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### Комплексный подход к инновационному развитию в республике Беларусь

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**Аннотация.** Проанализирована практика реализации пятилетних государственных программ инновационного развития, их достижения и проблемы, кадровый потенциал белорусской науки. Отмечается доминирование государственного сектора, недостаточное развитие малого инновационного предпринимательства, долгосрочный и комплексный характер управления инновационным развитием.

**Ключевые слова:** инновационная деятельность, национальная инновационная система, государственные программы инновационного развития, инновационная политика, кадровый потенциал белорусской науки

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Research article

### An integrated approach to innovative development in the Republic of Belarus

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**Abstract.** The practice of implementing five-year state programs of innovative development, their achievements and problems, human resources potential of Belarusian science are analyzed. The dominance of the public sector and the insufficient development of small innovative entrepreneurship, the long-term and comprehensive nature of innovative development management are noted.

**Keywords:** innovation activity, national innovation system, state programs of innovative development, innovation policy, human potential of the Belarusian science

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**Introduction.** The formation and development of an effective innovation policy in Belarus is carried out in accordance with the Law of the Republic of Belarus of 10.07.2012 "On state

innovation policy and innovation activities in the Republic of Belarus". The State programs for innovation development of the Republic of Belarus (hereinafter referred to as SPID) are of key importance in scientific and implementation activities. The first program was implemented in 2006-2010, and the second - in 2011-2015. The purpose of these programs was the formation of high-tech science-intensive industries of the V and VI technological paradigms.

An analysis of the results of the projects implemented within the framework of the programs showed that this main goal was not achieved. Basically, it was not advanced technologies

that were introduced, but ordinary modernization was carried out, with the involvement of international loans under state guarantees for the purchase of imported equipment and technologies. The effectiveness of such a strategy was low. The products manufactured at the enterprise after such an "innovative project" led to the release of goods that were "new" not for the world or domestic market, but only for this enterprise. Often, there were already analogs of such products on the market, so their production partially solved the problem of import substitution, but, in fact, was a catch-up development and preserved the technological lag behind the industry leaders.

**Materials and research methods.** These issues were taken into account when developing the SPID for 2016–2020. The government defined fairly strict criteria for innovation, established clear rules and procedures for conducting an independent expert assessment of projects to be financed within the SPID. By Order of the State Committee on Science and Technology of the Republic of Belarus dated June 5, 2017, No. 166, the "Methodological Recommendations for Classifying Technologies as Part of the V and VI Technological Waves" were approved. In order to create a mechanism for selecting and financing promising high-tech projects, the Republican Centralized Innovation Fund was established in 2016, which developed fairly strict procedures for a comprehensive analysis of the submitted projects in terms of their effectiveness for the country's socio-economic development. The successes of the implementation of the SPID 2016–2020 include: It can be attributed to the fact that the share of knowledge-intensive sectors of the economy in the structure of GDP increased from 28.5% in 2017 to 31.2% in 2021, and the share of shipped innovative products in the total volume of products shipped by industrial organizations over the same period increased from 17.4 to 19.8% [1, p. 11].

The share of innovatively active organizations in the total number of industrial enterprises in 2020 amounted to 26.2% and increased by 6.6% compared to the 2015 level. The disadvantages of this program include the fact that innovative development in the State Program for Innovative Development for 2016–2020 was still carried out mainly through the purchase of foreign technologies. Only 33 out of 75 projects were based on domestic developments, and more than 80% of funding was for projects related to the purchase of imported equipment and technologies [2, pp. 53–54].

Based on the interests of developing the innovative sector of the national economy and taking into account the aggravated foreign policy situation, when developing the State Program for Innovative Development for 2021–2025, priority in the selection was given to projects developed by domestic scientists. Belated replication of foreign technologies not only reduces profitability, but also creates threats to the country's technological security. This became obvious in 2020, when Western countries imposed unilateral sanctions against Belarus blocking technology transfer. Currently, the sanctions pressure is constantly increasing. Based on the current situation, innovation policy is built on the basis of the country's own intellectual potential and mutually beneficial cooperation with friendly countries. Therefore, the State Program for Innovative Development for 2021–2025 is based on the main principle that the main source of innovation is the developments of Belarusian scientists and innovators. For these purposes, the procedures for selecting and financing proposed projects have been changed, taking into account not only the level of the technology being implemented, but also the degree to which it uses domestic research and development.

**Research results and their discussion.** The implementation of the State Program for Innovative Development is of key importance for the socio-economic development of Belarus and has allowed achieving significant results. At the same time, some shortcomings of the existing practice have become obvious. The innovation infrastructure, the regulatory framework for venture financing, the very "strict" legislation and law enforcement practice for economic offenses are insufficiently developed. This has led to the insufficient development of small innovative entrepreneurship, since the risks here are much higher than in the trade of imported products or the provision of conventional services. In modern conditions, it is necessary to respond flexibly to breakthrough innovations, take into account the interests of consumers and partners, promptly make decisions and adjust them in a timely manner. This presupposes high motivation of subjects of innovation activities to achieve their goals and the right to justified risk.

