COMPETITIVENESS OF UKRAINE IN INDUSTRY 4.0: PROBLEMS AND PROSPECTS

Skorobogatova N. Ye., PhD in Economics, Associate Professor
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"
nskorobogatova@ukr.net

An analysis of the positions of our country in international ratings and the data of the State Statistics Service of Ukraine indicates the imbalance of the economic, innovative, social and environmental components of the country's development. According to the World Economic Forum [6], Ukraine has worsened its position in the Global Competitiveness Index: 81 out of 137 countries in 2017, 83 out of 140 in 2018 and 85 out of 141 in 2019 — there is an annual decrease of 2 positions in the ranking. The components included in the integrated indicators, two-thirds consist of the results of a global survey of company executives and a third of publicly available sources. In terms of the institutional component of this index, which includes an assessment of security, property rights, social capital, deterrence and counterbalance, transparency and ethics, public sector performance, government and corporate governance, Ukraine in 2019 takes 104th place among 141 countries, with a quantitative value lower average. Moreover, such elements of this component as security, social capital, property rights are of lower value. An unsatisfactory trend is observed in such components as macroeconomic stability — 133 position in 2019, financial system — 136 position in 2019. However, according to this rating, our country has competitive positions (above average) in terms of market accessibility, staff skills and infrastructure. The components characterizing innovative development, in particular, innovative abilities and the degree of dissemination of information and communication technologies are below average. It should be noted that having certain innovative opportunities, the state cannot provide an appropriate level of their distribution. This is a big problem, since the spread of the Fourth Industrial Revolution is precisely based on the use of information technology.

Another global ranking that allows you to assess the ease of doing business, the development of which determines the level of well-being of the country, is Doing Business [2] — an annual study of the World Bank Group, which is carried out for 190 countries. Doing Business covers the following areas of business regulation: starting a business, developing building permits, obtaining electricity, registering property, obtaining loans, protecting a minority of investors, paying taxes, cross-border trading, fulfilling contracts and resolving insolvency, ease of rating a business. This rating also takes into account the degree of regulation of employee employment and conclusion of contracts with the government. According to the rating, since 2012 Ukraine has been improving its position — from 152 in 2012 to 64 positions at the beginning of 2020. Positive changes over the past year relate to the simplification of the system for obtaining permits for construction, connection to electricity networks, registration of property, protection of minority investors and terms of international trade. Thus, the simplification of the business environment, unfortunately, does not affect the growth of the competitiveness of the Ukrainian economy.

The Global Innovation Index, which is annually jointly compiled by the International Business School INSEAD, Cornell University and the World Intellectual Property Organization (WIPO), determines the rating of innovative opportunities for 126 countries based on 80 indicators. The position of Ukraine in this rating in 2017 is 50, in 2018 — 43, in 2019 — 47 [3]. This year Ukraine took the eighty-second place in the field of innovative investments, worse than last year. At the same time, it ranks 2nd among 26 countries with below-average income and Ukraine 32nd among 39 countries in Europe. Ukraine has high scores in the institutes, human capital and research, business experience, knowledge and technology, and creative results that exceed the average for the group of countries with income below the average. Our state holds high positions in such areas as higher education, knowledge creation and intangible assets.

A comparative analysis of statistical indicators for Ukraine and EU countries allows us to state, despite the high value of indicators of higher education and the creation of knowledge, the number of research and development performers, Ukraine is below the average for EU countries, and has a tendency to decrease. Germany, which is the founder of the Industry 4.0 movement, on average 2,5 times exceeds Ukraine in the number of research workers and researchers. Thus, it is necessary to pay more attention to science both in quantitative terms and in relation to quality content. This thesis is also confirmed by a comparison of the share of the cost of research in GDP in Ukraine and other countries of the world (Fig. 1).

