INNOVATION ENVIRONMENTIN GLOBAL ECONOMY: DEFINITION AND MEASURABLE APPROACHES

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Abstract- This research is related to global innovation environment. Author discusses different approaches to global innovation measure and its relevance to development of global economy. The importance of global innovations is noticed and benefits from innovation environment are mentioned. The discussion about how does innovations affect global economy's development is held.

Keywords- Innovation, Global Environment, Global Economy, Development.

I. INTRODUCTION

For the development of innovation, a favorable infrastructure is necessary, where technologies could not only "emerge", but also receive further development. To date, large funds are allocated from the budget of any country to create and develop comfortable conditions that can stimulate production. It is possible to single out a whole series of "organized" territories in accordance with the type of innovation, such as: techno parks; science cities; closed administrative-territorial entities; technical and innovation zones; academic campus. The purpose of such organizations is the creation of new technologies and their introduction into production, and it is at the stage of direct commercialization of technology or in other words the transfer of technology (innovation) into the business sphere that complications arise in the economy [1].

For example, in Russia new technologies are being created, which are the basis for innovative development, but often do not receive further development, but remain at the level of theory or a pilot sample. So, the main problem is the lack of a mechanism for the commercialization of technology (introduction into production), innovations do not find their customers.

But it is important to note that the leaders of the world market, to date, become the owners of technology, moreover, not only those who managed to introduce a new technology once, but those who constantly produce new products or introduce new innovations, or improve already available technologies. The main tool that realizes the relationship between the developers of innovations (technologies) and its recipient can become a "technology transfer" [1], [2]. This process will be described in detail and assessed from the point of view of the effectiveness of application in the structure of innovation activity.

II. APPROACHES TO GLOBAL INNOVATIONS: THEORETICAL FRAMEWORK

A. Importance of innovations

Innovation is important at all stages of development; specifically, the creation and diffusion of technologies are important for economic growth and welfare across all economies. Different types of innovation play a role at various stages (e.g. in earlier stages, incremental innovation is often associated with the adoption of foreign technology). Opportunities for successful innovation experiments and a potentially different framework for development are emerging. Notably, these opportunities result from the rise of information and communication technologies, the development of global value chains, the increased importance of some emerging countries in the global innovation system, the growth of service-based economies and a greater openness to trade and foreign direct investment. Today a key challenge for innovation policy in emerging countries is to encourage inclusive growth and support research addressing major social challenges.

In spite of its demonstrated benefits for meeting the immediate and long-term developmental goals of emerging and developing countries, the relevance of innovation for these countries is sometimes questioned. Such thinking is often based on a fairly restricted understanding of innovation as "high technology." It is true that an exclusive focus on high-tech industries ("high-tech myopia") can be costly if the potential for innovation in other sectors is ignored [3]. Countries can incur high costs without reaping any benefits if they choose sectors that require expertise they lack and are highly competitive internationally. Yet, innovation takes place in different sectors, including services, agriculture and mining [3], [4]. Many opportunities for innovation have arisen in low-technology sectors with high export opportunities, e.g. the production of palm oil and derivative products in Malaysia. Also, innovation in agriculture is particularly relevant for addressing

socioeconomic challenges at the same time as fostering growth. There is evidence that agricultural R&D has a greater impact on poverty reduction than most other public investments [5].

Depending on the support mechanisms used, the types of innovation and the main agents involved differ somewhat. With respect to the overview provided, a few observations as follows are worth pointing out:

Innovation matters even in least developed countries with backward industrial conditions. Their adoption of foreign technologies can have high payoffs, because technology adoption requires adaptation to local economic, technological or environmental conditions. This can lead to the development and accumulation of innovation capabilities. There is evidence that domestic innovation played a bigger role than imports of knowledge for the take-off of emerging Asian economies [6].

