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EFFICIENCY OF INTERNATIONAL SCIENTIFIC AND TECHNICAL COOPERATION IN INDUSTRY 4.0

Abstract. The efficiency of international scientific and technical cooperation on the example of the leading countries was analysed in the article. The author has proved that the countries that are leaders of innovative development, effectively implement international scientific and technical cooperation and have a high degree of involvement in the global space. The relationship between the activity of scientific and technical cooperation and the level of incomes in the countries is revealed. Proposals for increasing Ukraine's participation in international scientific and technical cooperation in the context of Industry 4.0 were presented in the article.

Keywords: international scientific and technical cooperation, Industry 4.0, efficiency, globalization, innovative activity.

INTRODUCTION

In the context of the globalization of the world economy, the effective development of any country cannot be considered separate from other participants of the global economy. This thesis is relevant both in the economic context and in terms of science, technology, etc. The interdependence of countries in the process of technological change, which occurs in the conditions of Industry 4.0, has been repeatedly emphasized in leading global economic forums: World Economic Forum, Organization for Economic Co-operation and Development and others. And Ukraine does not stay out of these processes. In particular, the experts of the Association of Industrial Automation Enterprises of Ukraine have created a National Strategy of Industry 4.0 for Ukraine, which is based on a critical analysis of the current state of the Ukrainian economy and industry and defines the measures necessary for implementation in order to transition the country to the category of high-tech countries integrated into the global technological chains. value creation.

RESULTS OF THE RESEARCH

The analysis of analytical information and statistics indicates the activation of globalization processes. In particular, according to the KOF Index of Globalization, developed by the Swiss Economic Institute, the top ten countries in this ranking are high-income, innovatively active countries (Figure 1). The index is positioned as a composite indicator that allows you to assess the scale of integration of a country in the world space and compare different countries by its components: economic globalization, social globalization, political globalization.



Figure 1. The leading countries for the KOF Globalization Index-2018 [1]

Most of these countries are leaders in innovation (Global Innovation Index), as indicated in Table. 1:

Table 1. GII-2019 country ranking

<i>Rank position</i>	<i>Country</i>	<i>Value GII-2019</i>	<i>The level of income</i>
1	Switzerland	67,24	high income
2	Sweden	63,65	high income
3	USA	61,73	high income
4	Netherlands	61,44	high income
5	United Kingdom	61,30	high income
6	Finland	59,83	high income
7	Denmark	58,44	high income
8	Singapore	58,37	high income
9	Germany	58,19	high income
10	Israel	57,43	high income

* Compiled by data [2]

During the study, a correlation analysis was performed, the results of which revealed the following patterns. In innovative innovation leaders, the level of gross domestic product is strongly dependent on the number of patent applications from both residents and non-residents. It should be noted that the number of patent applications of non-residents is more important than the corresponding indicator for residents, which indicates a tendency for the expansion of intellectual property rights outside these countries and active international scientific and technical cooperation. This, in turn, makes it possible to increase the volume of gross national product, which also has a positive effect on the welfare level of the national economy of the country concerned. As for Ukraine, it should be noted that according to the KOF Globalization Index-2018, it is at 43 positions, the index value is 74,25. Considering the country's geographical position, resource availability and potential benefits, we believe that we could be ranked higher in this ranking. Undoubtedly, political uncertainty for a long time has adversely affected Ukraine's participation and place in the global economy. Unfortunately, today, the country's primary mission in the global economy is to provide raw materials and labour. However, the experience of highly developed countries demonstrates the impossibility of achieving economic prosperity without active international scientific and technical cooperation, especially in the context of Industry 4.0.

According to experts, for the domestic market of Ukraine Industry 4.0 should be a catalyst for the growth of industry, as well as the defense industrial complex [3]. A huge challenge for Industry 4.0 in the internal market is the involvement in the digitalization of Ukrainian industry and energy, the IT sector, and science. At present, both categories fall out of these processes [4]. The main task for Ukraine is to identify its niche in the global market. According to experts, the country currently has no conditions for any positioning among the leaders - the leading 20-30 post-industrial states of the world - in the next 5 years. Instead, Ukraine can be at least a regional leader in sophisticated and high-tech engineering services such as industrial

high-tech programming; design (electrical, mechanical, electronic, technological, construction, etc.); industrial automation and integrated engineering; development and production of complex, small-scale or unique products [4]. At the same time, the mission of Ukraine in the context of Industry 4.0 is formulated in two directions of positioning over the next 10 years: “Ukraine is a high-tech, post-industrial country integrated into global, technological value chains, producing unique engineering services and high-quality products in them. For its own needs, Ukraine is self-sufficient in providing its army and its economy with the most necessary technological products.” To accomplish this mission, the following areas are required [4]:

- institutionalization of the development of industrial high-tech segments at the state level;
- creation of an innovative ecosystem of industrial high-tech segments;
- accelerating clustering in the field of 4.0, both at regional and national levels;
- full-scale digitization of key sectors of industry, energy and infrastructure;
- Maximum integration of Innovation 4.0 in the country's defense complex and security strategy;
- launching export programs for industrial high-tech sectors;
- internationalization and integration into the global space 4.0.

We believe that the implementation of the measures foreseen in the Industry 4.0 strategy will increase the efficiency of international scientific and technical cooperation and national production and, accordingly, the competitiveness of the national economy in the world market.

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