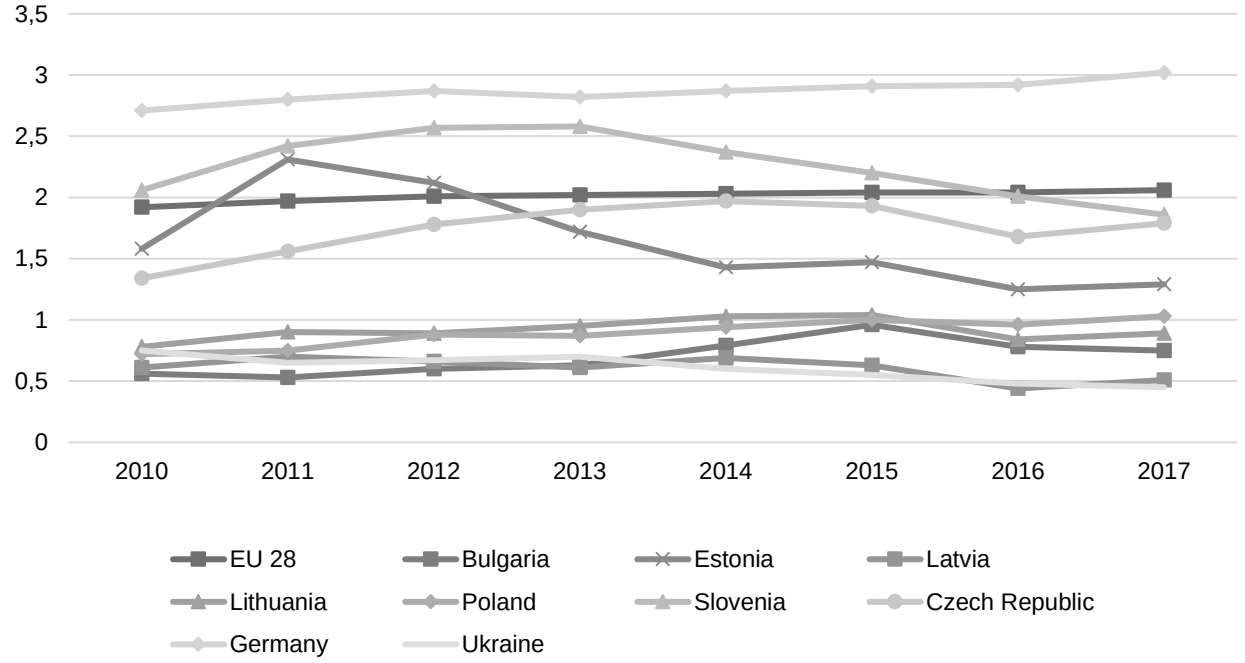

Fig. 1. Dynamics of the share of spending on R&D in GDP, 2010–2017

**) built according to data [5]*

If the average for EU countries during 2010–2017 the proportion of expenditure on research in GDP grows from 1,92% to 2,06%, then the opposite process is observed in Ukraine — the share of expenditures in GDP decreased from 0,75% in 2010 to 0,45% in 2017. A similar picture is observed in Slovenia and Estonia, however, in these countries, the average percentage of expenditure on R&D in GDP is still 3-4 times higher than in Ukraine.

As for the sources of financing the costs of performing research, according to the methodology for generating statistical information, they are all divided into five types: the business sector, the public sector, the higher education sector, the private non-profit sector and foreign sources. Comparison of statistical data indicates fundamental differences in the policy of financing the costs of research and development in the countries of the European Community and Ukraine. In European countries, on average, more than 50% are private sources of financing — the business sector. These studies are carried out in the interests of the business, which then uses them in its activities. Moreover, it should be noted the increase in the share of the business sector in the structure of funding sources. But in Ukraine, the opposite situation can be traced — a large share in the structure of sources of financing research at the expense of the public sector. This indicates that the business allocates significantly less funds for research. On the other hand, almost a quarter are foreign sources. Recently, Ukraine has been actively cooperating with Ukraine in the scientific sphere with the EU countries and other foreign countries, therefore the funds of foreign investors have a significant share in the total amount of financial resources. At the same time, it should be noted that during the period under review there is a tendency to decrease in the share of state funds and funds from foreign sources (from 75,3% in total in 2010 to 61,4% in 2016), but the business sector is increasing investments in research (23,8% in 2010, 36,9% in 2016). In addition, a trend should be noted: the ratings of innovative development of European countries improve with the growth of funding for research costs, in Ukraine there is an increase in the position of the rating of innovative development with a reduction in financial resources. Such a situation can be explained by the increase in the efficiency of using the invested funds, as well as by the high potential of the scientists carrying out these studies, the reorientation of research topics, and the like. This thesis is confirmed by an analysis of the country's positions in the ranking of innovation activity and its components. Thus, using the existing scientific potential of a country can allow it to make a significant breakthrough in development, which, in turn, will affect the economic well-being of all entities.

