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"Global Challenges and Prospects of the Modern Economic Development"****PECULIARITIES AND PRINCIPLES OF INNOVATIONS'
DIFFUSION IN GLOBAL ECONOMY**

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Abstract

The topicality of the research is explained by the fact that the course of global economy on digital development in the conditions of increasing competition on the market of raw materials, capitals, products, service, technologies emphasizes the necessity of innovations' implementation. The aspiration to fill new niches in global market, the priority to new products which meet global quality standards, the usage of experience of high-tech countries direct the economy of all countries toward stimulating research and development activity, and therefore, toward innovative development. Innovative products and technologies take up more and more role in global trade year by year. However, the analysis of dynamics of the global innovation index, Bloomberg Innovation Index from 2008 to 2018 shows that innovative development of national economies is determined both by fully formed global trends in global markets and by the peculiarities of socio-economic development in the area; this fact puts new questions in the research of peculiarities and principles of innovations' distribution in global economy. Our research considers a range of problems: 1. The appearance of breakthrough technologies is a global trend: how does the introduction of new ideas and studies change the structure of global markets? 2. Innovations mean the appearance of new opportunities and threats: what risks are connected with innovations' diffusion in global economy? 3. Innovations improve the life quality: how significant is innovations' influence on the social development of national economies?

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1. Introduction

Nowadays innovations are the main resource for quick development of high-tech countries; the positive experience of their diffusion proves that digitalization causes considerable changes in the ecosystem of the areas by breaking traditional chains of the cost creation and by redefining roles: new business models make outstripping growth possible for some companies and make other companies noncompetitive in the market (Peskova, Khodkovskaya, & Nazarov, 2019). In global aspect innovations' diffusion is connected with the fact that in their aspiration to keep and multiply competitive advantages national economies use the opportunities of the external environment with maximum efficiency and develop strategic potential. National economies integrate such directions as institutional, investment, financial, customs, scientific and technical and others and, thus, promote the development of innovative activity, keeping their competitiveness on a high level in the conditions of increasing competition in global markets.

According to the research Granularity of Growth carried out by McKinsey, total shareholder return of private companies that are leaders of innovative activity is 15% higher than the average return in the sector (23,5% against 8,7%); innovations increase the profit of the companies considerably, make it possible for them to prosper faster and to outstrip competitors (Baghai, Smit, & Viguerie, 2007). Despite the aspiration of national economies to innovations, the experts and analysts mention that the speed of creation the efficient system of innovative activity is not high enough in the majority of countries in the world; science engineering and consultation centres and technology parks organized for creation new factors of production and technology demonstrate weak activity and low productivity in such countries as the Republic of South Africa, Morocco, Iran. Working out and quick introduction of the results of the research and development reports through the centres of technology transfer and funds which finance innovative activity remain the problem for the economy of Russia. The experts of Bloomberg Innovation Index included Sweden, Singapore, Germany, Switzerland, Japan, Finland, Denmark, France, Israel in the top-10 most innovative world economies in 2018 (The World Only, 2018). Investments in the search and development of innovative researches and innovations' diffusion in global economy are the factors which had a considerable influence on the economies of these countries and are of certain scientific and practical interest.

2. Problem Statement

The process of innovations' diffusion is irreversible; it changes both national economies and global economy in general, accelerating processes connected with:

- the interaction of science, education, business and state that create and realize products on the basis of innovative management principles and in the interests of economic development of the country (Kharin, Rozhdestvenskiy, Kolenskiy, & Kharin, 2015);
- more opportunities for accumulation, renovation and usage of tangible and intangible assets and for participation in the international division of labour;
- the reinforcement of complex interdependence and complementarity of national economies in such spheres as production, exchange of products, services, information;

- the increase of flows of financial, intellectual, informational and other capitals between countries (Gokhberg & Kuznetsova, 2012);

- the change in the structure of exported products: the increase of the volumes of high-tech products;

- the state support of innovative processes in the long-term perspective;

- the reinforcement of indicators of macroeconomic instability;

- the uncertainty and risks of the environment and other factors.

Taking into consideration that national economies strive for the increase in competitive advantages, the geography and the structure of innovations' diffusion play an important role, they determine perspective directions of national economic development, priority business spheres, breakthrough projects. Consequently, innovations are the key factor of efficiency increase. Thus, the purpose of this study is to research the peculiarities and principles of innovations' diffusion in global economy.