The value of starting from imported novelties in order to advance has long been known. The notion was popularized by Gerschenkron (1962), who suggested that differences in nations' ability to develop technology and adapt it to their particular circumstances were the primary cause of countries' differences in per capita income and that the ability to appropriate the innovations of others was the essence of the latecomer's advantage [7].

B. Global innovation environment

In the modern economy there is a concept of a "new economy", which has recently been subject to disapproving discussions by critics, but still not enough arguments have been found to reject this concept. It is necessary to clarify the main points of this concept. So, in the report "The state of the world in 2001", the main components of the concept "new economy" were defined. First, it is the new base of the entire economy, where the raw material is information; Secondly, these are modern sources of energy - electronics and semiconductors; thirdly, radically new sources of information transfer - information systems [8]. The main tool of this economy is information penetrating into all spheres not only economic, but also social, political life of society. This concept does not force and does not limit the economy to this concept; on the contrary, it provides an opportunity for further development in all sectors where information and communication technologies also remain at the core.

At the current stage of development, it is possible to determine the main characteristics of the modern economy.

1. Globalization. This is one of the laws of the development of the modern world. This concept applies not only to the economic sphere of society. For the economy as a whole, this process is superior to the integration process. Globalization involves interaction between people, companies, and states of different countries by means of world trade and investment, where information technologies are also based. To date, there has been an increase in the scale and pace of capital movements, which creates a single space for economic activity. Strict price and non-price competition is observed, which gives a strong impetus to the development of innovations in the country. Thus, it is possible to single out the main aspects of the influence of the process of globalization on innovative development:

2. Acceleration of the pace of production of new technologies. Due to the severe competition and the continuous release of new products (technologies, inventions, services, and various consumer goods), a short period of time remains for the creation and realization of new ideas. This development is also based on information and communication technologies. As a result, the "life" of each product has significantly decreased, because something is constantly being created [9].

Inter-firm cooperation and development of network organizational structures. Products obtained at the output after productions are the result of the action of integration interactions of various technologies. Due to the short life cycle of a modern product, even the largest companies are unable to conduct high-quality and large-scale information research and quickly enter the arena of world markets. This encourages organizations (even large ones) to cooperate in the field of information research, and as a result, there is an increase in growth and stimulation of networking between enterprises.

Functional integration and cooperation within enterprises. The presence of flexible horizontal links between the managerial and research links in the company can ensure rapid integration of world trends, which again is necessary for the rapid creation and successful implementation of a new product.

3. Cooperation with centers of knowledge production. It implies close cooperation with state laboratories, research universities, and centers of applied and academic science.

Increase in the share of services and the role of knowledge transfer. This process encourages companies to use outsourcing as a new way of organizing economic activity, which allows you to achieve certain years and savings. Also, this affects the change in existing business models, since the implementation of interaction between companies requires a higher level of organization.

4. High level of importance of intellectual capital. This characterizes the fact that there is an increase in the importance of value added from the intangible assets of the enterprise and the intellectual capital. One of the first authors who paid attention to this trend was J. Tobin, who said that this leads to a significant excess of the value of their capitalization over the level of the value of tangible assets [10]. This means that the

level of intellectual capital is the most important for the shareholders of companies.

5. Increase in entrepreneurial activity. This characteristic speaks of the in-creased activity of small entrepreneurs, moreover, in most developed countries; the creation of favorable conditions for the "existence" of small entrepreneurs is a priority task of the state strike. So, in the USA for the last 20 years 90% of jobs were created by small entrepreneurs, whereas the number of jobs of large corporations has decreased on the contrary [11]. The increase in entrepreneurial activity in recent years is characteristic of all developed countries.

The described characteristics (Figure 1) of a modern or new economy allow us to say about the importance of creation, development (dissemination) and application of new knowledge. The qualitative functioning of these data characterizes the successful course of economic development. Thus, the above-mentioned fact was confirmed that the basis of the modern economy is information that takes various forms, like knowledge, technology, experience and other possible forms of obtaining and processing information. The qualitative functioning of the economy at all levels is determined by the level of ability to apply and develop new knowledge, through which the innovative activity of the economy increases.