According to statistics, during 2010–2018 there is a decrease in the number of innovatively active enterprises from 1462 in 2010 to 777 in 2018. Since the total number of enterprises has decreased over a given time, the share of innovatively active enterprises has grown from 13,8% in 2010 to 16,4% in 2018. The effectiveness of innovatively active enterprises is variable during 2010–2018. However, at the beginning and

end of the period it has not changed much — about 2,000 units of new technologies are introduced into production annually. The turning point was 2016, when the number of new technologies introduced into production increased almost one and a half times. This situation may have been caused by the adaptation of enterprises to changing market conditions after 2014 and the objective need to reorganize production in connection with access to new markets. The volume of income of enterprises from the sale of innovative products for 2010–2016 tends to decrease while moderate growth in the amount of expenditures on innovation. That is, the expenses incurred for innovations did not bring a corresponding increase in sales volumes. At the same time, it should be noted that the change in sales volumes does not mean changes in the profitability of products and assets as a whole, so comparative calculations of investment efficiency are necessary, taking into account both non-recurring expenses (innovation costs) and current (production costs, management expenses, etc.). An indirect confirmation of the insufficient effectiveness of the implemented innovations is a quantitative decrease in the share of innovation costs in the total sales volume and a corresponding decrease in the share of innovative products sales in the total sales volume, which was recorded by the State Statistics Service of Ukraine during 2010–2016. Thus, we consider the following issues of the Ukrainian economy in the areas of innovative development of Industry 4.0:

- imperfection of the system of institutions that ensure the development of the state, in particular, the political, regulatory, as well as the business environment;
- insufficiently developed innovative infrastructure, which leads to an unsatisfactory level of capital accumulation, environmental problems, social tension, in particular due to the lack of effective communications between the relevant structures, untimely and unsatisfactory quality of services, etc.);
- insufficient quality management system of enterprises and the lack of a strategic vision for further development, taking into account the changing external environment, taking into account the innovative transformations of Industry 4.0 and the global economy.

For innovative development and increasing the level of international competitiveness of the Ukrainian economy, a Strategy for the Development of Innovation Activities for the Period until 2030 [4], a draft National Industry Strategy 4.0 [1] and others have been developed. The main provisions that must be implemented to ensure the effective innovative development of Ukraine in the conditions of the Fourth Industrial Revolution:

- identification of innovative promising sectors of the economy and providing them with priority value for state support;
- improving the effectiveness of training, taking into account modern innovative technologies used in the world;
- integration of business, science, the state into a single ecosystem to create an innovative infrastructure and an effective regulatory space;
- creation of innovative clusters in the Industry 4.0 industry at the regional and national levels in order to effectively address core tasks at the appropriate level;
- popularization and large-scale implementation of innovative technologies of Industry 4.0 at all stages of the product (service) life cycle;
- internationalization and integration into the world community, taking into account the existing competitive advantages and observing the position of protection of the national producer. We believe that the implementation of the proposed measures will increase the level of international competitiveness of Ukraine due to the innovative component.

References:

1. Official site of the Association of Industrial Automation Enterprises of Ukraine (2019), available at: https://appau.org.ua/.
2. Doing Business 2020 (2019), available at: https://www.doingbusiness.org/en/reports/global-reports/doing-business-2020.
3. Global Innovation Index 2019 (2019), available at: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2019.pdf (Accessed 18 November 2019).
4. Cabinet of Ministers of Ukraine (2019), “Strategy of development of the sphere of innovative activity for the period till 2030” available at: https://zakon.rada.gov.ua/laws/show/526-2019-%D1%80#n12.
5. Kuznietsova, M.S. (2019), Naukova ta innovatsijna diialnist Ukrainy 2018. Statystychnyj zbirnyk [Scientific and Innovative Activity of Ukraine 2018 Statistical collection]: Avhust Trejd, Kyiv, Ukraine.
6. Global Competitiveness Index 4.0 (2019), available at: http://reports.weforum.org/global-competitiveness-report-2019/.