3. Research Questions

The research questions of the study are brought up taking into consideration the tendencies typical for modern global economy, effects and barriers of the position and development of the innovative area in national economies, the problems of innovation's diffusion in digital economy which are not researched fully:

1. How has the innovations' diffusion influenced the change of the structure of global markets?

2. What new outlooks and obstacles appear in connection with the innovations' diffusion in global economy?

3. What is the influence of innovations on the social development of national economies?

4. Purpose of the Study

The purpose of the study is to define the peculiarities and principles of innovations' diffusion in global economy under the influence of the processes of digitalization. We are going to describe the main tendencies in innovations' diffusion in global economy and to research the positive experience of innovations' diffusion in foreign countries. It is also necessary to reveal the peculiarities and principles of innovations' diffusion taking into account internationalization and integration of national economies in global market.

5. Research Methods

The following methods were used in the research: theoretical (dialectical logic, rational knowledge and others); diagnostic (the diagnostic analysis of the state and reasons, questioning and testing); empirical (facts description, measuring and generalization of the research results and others).

The information base of the research is the data of the analytical research institutes, centres of the World Bank (the International Bank of Reconstruction and Development, the International Association of Development, the Multilateral Agency of Investments' Guarantees), international consulting companies and analytical agencies (McKinsey, Bloomberg), materials on the problems of the introduction and usage of innovative working outs from special and periodical publications.

6. Findings

The analysis of evolution of globalization processes in global economy made it possible to determine that modern trends in its economic and science and technical development are connected with innovations' diffusion; it was reflected in one of the main purposes of the sustainable development of the countries – the UN members until 2030: creation of steady infrastructure, assistance in multifaceted and sustainable industrialization and in innovations. Digitalization is the source for achieving this purpose as the existing context of global economy's digitalization promotes gradual transformation of the models for socio-economic development of national economies (Smirnov, 2015). According to the European Commission report, digital economy is estimated at 3,2 trillion euros in the countries of G20 and is about 8% of the GDP. According to the data by the World Bank, global combined production may increase by 1,4 trillion US dollars due to the wide usage of technological innovations. The transition to the VI technological paradigm, the usage of network strategies in innovative markets had a considerable influence on the structure change of global markets. The amount of innovative products is increasing: in the structure of world trade of products and services about 80% is the market of intellectual property which is about 6% of the profit gained from the world technologies' turnover (UNCTAD, 2015).

The above mentioned processes have determined the following main tendencies of innovations' diffusion in global economy:

- the extending of the social division of labour, specialization and unification of the efforts in the sphere of production, science and technical, innovative activity and the universal diffusion of commodity production in the innovative sphere have led to commercial exchange of the products of innovative activity;

- the cyclicity and the irregularity of the innovative process stimulate manufacturers to find the opportunities for survival, extension and capitalization of business; it increases investment activity in innovative researches and studies which guarantee the inflow of economic benefits. Thus, while researching the efficiency of investments in innovations carried out by Strategy& it was determined that during the last 5 years 88 companies from different countries in the world and from different branches have been granted the status "highly efficient innovative companies", their common scientific content was 4,5% while the increase of sales and market capitalization was 2,6 and 2,9 times higher;

- the creation of market mechanism in order to carry out the trade of innovative products. The properties of innovative products such as usefulness, uniqueness, processing complexity lose their commercial appeal very quickly so the value of innovative products is determined not by the aggregate of expenses on its creation and working out, but by the significance of the value parameters for a buyer and a producer. Taking into consideration a wide range of innovations, their value differs in different segments of global market, and innovative products' promotion presupposes considering the changing conditions in which the generation of the global state of the market takes place. The usage of the market mechanism in order to carry out the trade of innovative products is connected with peculiarities of innovations' market: inelasticity of demand in the market as price policy partly influences the volume of innovations' transfer or the volume of their sales;

- the heterogeneity and differentiation of the international technological space. It is typical for the economies of the leading countries to take part in the innovative links of the global chains of added value, and a lot of developing countries remain to be exporters of resources. 76,6% of the global expenses on

researches and studies belonged to the USA, Europe (34 countries), China and Japan in 2017. There was an increase of expenses in all the regions in 2018: the increase of expenses on researches and studies in China was 34%, in European countries – 14%, in Japan – 9,3%. According to Bloomberg Innovation Index 2018, the corporate expenses on research and development of the 1000 biggest global public companies increased by 11% and were \$782 billion of investments in 2018 (The World Only, 2018);

- the reinforcement of transformation of ideas, researches and studies into new socially recognized socio-economical and science-technical solutions. The innovations which promote ecologically oriented economic development are especially attractive both for business and society in general. Japan and Sweden are the world leaders in introduction of ecological innovations in industry and transport. The programmes and road maps to solve global problems – preservation of natural and eco-systems – are developed in the majority of economically developed countries in the world; it leads to the decrease of sickness rate, famine, poverty;

- the spread of patent trolling which hinders the development of innovative environment. According to the data by the American company RPX which collects the statistics of patent cases, 5219 patent proceedings were instituted in 2015; 3621 from them were instituted by patent trolls (RPX, 2015). In the USA the patent trolls' activity reached its maximum level in 2015 – 69%. The amount of patent cases increased tenfold in 2017-2018;

