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INTERNATIONAL SCIENTIFIC AND TECHNICAL COOPERATION IN THE REPUBLIC OF BELARUS: MAIN FEATURES

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Abstract

The decisive factor in the social and economic development of countries and the world was the contribution of science, innovation, and new technologies. With their help, the production volume of products, goods, and services and their diversity are constantly increasing. At the same time, the key to successful and stable development is not in the availability of the latest achievements but the possibilities for the country's benefit. The more efficient the market mechanism for the transmission and attraction of the latest achievements, the more efficient the distribution of this factor of production in society and the greater the benefit to scientific organizations and the state will be. The role of international cooperation is to support and complement national efforts. Nowadays, an analysis of international trends shows that the effective development of science and the creation of competitive innovation products is impossible without the deep integration of national scientific and industrial spheres into global research and innovation networks. That is the only way to ensure the inflow of foreign investment, highly effective personnel, and new technologies.

Keywords: *International scientific and technical cooperation; International relationships; Research*

1 INTRODUCTION

In the 21st century, the trend towards internationalization and globalization of scientific research increased rapidly. According to the National Strategy for Sustainable Socio-Economic Development of the Republic of Belarus for up to 2030 (MERB, 2017), the basis for economic development is innovative technologies based on new knowledge and information. The developments of science, technology, and innovation are accompanied by an 'intensified race for technological leadership and new areas at the global market for high-tech products' (OECD, 2014, pp. 125-140) (MERB, 2017, p. 12).

The economy of the Republic of Belarus is mainly export-oriented and dependent on both foreign markets and imports of raw materials and fuel and energy resources (MERB, 2017, pp. 24-25), pays close attention to the development of international relations with a large number of countries in Europe, Asia, Africa, and America. International cooperation, including cooperation in science, technology, and innovation, is seen as one of the

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significant factors in the successful and sustainable socio-economic development of Belarus. That confirms the provisions of the country's most important program documents: “The National Strategy for Sustainable Socio-Economic Development of the Republic of Belarus for the period up to 2030” (MERB, 2017, pp. 91-93), Decree No. 26 of January 26, 2016 “On introducing amendments and addenda to Belarus President's Directive No. 3” (Lukashenko, On introducing amendments and addenda to Belarus President's Directive No. 3, 2016), “The State Program for Innovative Development of the Republic of Belarus for 2021–2025” (Lukashenko, 2021), Strategy “Science and Technology: 2018–2040” (NAN, 2018).

The productivity of innovation activity directly depends on the level of funding and the effectiveness of the research and development organization.

Despite a small share of budget allocations to the R&D, the role of the state in their development is significant. The public and private sectors are involved in the research process financing as equal partners. The government often allocates funds to start the riskiest development. After that, the business stays connected with the investor (Markov & et al., 2015). As a result, research and development are on average 70% or more financed by the corporate sector of the economy. These proportions most adequately characterize public-private partnership in scientific, technology, and innovation in developed countries.(Markov & et al., 2015, p. 79).

One mechanism for financing scientific and technical activities is international cooperation. It is one of the most dynamically developing areas of foreign economic activity, which includes joint development of scientific and technical challenges, the exchange of scientific results and experience, the joint training of qualified personnel, etc. The scope of international scientific and technical cooperation covers a wide range of issues: from basic research to solving practical problems (Nehorosheva, 2017). The variety of the cooperation forms (mutual consultations, development of scientific forecasts, cooperation in conducting scientific research, and cooperation in the field of scientific and technical information, patents, inventions, standardization, etc.) allows countries to choose those that best suit their national interests and features of economic development (Nedilko, 2007).

2 THE SCOPE OF THE INTERNATIONAL SCIENTIFIC AND TECHNICAL COOPERATION

An international scientific and technical cooperation can be defined as a scientific and creative activity aimed at gaining new knowledge about nature, men, society, and artificially created objects and using that scientific knowledge to develop new ways of their application. It conducts national entities in cooperation with foreign partners. The process aims at the knowledge creation and, that way, it formats an 'offer' and the information exchange (Markov & et al., 2015, p. 259).