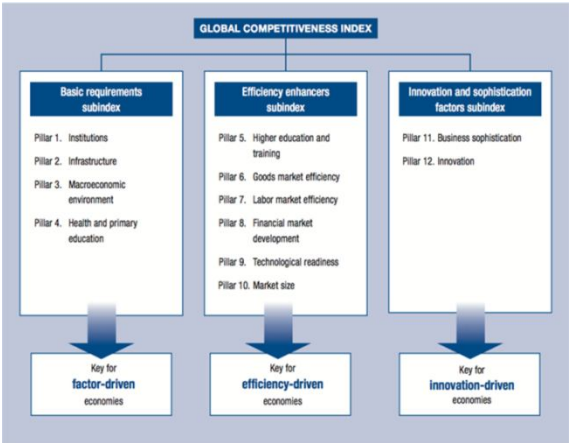


Fig. 1. Factors affecting the degree of modern economics' development

In a modern economy with constantly growing competition and the level of innovation, more and more companies are faced with non-price problems. Now it is more important not only to have skills, but to have the potential to receive and effectively introduce new knowledge (skills). Thus, the source of the value is shifted; knowledge occupies a leading position instead of labor.

6. Permanent increase in the rate of economic growth. This process has a long enough character, since the 1970s there has been a long increase, not counting economic crises, which also subsequently gave impetus for further recovery after the economic recovery. The reason for this trend is the increased level of technology development and increase in the level of profitability, as well as the active injection of large amounts of investment. The increase in the rates of economic growth is accompanied by the strengthening of the role of the state and the development of a clear and stable macro policy by the majority of developed and developing countries. Moreover, most of the state budget is directed to the development of human capital, which indicates the desire to raise the level of production. Financing of educational institutions, professional training and retraining of working cadres and scientific development centers is increasing.

III. GLOBAL INNOVATION MEASURABLE APPROACHES

A. Global Innovation Index (GII)

For evaluation global innovation ability many countries try to find their rank inside global innovation index system.

The Global Innovation Index (GII) aims to capture the multi-dimensional facets of innovation and provide the tools that can assist in tailoring policies to pro-mote long-term output growth, improved productivity, and job growth. The GII helps to create an environment in which innovation factors are continually evaluated. It provides a key tool and a rich database of detailed metrics for economies, which in 2017 encompasses 127 economies, representing 92.5% of the world's population and 97.6% of global GDP [12].

The Global Innovation Index 2017 (GII), in its 10th edition this year, will be released June 15, and continues to be co-published by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO, an agency of the United Nations) [37]. The core of the GII Report consists of a ranking of world economies' innovation capabilities and results. Over the last ten years, the GII has established itself as a leading reference on innovation. Understanding in more detail the human aspects behind innovation is essential for the design of policies that help promote economic development and richer innovation-prone environments locally. Recognizing the key role of innovation as a driver of economic growth and prosperity, and the need for a broad horizontal vision of innovation applicable to developed and emerging economies, the GII includes indicators that go beyond the traditional measures of innovation such as the level of research and development (Figure2).

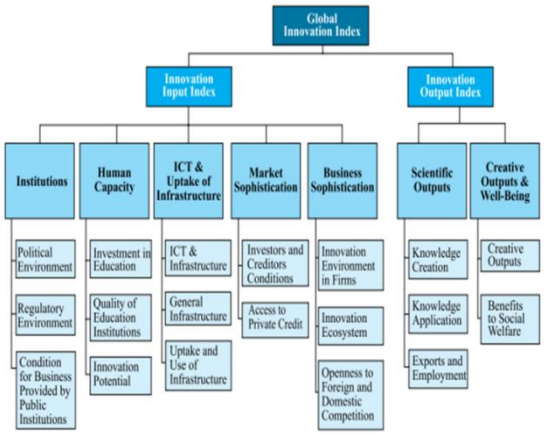


Fig. 2. Structure of Global Innovation Index

The Global Innovation Index (GII) is an evolving project that builds on its previous editions while incorporating newly available data and that is inspired by the latest research on the measurement of innovation. The GII relies on two sub-indices - the Innovation Input Sub-Index and the Innovation Output Sub-Index - each built around key pillars.

