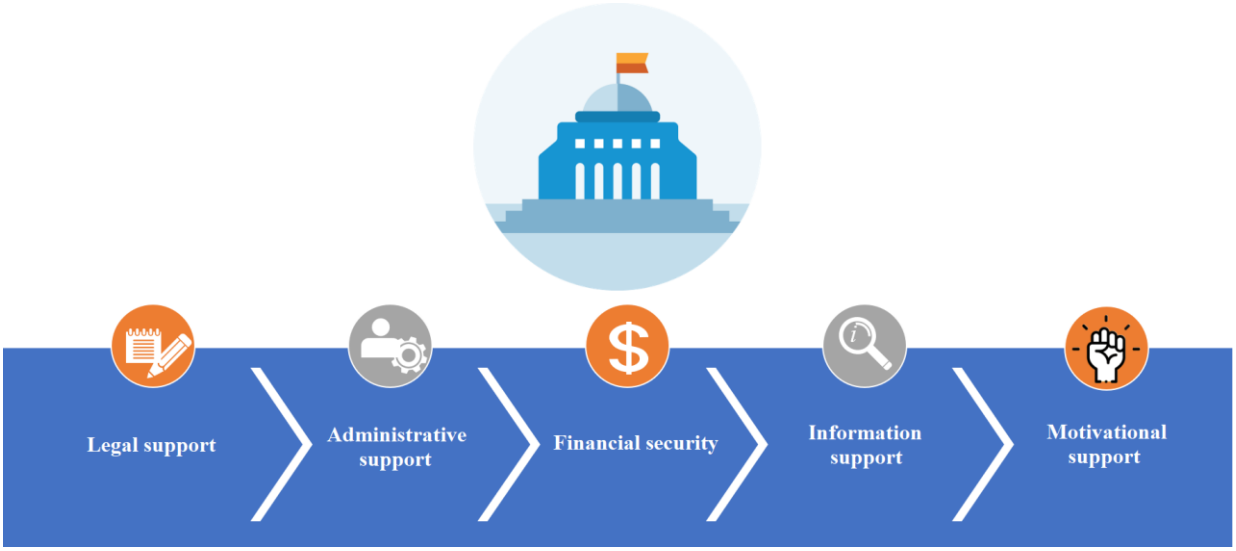

Fig. 1. Priority areas of government policy for the development of the high-tech sector in Kazakhstan

In the first block, the following tasks will be performed:

- development of a clear concept and accompanying quantitative and qualitative criteria for the terms “high-tech sector” and “high-tech company”, as well as consolidation of these definitions at the level of the republic's legislation;

- developing and implementing a policy aimed at increasing the number of high-tech companies based on suitable and useful priorities for our country. Because now, the development of NHS is only seen as part of government programmes more focused on the development of the industrial sector;

- revision of the tax system, introduction of tax incentives for entities operating in the NVS. It is known that some countries apply reduced rates of insurance premiums as part of tax incentives for R&D. For example, in Luxembourg, starting from 2018, a new regime for intellectual property has been introduced, the peculiarity of which is that 80% of income from patents, inventions and software may be exempt from taxation, which in turn leads to an effective tax rate of 5.2% for income tax with a standard 26% [14];

- establish a procedure for granting 'high-tech' subsidies and various support measures, based on the principle of creating 'complex' products that would be in significant demand from foreign importers, having previously studied the experience of existing companies — leaders in the export of high-tech goods;

- active assistance in realization of large innovative projects together with the countries which are a part of the EAEC, taking into account interests of all subjects of SNC, representing possibilities of participation in innovative projects based on offered ideas and visions, instead of the status or size of the subject.

The tasks carried out through administrative support include:

- First of all, for local authorities — understanding the activities and goals of existing high-tech companies in the region and the competitive advantages of the region itself. The science-based high-tech sector includes many different industries and one particular region cannot succeed in developing all of these industries. For example, the development of biotechnology depends heavily on close relationships with universities that have a strong scientific base; companies that produce advanced technologies have their own distinctive location preferences, as it is more important for them to rent related premises for long periods[1]. However, not all regions can provide the opportunities necessary for the full development of the activities of entities in these industries. It is therefore advisable to define the specialisation of your region and the dynamics of clusters of the selected industry or several industries.