The sustainability of international scientific and technical cooperation depends primarily on whether it is beneficial to all parties involved. In science and innovation, the need to maintain balance and mutual benefit becomes apparent when it comes to reducing research costs and risks, faster results, avoiding duplication, and improving R&D implementation, and research results (publications, start-ups). Also, they are significant post-effects like patents, licenses, career development of researchers, or obtaining additional funding.

Scientific and technical cooperation is a rather young form of international economic relations. It exists due to the scientific and technological revolution and the development of interstate specialization, the international division of labor, and cooperation, not only in production but also in the field of research and development. First, this process applies to post-industrial countries (Maksakovskiy, 2008).

In a market economy with a high intellectual component, international scientific and technical cooperation serves mainly to solve global challenges that require coordinated efforts. At the same time, it can take various forms, and be carried out with different goals and participants in innovation activities (the state, private companies, scientific organizations, or individual scientists). International scientific and technical cooperation expands the potential of each of the countries participating in it. It allows solving several

significant tasks that are difficult, and sometimes impossible, in conditions of intellectual and informational isolation. That includes:

- providing access to the World Bank support of science and technology development, intellectual products, and their use.
- preservation or development of scientific and technical specialization and strengthening the advantages of the division of labor in the field of science and technology.
- eliminating duplication of expensive research.
- creating conditions for solving common problems of innovative development.
- ensuring international copyright protection.

As follows from the above, the tasks of the international scientific and technical cooperation are much broader than simple financing of R&D. Regarding the topic of the research conducted in this section, the financial component of the international scientific and technical cooperation can be divided conditionally into two types. That can be direct foreign financing of research and development, carried out within the framework of interstate agreements (the optimal amount of which, according to experts, to avoid external dependence, is within 5-10% of the amount of national financing) and indirect, carried out within the framework of transnational corporations.

The deepening of scientific and technical cooperation is ensured through collective protectionism. Also, can be used as corporate technology sharing for general use; agreements on the exchange of expensive equipment; joint production of high-tech products; creation of joint research centers.

Here it is necessary to mention technological networks, consisting of companies using a single basic technology to produce goods and the services provided. At the same time, each company in the technological network is independent, and all relations are built exclusively on market principles. In developed countries, such networks most often include research and design institutes as the main partners (Markov & et al., 2015, pp. 85-87).

The main form of implementation of international scientific and technical cooperation is the joint research and development conducted with foreign partners in the form of small projects in terms of funding. Projects, as usual, are an integral part of scientific and technical cooperation programs carried out under international agreements (Markov & et al., 2015, p. 282).

Scientific and technical cooperation can be carried out on a commercial and non-commercial basis and take various forms: the sale and purchase of scientific and technical knowledge, the implementation of joint international projects, the creation of common research centers, joint experimentation, etc.

The main of these forms was and remains the sale and purchase of scientific and technical knowledge, which in the scientific literature is usually referred to as transfer. When talking about technology transfer, they most often mean trade-in patents – documents containing a description of an invention and the conditions for its use and sale, and licenses that allow other individuals and organizations to use these patents.

Recently, the exchange of patents and licenses has been enriched by the transfer of best practices and knowledge. There is also a transfer of advanced technologies through such new channels as the construction of turnkey enterprises, engineering – engineering services, including design and construction, consulting, technical consulting and project examination, and leasing (Surin, 2008).

International scientific and technical cooperation is an important step toward increasing the efficiency of scientific activity. The main task of international scientific and technical cooperation is to determine the thematic priorities of cooperation, which are formed due to the coincidence of the priority areas of scientific research or scientific and technical activities of the parties. The state's participation in international scientific and technical cooperation, contribution to the progress of science and technology, and the state's image as a partner in the scientific and technical sphere largely determine its position on the world scene (Meerovskaya, 2005) (Zadumkin, 2012).