Five input pillars capture elements of the national economy that enable innovative activities: (1) Institutions, (2) Human capital and research, (3) Infrastructure, (4) Market sophistication, and (5) Business sophistication. Two output pillars capture actual evidence of innovation outputs: (6) Knowledge and technology outputs and (7) Creative outputs.

Each pillar is divided into sub-pillars and each sub-pillar is composed of individual indicators (81 in total in 2017). Sub-pillar scores are calculated as the weighted average of individual indicators; pillar scores are calculated as the weighted average of sub-pillar scores.

Four measures are then calculated:

- Innovation input Sub-Index: is the simple average of the first five pillar scores.
- Innovation output Sub-Index is the simple average of the last two pillar scores.
- The overall GII score is the simple average of the input and output Sub-Indices.
- The Innovation Efficiency Ratio is the ratio of the output Sub-Index over the input Sub-Index.

The GII gathers data from more than 30 sources, covering a large spectrum of innovation drivers and results; privileging hard data over qualitative assessments (for example, only five survey questions were included in the GII 2017) [12].

Bloomberg published the results of the annual survey of the Global Innovation Index - a ranking of countries based on data in six categories: research, education, scientific personnel, high technology companies, manufacturing and patents. Here the main results of this research.

Research & Development.

Top-5: South Korea, Israel, Finland, Sweden, Japan.

In this category, the first place was taken by South Korea - this proves that any country can develop the economy through interaction of the government and private entrepreneurship, Bloomberg believes. In 1957, after the Korean War, the country's GDP per capita was the same as that of the West African state of Ghana. Intensive technological research, conducted by Korean companies led by Samsung, modernized the economy of South Korea.

Production.

Top 5: Switzerland, Ireland, Singapore, Germany, Austria.

To be a leader in innovation, one must be the first in production. But not all production is equally innovative - one cannot compare, for example, the manufacture of chips and computer chips, Bloomberg reports. Therefore, the researchers considered the cost obtained from the sale of pharmaceuticals, cars and computer technology.

Swiss pharmaceutical giants Novartis and Hoffmann-La Roche are the leaders in this category. China is ranked 41st in the ranking: despite the fact that the industrial sector of the country is huge, most of the products do not belong to the high-tech area.

High-tech companies.

Top 5: USA, China, Japan, South Korea, Canada.

This is one of the categories of the rating, which is not affected by the size of the economy and the population of the country. The fact that the US was the first among other countries in this category is not at all surprising, notes Bloomberg. America has great potential in this direction. In the country there are many high-tech companies - from Google to Monsanto (a transnational company engaged in biotechnology in botany).

Higher education.

Top-5: South Korea, Russia, Finland, Israel, Ukraine.

Researchers determine the level of education of employees on the basis of four factors: the percentage of the population of college age with higher education, the percentage of labor with higher education, the annual output of engineers and specialists in the new branches of science per thousand personnel, the annual output of specialists in science and technology per thousand graduates of universities.

Pakistan, Kenya, Brazil, Indonesia - countries that are close to achieving a minimum level of higher education. A high level of literacy can be part of the in-novation process, but this is not enough - for example, Russia has great potential in the exact and natural sciences, but, according to Bloomberg, innovation is not the strongest side of the country.

Scientific Staff.
Top 5: Finland, Iceland, Denmark, Israel, Singapore.
After the failure of Nokia in the mobile phone market, the Finns vowed to develop diversely and use the best technical minds, notes Bloomberg. The fastest growing sector is the gaming one; it's a bright demo of the Angry Birds app.
Iceland, Denmark, Israel and Singapore are small but prosperous countries. Iceland is the leader in genomics, Denmark in pharmaceuticals, Israel in software, and Singapore in electronics.