- the exchange of information is accelerated due to the transition to multipolar global economy and the appearance of new forms of scientific cooperation. In global practice scientific outsourcing (outsourcing of knowledge management) has become widely-spread in software development (offshore software development) in such countries as Ireland (17% from the global market) and India (44%). The biggest international ICT companies (such as Microsoft, Intel, Google, IBM, HP) create their research centres in large Russian cities. According to scientific researches, the main factors for the companies which use scientific outsourcing are the decrease of general expenses (from 10% to 15% on average), the improvement of service quality and of business processes, the opportunity to enter new markets. But not all companies can use scientific outsourcing successfully; researches also show that only 56-63% of the companies can use it successfully (Lacity & Willcocks, 2012). The market of scientific outsourcing is expected to reach 124,29 bln. US dollars by 2025. The IT and telecommunications segment will grow faster than before and will increase by 20,8% from 2018 to 2025. The increase of data volume in IT and telecommunications branches leads to a wider usage of research and development which leads to the growth of innovations market in its turn (Borisenko, 2018);

- the increase of risks and uncertainty in the markets of innovative products; the reasons for their appearance are connected with the fact that the questions how to estimate usability and the classifications of innovative products made using convergent technologies are not regulated; they are also connected with the increase of the amount of law suits on illegal usage of patent rights; the strengthening of competition of ideas and studies; the difficulty to estimate demand for an innovative product.

The above mentioned tendencies in innovations' diffusion increase due to digitalization of global economy, they change its structure and transform it into a new quality state when digital technologies dominate in all spheres of economy and social life (Smirnov, 2018). The experience of foreign countries in innovations' diffusion shows that despite some common tendencies in innovations' diffusion, their

influence on the social development of national economies should be mentioned. In this aspect the experience of the countries with a high level of innovative economic development such as the USA, China, Switzerland is especially interesting. The above mentioned tendencies in innovations' development in global economy are characteristic of these countries as well.

There are state subsidies for large business's innovative studies in some countries (Italy, Spain, Switzerland and others). According to experts who estimated retrospectively the efficiency of the state financial support of innovative projects in European countries, the input and output effects of the projects are obvious. However, taking into consideration regular investment of public money in the projects of the same (biggest) companies, it can be claimed that the reached profitability of the projects could be guaranteed even without the state financial aid. The fact that governments choose only big companies can be explained by the potential rate of innovations' profitability and by the opportunity to shift investment risks on business which is able to defray expenses in case of the failure of the innovative project. In Russia the usage of state money for realization of innovative projects exists in a quite widely-spread system of public-private partnership which unites private and public capitals. The projects connected with the development of high-tech home branch by creating competitive products are in special priority.

Research centres and technology parks appear in China with the help of such companies as Samsung, Alcatel, Philips, Epson, etc due to the state support of the scientific-research sector. In the USA research and development studies are not supported by the state directly unless they are connected with the solving issues strategically important for the state. At the same time more than one hundred research laboratories of the defence complex are financed by the US public money. Swiss government and cantons finance not only national but also international projects in the space sphere and the sphere of nuclear research.

In China the development of innovative area determines the inflow of foreign investments in the country's industrial sector. Transnational corporations and companies with participation of foreign capital have appeared in the country with the aim to stimulate the inflow of direct foreign investments; it promoted attraction of modern studies in the high-tech sphere and of highly qualified specialists to the country. Institutional reorganization have changed the law of the country considerably; it stimulated foreign companies' activity and the creation of high added value.

In the USA and Switzerland the innovations' market is regimented hard concerning commercialization and transfer of technologies, financing researches; the reporting structure exist for the agencies which regulate research and development. Innovations in business are encouraged by tax subsidies in the USA: companies can get a 20%-subsidy from the increase of expenses on innovations.

Different incentives and preferential advantages are used in such countries as the USA and Switzerland in order to activate private sector's money. The private sector of innovations in Switzerland is especially specific: some big corporations oriented on innovations, scientific cooperation of corporations regardless the size of business, innovative studies of the demanding industrial branches are of special interest. Besides, the system of knowledge and technology adaptation functions successfully in Switzerland.

Having researched the peculiarities and principles of innovations' diffusion regarding internationalization and integration of national economies in global market, breakthrough technologies are concluded to open new opportunities in front of the countries but only if the countries are able to use them. The absence of regulatory system, of qualified specialists, of innovation oriented companies is the

obstacle for innovations' diffusion in many countries as it is necessary for the efficient usage of the advanced technologies' potential.