3 INTERNATIONAL SCIENTIFIC AND TECHNICAL COOPERATION: SITUATION IN THE REPUBLIC OF BELARUS

To determine the priorities of international scientific and technical cooperation in scientific and technical fields and partner countries, it is necessary first to answer the question: "What

exactly dictates the need to develop international activities in this field?" and then formulate criteria for the selection. In Belarus, when deciding about some international scientific and technical cooperation project's budget allocation, it is significant to find a balance between socio-economic development tasks, foreign policy, and the interests of scientific organizations and their specific groups.

The choice of priorities can be made at different levels:

- to be the prerogative of the government and interested public administration bodies, acting on the principle of “bottom-up”.
- carried out through broad consultations with stakeholders at different levels on the identification of key scientific areas.
- be determined by existing agreements on scientific and technical cooperation of a framework nature.
- be given at the mercy of the organizations-participants of the international scientific and technical cooperation (Lukashenko, 2016).

However, at any level, the priorities are set, and this process must be accompanied by the identification and understanding of the driving forces, goals, and objectives of the international scientific and technical cooperation in the countries that are potential partners of Belarus.

The international scientific and technical cooperation participants include all those employed in the scientific industry – this is about 26 thousand specialists, of which almost 17 thousand are researchers. They work in more than 450 organizations (Table 1).

Table 1 – Indicators of organizations that carried out research and development

	2000	2005	2010	2015	2016	2017	2018	2019	2020
Number of organizations performing research and development, units	307	322	468	439	431	454	455	460	451
List number of employees who carried out research and development, people	32 926	30 222	31 712	26 153	25 942	26 483	27 411	27 735	25 622
of which researchers	19 707	18 267	19 879	16 953	16 879	17 089	17 804	17 863	16 697

Source: (Belstat, 2020)

The international scientific and technical cooperation coordination system in different countries is built, in general, in the same way. At the center of it is the ministry responsible for the development of science and technology (as a rule, the Ministry of education and science), and less often – the Ministry for innovation development or the Ministry of the economy. It works closely with the Ministry of Foreign Affairs, national agencies, and scientific foundations. The latter work directly with scientific organizations, companies, and individual scientists, that is, with the subjects of international scientific and technical cooperation. Differences between countries lie mainly in the number and variety of agencies and foundations.

The system of coordination of the international scientific and technical cooperation of Belarus is close to the described scheme and corresponds to the system of management of the scientific and technical sphere of the country. The system includes the President of the Republic of Belarus, the Council of Ministers, the Ministry of Foreign Affairs, the State Committee for Science and Technology, line ministries, the National Academy of Sciences of Belarus, foundations, and several organizations that partially act as agencies at the State Committee for Science and Technology.

The mission of the State Committee on Science and Technology is:

- to prepare and, according to the established procedure, submit to the Council of Ministers of the Republic of Belarus proposals on the amount of financing of international scientific and technical cooperation at the expense of the republic budget.
- to conduct competitions for international scientific and technical projects.

- to organize the state scientific and technical expertise of international scientific and technical projects.
- to participate in the work of international organizations, commissions, committees, and associations and organize international cooperation with foreign countries on issues within the competence of the State Committee on Science and Technology.
- to organize exhibitions and fair activities to promote Belarusian scientific and technical products to foreign markets (GKNT, n.d.).

The National Academy of Sciences of Belarus realizes international scientific and technical cooperation and coordinates it, together with its subordinate organizations developing mutually beneficial relations with academies of sciences and other scientific organizations of foreign countries, implementing interstate scientific and technical programs and projects, and participating in activities of scientific and technical organizations and associations. Similarly, branch ministries (ministries of education, industry, health, transport, energy, communications, the Military Industrial Committee, etc.) manage the foreign economic activities of subordinate organizations within their competence, assisting them in establishing relations abroad, promoting potential and project implementation.