Patents.
Top-5: South Korea, Japan, China, USA, Germany.
Patents protect and encourage ingenuity, allowing their authors to protect themselves from identity theft. But they can also hinder the development of science, since they do not allow new inventors to use existing technologies. Countries whose residents receive many patents (and attract legal claims) are at the top of science and technology. South Korea was in first place in this category thanks to Samsung.

Disadvantages of such measurements.
Measuring the innovation index does not take into account an important factor that is difficult to assess - the role of state regulation. It can either accelerate or impede the adoption of new solutions.

B. Innovation activity of global company
It is possible to formulate the following definition of the term "innovation activity" - these are the processes of creation, development and distribution of new or improved types of products, services, technologies, raw materials and materials, methods of organizing production and management. Therefore, innovation activity includes:

- scientific activity;
- activities on the implementation of developments in the product, technology, prototype production;
- activities on the introduction (application) of this product and technology, as well as industrial production.

In the opinion of many authors, all activities within the framework of the in-novation process pertain to innovation, including:

- marketing researches of commodity markets and search of new consumers;
- information support of a possible competitive environment and consumer properties of goods of competing firms;
- search for innovative ideas and solutions;
- partner in the implementation and financing of an innovative project.

As innovation activity is carried out in the system of research and development, production, marketing and other structures, their objectives stipulate the features of its implementation, as well as material, technical, personnel, financial in-formation. In addition, the specifics of the functioning of such structures are determined by the content of a particular stage of the innovation process. Therefore, the detailed definition of innovation as an object of management should include, in our view, two aspects.
First, innovation activity is a combination of processes of production and non-productive nature that ensure the continuous improvement of production as a result of the growth of social needs on the basis of the interrelated progressive development of science and technology, objective economic laws and patterns of development of economic systems.

Secondly, it is a set of actions that ensure a high level of use of the innovative potential of the economic system, which is necessary and sufficient in a specific period of time to create, commercialize and operate new products that enable us to obtain a new quality of production and livelihoods.

As an object of management, innovation activity is a very broad area encompassing a complex of complex and heterogeneous phenomena and processes. From a theoretical and practical point of view, it is very important to give a clear formulation of innovation as an object of management. In part, the need for this is due to the fact that innovation activity is often completely identified with scientific and technological progress. If only innovative processes are understood as the acceleration of scientific and technological progress in the creation of new technology and advanced technology based on the use of the achievements of fundamental science, carrying out search and applied scientific research to meet the specific needs of the national economy, one cannot get a complete picture of it as an object of innovative management.

The definition proposed above reflects the essence of innovation as an object of state innovation policy, therefore, one cannot agree that in some cases the concepts of "innovation activity" and "state innovation policy" are identified. From our point of view, innovation policy should be considered as a set of measures, methods and means to achieve the objectives of innovation, allowing them to fully implement them taking into account the interests of specific economic systems.

Effective implementation of innovative activities is impossible without an appropriate mechanism for realizing its goals and objectives. The basic element of such a mechanism, allowing assessing the fundamental possibility of implementing innovation, is the innovation process. In most studies of innovative processes in a market economy, these issues are considered in two main directions. The first direction (which, in particular, received its development in the

studies of R. Nelson and S. Winter) is connected with the impact of market forces on the activity of subjects of innovation activity. Within the framework of this direction, special attention is focused on the procedures for appropriating a part of the additional profit from the implementation of innovations, competition in the field of technological development, and selection of the most effective processes and products. The second direction examines the problem of regulating innovation processes on the part of the state, and the mechanisms used at the same time: direct financing of R & D, state and departmental standards, state purchases of high-tech goods.