To address these issues, the State Program for Innovative Development for 2021–2025 includes measures to create an institutional environment favorable for innovators. A set of measures to support innovative entrepreneurship, develop innovative infrastructure, and stimulate public-private partnerships in innovative activities has been developed and is being implemented. It is envisaged to increase the role of youth public associations and public associations of entrepreneurs in the implementation of innovation policy.

Great importance is attached to the popularization and stimulation of technical creativity among schoolchildren and college students, support for invention and rationalization. Tasks have been set to improve training, develop the infrastructure to support small innovative entrepreneurship. A system of measures to involve young people in innovative entrepreneurship is being implemented. For this purpose, educational institutions are developing the infrastructure necessary for the real involvement of young people in innovative activities, creating technology parks, centers for engineering and technical creativity, and small business incubators. To develop innovative entrepreneurship in high-tech industries, it is proposed, following the example of China, to provide Belarusian scientists with the opportunity to create small innovative enterprises based on their own developments carried out in state universities and research institutions.

Much of what was planned has already been accomplished. As of June 12, 2023, there were 24 innovation infrastructure entities operating in Belarus, including 16 science and technology parks, 6 technology transfer centers, and the National Intellectual Property Center [3]. They provide support to aspiring innovative entrepreneurs, but the underdevelopment of venture business makes it difficult for them to strengthen and enter the stock market.

The change in priorities in the innovation policy of Belarus is evidenced by the fact that the State Program for Innovative Development for 2021–2025 places the main emphasis not on quantitative but on qualitative changes. State support should be received by those who increase the production of products that are new not for a given organization, but for the domestic or global market. Therefore, along with the planned increase in the share of shipped innovative products from 20% in 2021 to 21% in 2025, a new indicator is being introduced reflecting the level of innovations being introduced – the share of products new to the domestic or global market. This indicator should increase from 48.2% in 2020 to 54% in 2025 [4, p. 36].

The share of innovation-active organizations in the total number of manufacturing organizations should increase from 29.8% in 2021 to 30.5% in 2025. Particular attention is paid to the accelerated growth of process, and not just product, innovations. The share of organizations implementing process innovations in the total number of innovation-active organizations in the manufacturing industry should increase from 26.5% in 2021 to 35% in 2025. Improving the quality of product and process innovations should improve the structure of Belarus's exports. The share of exports of science-intensive and high-tech products in the total volume of Belarusian exports (taking into account high-tech medium-tech goods and high-tech services) should increase from 33.5% in 2021 to 35.6% in 2025 [4, p. 36].

The strong point of the NIS of Belarus is considered to be human resources, but the availability of qualified personnel is not enough for the effective development of the NIS.

Belarus, like Russia, occupies very high places in world rankings in terms of human capital development indicators, thanks to high indicators coverage of the population by various levels of education. However, the quality of "mass" higher education and the cult of "easy money" do not contribute to the interest of graduates in complex and risky innovative activities. The prestige and attractiveness of research and innovation activities for young people are of great importance. Unfortunately, negative trends persist in this regard. Over the period 2017–2021, the number of personnel engaged in research and development decreased from 26,483 to 25,644 people, including researchers - from 17,089 to 16,321 people, and the number of doctors of science among them decreased from 645 to 548 people. The decrease in the prestige of scientific activity is evidenced by a decrease in the number of postgraduate students during this period from 5,149 to 4,709 people [1, p. 48]. In 2023, the number of postgraduate students in the republic was 4.4 thousand people. 786 people graduated from postgraduate studies. 640 people studied in doctoral studies, 178 people graduated from doctoral studies. 51 people became doctors of science, 293 people became candidates of science [5].

The number of postgraduate graduates who defended their dissertations is alarming, as the aging of the scientific workforce remains a serious problem. In 2021, out of 548 doctors of science, 277 people were over 70 years old (50.5%). In 2023, the number of doctors of science decreased to 519, and among them, 270 people were over 70 years old (52%). In 2021, out of 2642 candidates of science, 952 people were over 60 years old (36%) [1, pp. 29, 38]. The number of candidates of science in 2023 increased to 2687, but 1013 of them were over 60 years old (37.7%) [6].

**Conclusion.** In Belarus, they understand well the threats and challenges of the modern geopolitical situation and pay special attention to the innovative development of the country. Currently, work is underway to prepare a Comprehensive Forecast of Scientific and Technological Progress for 2026–2030 and for the period up to 2045 and the Decree of the President of the Republic of Belarus "On Priority Areas of Scientific, Scientific, Technical and Innovative Activities for 2026–2030". This is a long-term and comprehensive approach to solving the most important socio-economic problems, typical for Belarus. The strategic goal of the development of the NIS of Belarus is to create the foundation of a knowledge society and an intellectual economy through its scientific and technological transformation with a gradual transition to higher technological structures.

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