The analysis of innovations' diffusion in national economies made it possible to determine the obstacles which prevent their advancement in global economy. The aspiration of the countries to the increase and retention of competitive advantages provoked the reinforcement of control from the state for the transfer of innovations, creating a large amount of restrictive regulatory acts on commercialization of innovations, unwillingness to exchange advanced technologies. Unfortunately, this is the position of the majority of innovative economies in the world; they prevent spread of innovations in global economy and thus limit the rate of the global economic growth.

Innovations' diffusion is slowing down in the world due to a cautious attitude to changes which are the consequence of introduction of new researches and technologies in the economy. Innovations' diffusion provokes changes in different spheres: industrial, social, cultural, etc, so the transformation both of business processes and a lifestyle takes place. Consequently, the demand for new knowledge, abilities, skills for innovations mastery and their successful usage in practice is really noticeable; it leads to extra expenses connected with the retraining of employees, staff optimization, technological reorganization, reequipment. In some cases the innovation introduction can provoke job cuts or sometimes job losses. All these factors-obstacles hamper innovations' diffusion.

Despite serious obstacles for innovations' diffusion, their outcomes will positively effect the digital economy. It is estimated by the World Bank that the perspectives for innovations' diffusion are connected with the economic growth, people's involvement in social life, providing employment, development acceleration and unprecedented rates and scales of economic changes.

Today innovations are defined as a main driving force of digital economy in the usage of methods to economically substantiate solutions concerning organization of new productions; principles of organization of new production, forms and methods of organization of production processes; the output of high quality products while all kinds of resources are combined extremely efficiently in the enterprise; quantity and quality dependences, interrelation between the elements of production system in the process of designing, mastery and creation of new products.

The influence of innovations on the social development of national economies is heterogeneous and has become especially noticeable recently. It is explained by two reasons: differentiation in the levels of socio-economic development in some countries and the difference in the receptiveness of digital economy's achievements and digital technologies (Smirnov, 2018). Innovative transformation characterized by introduction of new achievements and technologies in all spheres of life is popular among economically advanced countries and it forms high innovative potential of national economies. The economy of developing countries is under the process of adaptation to innovations when they receive foreign technologies. African countries feel a bigger gap with advanced economies: they introduce the elements of advanced innovative experience and observe considerable changes in their social development – improvement of infrastructure, payment systems, enterprise growth, the quality increase in social services and transparency of budget indicators. Thus, innovations are a way to assist development of national economies and to eliminate disproportions in socio-economic indicators, for example, in the

volume of gross domestic product per head of population, the science-technical potential and industrial sphere, the volumes of financing scientific studies.

Our research of peculiarities and principles of innovations' diffusion in global economy states the following findings for the national economies for innovations' promotion in the digitalization era:

1. The high level of information exchange should be achieved. In modern economy international exchange of technologies, scientific information, experimental data accelerates innovations' diffusion and business development. The usage of foreign experience, taking part in international projects will promote the increase of business innovative activity based on mutually beneficial international cooperation in the sphere of science and innovations.

2. To overcome the deficit of investment in innovations. Investment flows in economy make it possible to create extra financial resources for financing innovative projects (Nazarov & Plaksina, 2011). If a state and a private capitals are united, it is possible to overcome the deficit of investment in innovations and to create conditions for the increase of consumers' interest to innovative products.

3. To resist discriminative ways of keeping competitive advantages. Innovations' diffusion in global economy is connected with unscrupulous methods of competitive struggle when countries – innovative leaders give “used up” technologies to developing countries while innovations' transfer, and therefore, they make “innovative gap” even bigger. The positive experience of innovative development of national economies can be used in order to resist discriminative ways of keeping competitive advantages: the model of export specialization with a limited inner demand and the usage of outsourcing (India), the development model of multibranch industries with a wide export orientation (China).

4. To expand the programme of state researches. Working out of such a programme as a part of national economy promotes the creation of technology parks and business incubators which develop technological partnership of the state and private business, creation of the system which will provide innovations' diffusion from the industrial sphere to the sphere of consumption on the level of global economy.

5. To develop institutional environment of innovations' market. The existence of institutional environment which promotes efficient interaction of inner and outer subjects of innovative market makes it possible to eliminate unnecessary barriers and obstacles to innovations' diffusion and to create closer relations between a consumer and a seller of innovative products. Institutional environment which meets the requirements of the market decreases the barriers to the entrance of new products to the innovative market, decreases risks and uncertainty.

7. Conclusion

The research showed that innovations' diffusion in global economy has common tendencies but depends on the local level of scientific, science technical and innovative development. Moreover, innovative leadership determines in many ways the speed of introduction of research and development results in the economy. Innovations' diffusion will be successful only in the case if the worked out innovation is connected with the key economic branches, is highly efficient and conforms to the technological structure of global economy.

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