Practice shows that increasing the inflow of financial resources into the scientific and technological sphere can be achieved only by increasing its economic re-turns, turning science into an effective tool for the formation of the scientific and technological level of the industrial sector of the economy, the progressive evolution of its production structure, the growth of labor productivity, and the renewal of funds. Obviously, for this purpose, innovation activity should be accompanied by the commercialization of research and development results and bringing them to the kind of ready goods (services) that are in market demand. World experience shows that the market cannot always and should be the compass, which should determine the direction of innovative development of economic systems. The use of only a market mechanism in the innovation sphere restricts the selection of promising areas, the consideration of development trends and their dead ends.

Innovative activity is organically connected with production and consumption, and innovative structures are part of an extensive network of social and political institutions. The key subjects of market relations in the implementation of innovative activities are:

- holders of intellectual property rights (inventions, know-how, etc.);
- investors financing the creation and use of intellectual property, as well as the industrial production of new products;
- enterprises engaged in innovative activities;
- bodies of state administration and control;
- consumers of products or services;
- competing producers that produce competitive products or services on the basis of their own developments or other similar intellectual property objects;
- economic entities that unauthorized use objects of intellectual proper-ty in their commercial interests, as well as issuing counterfeit products.

In the market of innovative products or services, as in other markets, there is a constant clash of interests of subjects of innovation. At the same time, innovative activities in Russia have a number of features. In general, it is characterized by significant scientific and technical potential and a low net result of innovation activity. The variety of conflicts arising in the process of innovation in Russia requires a general change in the situation, rather than a system of limited measures. At present, the only guarantor of radical changes in this sphere is the state, creating conditions for a permanent innovation process on market principles, regulating its adequately changing environment. In addition, it is only through means of state influence that the conditions for innovation can be changed (to improve the legislative base, protect intellectual property, state and commercial secrets, identify promising areas of research and development, priority for the nation and the economy, and create conditions for investing in industrial production).

The main components of state regulation of innovation activity are:

1. Indirect stimulation of the development of science and the development of its achievements in the public and private sectors of the economy through tax, depreciation, antitrust, patent, foreign trade policy, and by supporting small businesses;
2. Direct public stimulation of R & D, allocation of public resources (orders, grants, loans) between various fields of research and development depending on the structure of state scientific priorities, as well as research and development in state scientific centers;
3. Maintenance of a favorable innovative climate in the economy and the infrastructure for providing research and development, including national services for patenting and licensing, standardization, certification, statistics, scientific and technical information, analytical centers for studying foreign experience, preparing forecasts of scientific and technological development and forming a system based on them national scientific priorities.

At the same time, it is necessary to understand that the development and implementation of these activities are limited to a complex of problems, the solution of which is necessary to create an enabling environment for innovation. First of all, this is the legislative base, which includes laws and regulations that regulate the relations of participants in the innovation process, state property rights, developers and investors.

CONCLUSION

Innovation is considered to be activity aimed at obtaining the results of scientific research and carrying out experimental developments that should be realized as a new or improved product demanded by the market, as well as creating a new or improving the existing technological process that will be used in the future production activities of the organization.

It should be remembered that the introduction of technical, organizational and economic innovations causes adequate changes in existing forms and methods of organizing management. This necessitates the continuity of the process of developing managerial

innovations and is becoming an increasingly important condition for increasing the efficiency of enterprises' activities.

Innovative activity is one of the forms of managerial activity of managers of an enterprise, taking into account both the influence of the external environment and the change in the Russian market of innovations that occur under the influence of general and specific factors.

Common factors that affect the enterprise's innovation activity include cyclical fluctuations, whose influence on the Russian economy as a result of the process of globalization is constantly increasing. So the rise in prices for Russian food is influenced by the growth of world prices, or the rise in prices for gasoline is the result of rising world oil prices or the growth of world demand raises prices for individual resources.

As a specific factor, the state of the scientific and technological potential of the production sphere, the commercial and political conditions for the implementation of specific products of innovation activity in the market, the activity of the managers themselves, which it is difficult to call innovative, stand out.

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