In Belarus, there are about 40 normative legal acts affecting the issues of the international scientific and technical cooperation, most of which are non-specialized and determine the procedure for the functioning of the scientific and technical sphere. The most important legal acts include the following:

1. Law of the Republic of Belarus "On the basics of the state scientific and technical policy".

The law establishes the state bodies of the Republic of Belarus to support and promote the development of institutions, organizations, companies, public, scientific, and scientific-technical organizations, individual scientists, and experts. Their task is also to create the necessary legal and economic conditions for establishing equal relations with foreign and international entities in the frame of scientific and technical cooperation. It also defines the forms of the international scientific and technical cooperation:

- implementation of joint research and development, scientific and technical programs based on international treaties.
- agreements and contracts.
- conducting joint research and development in international teams of specialists, international institutions, joint ventures, and organizations.
- mutual exchange of scientific and technical information, creation and use of joint interstate information funds and data banks.
- holding international congresses, conferences, symposiums, and other scientific meetings.
- mutual exchange of personnel, students, graduate students, and joint training of specialists.

The law establishes that the subjects of scientific and technical activities can take part in the implementation of international programs and projects, conclude agreements, agreements, and contracts with foreign and international organizations and firms, and join foreign and international scientific communities, associations, and unions by the law Belarus (GKNT, 2015).

2. Law of the Republic of Belarus "On International Treaties of the Republic of Belarus" (Law, 2018) defines the concept of an international treaty and establishes the procedure for concluding, entering into force, official publication, registration, storage, execution, suspension, and termination of international treaties The Republic of Belarus.

According to the Law, the International Agreement of the Republic of Belarus is: "the international treaty (the interstate, intergovernmental or international treaty of interdepartmental nature) signed in writing by the Republic of Belarus with the foreign state (foreign states), the international organization (the international organizations), another subject (other subjects) having (having) rights to sign the international agreements which are regulated by international law irrespective of contains it in one document or several documents connected among themselves, and also irrespective of its specific name and method of the conclusion (the agreement, the agreement, the convention, the decision, the pact, the protocol, exchange of notes or letters and other names and methods of the conclusion of the international treaty)". (Law, 2018)

The concept of an international treaty and knowledge of the list of existing international treaties is of great practical importance: by the law, the subject of the international scientific and technical cooperation has the right to receive funding from the republican budget only for those activities that are implemented within the framework of the obligations assumed by the Republic of Belarus, the Government or a government body Republic of Belarus under an international treaty (Law, 2018).

3. Decree of the Council of Ministers of the Republic of Belarus "On approval of the Regulations on scientific and technical projects carried out within the framework of international treaties of the Republic of Belarus" establishes the procedure for filing applications, competitive selection, financing and implementation of scientific and technical projects carried out by organizations of the Republic Belarus within the framework of international treaties of the Republic of Belarus in full or in part at the expense of the republican budget.

4 CONCLUSION

International scientific and technical cooperation for the Republic of Belarus is vitally important. The Republic of Belarus created enough legal documents to ensure international scientific and technical cooperation. But with all this, the efficiency of the work of documents is not great. Unfortunately, now there is no strategic document that would cover the entire spectrum of the international scientific and technical cooperation, as in the example of Germany, where the Strategy for International Scientific and Technical Cooperation has been developed. In Belarus, the preparation of such a document would be expedient, considering the geopolitical position of the Republic of Belarus and its strategic interests and partners.

Now, the Republic of Belarus has concluded agreements on scientific and technical cooperation at the governmental level with more than 50 countries, but not all of them are practical, several agreements are, unfortunately, declarative. In addition, bilateral agreements on cooperation in the field of science, technology, and innovation are concluded at the level of organizations and institutions, which allows them to carry out several works directly with counterparts.

The success and sustainability of international scientific and technical cooperation depend primarily on whether it is beneficial to all parties involved. Now it is necessary to expand the geography of the international scientific and technical cooperation and improve the quality of existing cooperation with an emphasis on cooperation with developed countries of the world, relying on existing domestic and studying foreign experience.

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