- The next important step is to establish business relationships with high-tech companies in other regions, not only those in the neighbourhood. In Kazakhstan, business relations between the regions are weakly connected, mainly each region tries to cooperate with cities of national importance to a greater extent. Therefore, it is necessary to establish contacts with remote and not "similar" regions;

- intensifying support for scientific schools, as well as strengthening the links between research, innovation and education, creating conditions for the employment of young professionals to avoid losing potential innovators. Today, many young specialists are offered well-paid positions in various large and successful companies abroad, which is why their own minds have been dwindling;

- investing in human capital and quality of life. Foreign experience shows that the positive impact of monetary investment in human capital and environmental development is one of the factors of sustainable economic growth. Changing the thinking and culture of the population, as well as beautification of cities, will contribute to a faster transition to a high-tech society where business and living conditions are comfortable, which will result in lower emigration rates and increased labour efficiency;

- creating favourable conditions for private investors, which will make it possible to implement more long-term and capital-intensive scientific projects through the maintenance of developed infrastructure in the region, the creation of a clear and realistic strategy for interaction with investors, and correctly organised work on investor information support.

Financial support involves the implementation of measures aimed at improving access to finance for companies operating in the high-tech sector. This includes:

- a detailed creation of a grant co-financing tool (within the range of 40-50%) for projects implemented by technology companies to develop new products that would meet the demand of all major national companies for innovative and/or import-substituting products;

- increased funding and government orders for applied research and development;

- granting grants to SMEs in the amount of up to 60% of the cost of research and development work;

- it is also possible to introduce financial support, with certain criteria, when the amount of support provided changes depending on the type of R&D, its industry and significance.

Information support consists in the implementation of the following items:

- exchange of experience, cooperation and collaboration with high-tech organisations of the EEEC Member States in order to implement joint scientific and technological breakthrough projects;

- improvement of the developed market infrastructure allowing productive contacts with investors;

- establishing a process of interaction with interested young scientists and start-ups through forums, conferences and exhibition and fair activities in each region.

The motivational support consists of the following recommendations:

- motivating domestic manufacturers by implementing measures to support measures for certain equipment, components and materials that are essential in the process of manufacturing or servicing high-tech product groups, by applying quotas for the purchase of domestic high-tech products;

- creation of various support programmes for high-tech subjects through the provision of up-to-date information, advice, possibly technical assistance and training programmes;

[1] President of “Business Russia”: Business has a reflection on its role in implementing the May decree. Available at: https://www.vedomosti.ru/business/characters/2018/12/16/789403-u (Accessed 03.08.2020). (In Russian).

- providing expert and financial support to NBC organizations at early stages of development by business angels. As their experience, involvement and expertise can accelerate the development of high-tech products and increase their chances of being released in a shorter time;

- improving interaction between the subjects of internal affairs and the state by creating and maintaining a level of demand for high-tech technologies and services, for example, by concluding agreements providing for the provision of obligations to purchase certain products or advance payments.

- conducting events to encourage young people in the country to engage in scientific activities by providing grants for professions in demand in the field of science and technology, and encouraging them to pursue new ideas and projects on their own, thereby increasing the number of people employed in the scientific sphere.

Other actors in the high-tech sector must also make efforts and structure their activities, not only with a view to making a profit, but also with a view to bringing as much new and effective development to the sector as possible. To achieve this goal, we offer the following recommendations:

- in order to better position itself in the marketplace of high-tech products and to create a sustainable business model, the first thing you need to do is to: identify value chains; have your own capacity to continuously analyse the various value chains and make the appropriate strategic adjustments; constantly analyse all participants; identify the various stakeholders that could extract value from the products or services you supply.

- the next thing to do is to keep an eye on improving the company's scientific base — constantly monitoring and tracking what knowledge and skills may be required in the short and long term. Often, the knowledge required can be extremely specific and there is limited supply on the market. This may include: revising the recruitment strategy, as mentioned above, in line with skills important for future projects; regular technological training of personnel; and providing opportunities to participate in the creation of high-tech products, based not only on the position held but also on individual qualities and talents;

- in order to maintain the organisation's high competitiveness, it is necessary to consider the use of ultra-accelerated depreciation methods for new technologies and technological equipment. Which implies ensuring an average rate of fixed capital replacement at a level no longer than 6.5 years [16]. Because a significant part of fixed capital has longer periods of use, this average reproduction rate will be achieved by reducing its operation. Such methods of depreciation of fixed capital enable companies to keep pace with scientific and technological progress while achieving maximum competitiveness;

- the latest technologies and developments should be regularly and systematically monitored through various information channels, information should be quickly exchanged by collecting all data in a structured manner, data collection methodologies and market research tools should be continuously improved and new incentives should be created for active participation in the collection of technological intelligence;

- project implementation should be based on the fact that the entire project management process is flexible and adaptable to changing customer requirements and includes measures to reduce risks;

- the implementation and use of well-protected internal systems, in order to provide accessible confidential information for safer retrieval and subsequent use, leaving no possibility of jeopardising it from outside. It is also necessary to introduce procedures to maintain and protect intellectual property;

- striving for economic and other relationships with the state, as joint efforts on a project can bring more benefits to both parties. For example, a company may receive financial support and if research and development is successful, products may be distributed with the help of the government. The government, in turn, can take a direct part in research and development, controlling all stages and making adjustments, while obtaining new high-tech products that are domestically produced [17-20];

- establishing contacts with NBC entities from other EEU countries operating in the same industry as a result of information and personnel exchange, to gain new experience and expand knowledge;

- attracting young specialists and those who may not have higher education, but have the ability to generate ideas and are interested in a particular industry. Young professionals are usually more active and less afraid of the failures and risks associated with the implementation of new developments.

Conclusion

The science-intensive high-tech sector is clearly of global importance for the progressive development of the country and for improving the quality and standard of living of the population, creating an advanced society and strengthening competitiveness. The availability of qualified specialists and masters of their craft in high-tech sectors contributes to the formation and further application of intellectual property rights. The development of this sector provides many new opportunities and advantages for our country, including: positive structural

changes in the national economy, the possibility of opening and using a new energy source(s), achieving a high level of informatisation of society, entering the top countries of the world in terms of quality of life of the population, development of infrastructure, promotion in the space industry and much more. Subjects of knowledge-intensive high-tech industries produce products that can bring significant changes to existing conditions and contribute to more efficient functioning of the economy. The recommendations we have proposed to improve the performance of high-tech industry players have the potential to create favourable preconditions for sustainable economic growth in the long term.

Acknowledgements

This research was implemented through grant funding from the Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan (Grant No. A08053415).

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For citation: Orynbasarova E. D., Taubayev A. A., Kamenova A. B., Omar Zh. T., Borisova E. I. Priorities of the state policy for the development of the knowledge-intensive high-tech sector of Kazakhstan in the conditions of the Eurasian economic union // Corporate Governance and Innovative Economic Development of the North: Bulletin of the Research Center of Corporate Law, Management and Venture Investment of Syktyvkar State University. 2020. No. 4. P. 86–94. DOI: 10.34130/2070-4992-2020-4-55

Для цитирования: Орынбасарова Е. Д., Таубаев А. А., Каменова А. Б., Омар Ж. Т., Борисова Е. И. Приоритеты государственной политики развития наукоемкого высокотехнологичного сектора Казахстана в условиях Евразийского экономического союза // Корпоративное управление и инновационное развитие экономики Севера: Вестник Научно-исследовательского центра корпоративного права, управления и венчурного инвестирования Сыктывкарского государственного университета. 2020. № 4. С. 74–85. DOI: 10.34130/2070-4992-2020-4-55