Innovative economy: preconditions and factors of formation and development

Economie inovatoare: precondiții și factori de formare și dezvoltare

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SUMMARY

Dynamic economic growth can be considered an important factor in the country's competitiveness in the market system. In the process of improvement of the market economy model, priority should be given to development of production on a new technical basis, innovation activity to translate scientific and technological research results into production, creation of new technological processes and restructuring in on the modern scientific and technological basis of all branches concerning material production and the service sector. The purpose of the study is to identify the assumptions and factors regarding the formation and development of innovative economy.

Keywords: *innovative economy, development factors, progress, security.*

REZUMAT

Creșterea economică dinamică este un factor important în competitivitatea țării în sistemul economiei de piață. În procesul de îmbunătățire a modelului economiei de piață, ar trebui acordată prioritate dezvoltării producției pe o nouă bază tehnică, activității de inovare pentru a transfera rezultatele cercetării științifice și tehnologice în producție, creării unor noi procese tehnologice și restructurării tuturor ramurilor de producție și serviciilor pe o bază tehnologică și științifică modernă. Scopul studiului este de a identifica ipotezele și factorii în formarea și dezvoltarea economiei inovatoare.

Cuvinte-cheie: *economie inovatoare, factori de dezvoltare, progres, securitate.*

Introduction. Government expenditures stimulate economy and help Japan recover from the crisis of late 2009 -2010. The government has proposed to open the agrarian sector and the service sector to more foreign competition and stimulate exports through free trade agreements. However, there are discussions on restructuring the economy and financing new programs to stimulate the economy in the face of the difficult financial situation in the country. Japan's huge public debt, which exceeds 200% of GDP, persistent deflation, instability of exports to stimulate economic growth, aging and shrinking population - these are the main long-term problems for the Japa-

nese economy [7]. According to Zhores Alferov, countries have no future need to expand the issue of import-substituting products without the development of high-tech [5].

The purpose of the study is to identify the assumptions and factors concerning the formation and development of innovative economy.

In the study, the authors used methods of comparison, induction and deduction, historical, statistical, and other.

The analysis and test results. According to the author, an innovative economy is based on the flow of innovation, constant technological improvement, manufacturing and exporting high-tech products with very high added value and the technologies themselves. It is assumed that this is mainly a profit that creates intelligence innovators and scientists in the information sphere rather than in material production (industrial economy) and concentration of finances (capital).

The innovation is not a fad, but a necessity of survival to maintain competitiveness of the ideal of prosperity. A striking example of this phenomenon is are the events in the motorcycle market. When Yamaha has attempted to attack the company Honda, in response to that instead of the traditional decline in prices it has chosen an innovation strategy and in 18 months it has launched 113 new models of motorcycles, leaving its opponent no chance of success [5].

The author noted that the experience of developed countries shows that the winner in the battle for the consumer is the one who builds its his activities mainly on the basis of an innovative approach and the main purpose of the strategic plan is to expand new and original products and services [12].

A number of researchers believe that the most developed countries in the world today advance their economies using innovative methods [13].

The Industrial Revolution periodically changes the existing production system, causing a constant desire for innovation. According to Schumpeter, economic dynamics is based on the dissemination of innovations in various spheres of economic life [3]. The result is the impact of innovation on economic processes, or directly on the products. Currently, the list of countries with economies in innovation and venture business development - an essential component of the innovation economy - includes the United States, Germany, Japan, Australia, Canada, Sweden, Finland, Singapore, Israel and other countries. Innovation was together with accompanied any reasonable man in ancient times in the form of fire, batons, stone etc.; and has accompanied been with the mankind ever since. The theory of development, innovation, and, accordingly, an innovative economy has been created by an outstanding scientist. The fundamental monograph by the Austrian economist J. Schumpeter in the early twentieth century "The Theory of Economic Development" was published in 1911 and reprinted in 1926 and 1934. Since then, many prominent scientists, including the winners of Nobel Prize for economics, constantly deepened the theory of development and innovation. Joseph Schumpeter first introduced the distinction between growth and development of the economy, gave the definition of innovation and classified them it as follows [14]. This concept (innovation) includes five cases:

1. Creation of a new product; which consumers further need to familiarize with the new quality of the product;

2. Creation of a new method of production, which has not been practiced in industry and or mandatorily based on a new scientific discovery and may consist in a new form of commercial circulation of goods;

3. Open a new market, i.e. the market in which this industry in the country has not yet traded;

4. Open a new source of inputs, again irrespective of whether this source existed previously or had to be re-created.

5. Creation of a new organization of industry, for example, to achieve elimination of monopolies or monopolistic position. With the emergence of capitalism, the innovative sector of economy was formed, including special education, science, creative entrepreneurs.

The economy is called innovative because innovation is created and used in all sectors of economy and life. Some experts [11] identified several criteria that characterize the innovative society:

1) nomination to the fore services;

2) individualization of production and consumption;

3) development of small-scale production;

4) leading role of knowledge, science and information;

5) introduction of computers and new technologies;

6) elimination of class differences and formation of the middle class;

7) it is a human civilization, therefore people are the main value. Accumulated high quality and the creative human capital became the main driver of mass generation of innovation and creation of innovative economy. The concept of information society is close to the post-industrial theory [11].

Bell's work on the post-industrial economy describes the transformation in which excess profit is created not due to production, but due to establishment of new and dynamic markets. Innovative economy is the generation of economic structure, which is replacing the industrial economy [4].

Innovative economy first appeared in the United States. The famous American futurist Alvin Toffler points to its beginning - in 1956, "the first symbolic figure of disappearance of Economy smoking chimneys and the birth of the Second Wave of the new economy of the Third Wave, "white-collar" employees who numerically surpassed the factory workers [14].

According to the research done by the author, innovative economy is based on the following basic principles, features and indicators: a high index of economic freedom; high level of education and science; technological ordersorders ?? economy; competitive and high quality of life; the high cost and the quality of human capital in its broadest sense; high competitiveness of economy; high share of innovative enterprises (over 60-80%) and product innovation; replacement of capital; competition and high demand for innovation; redundancy of innovation and, consequently, to the need to ensure the effectiveness of some of them at the expense of competition; start new markets; market principle of diversity; extensive industry knowledge and its high export? of it? [6].

Capital Substitution appears at any stage of the innovation process. It attracts all sorts of research teams, which compete with each other for funding different research and development. The task of this stage is to get excess of innovative ideas, knowing that most of them will not succeed, but it allows you to create the conditions to replace the capital. Private firms purchase patents and inventions and hope to gain profits [6].

Once reaching the next level of development, innovative companies grow to the point when they become interesting for larger corporations, innovative and venture capital funds and other organizations. Thus, even before the stage of bringing up future development of prototypes, the market begins to attract foreign investors and industrial companies, buys the development, on the basis of which launch technological innovations. For example, Intel Corporation announced that in 2015 it would establish a computer-based nanotechnology, today ensures the growth of its shares [5].

Capital Substitution occurs in different markets in the same time. At each stage of this process substitution occurs with increasing profit. Innovative economy is based on that even non-existent or development ideas, which already laid the foundation for new and fresh markets of innovative products.

The global economic crisis, according to the author,, appears as a process of substitution of the dominant technological structures at the present stage in the early 21st century. Innovative Economy requires an excessive amount of products, services and agents at each stage of the process: an excess of knowledge, ideas, designs, patents, high-tech companies, entrepreneurs, scientists, infrastructure, etc. According to the author, this redundancy initiates and supports competition, which leads to an increase in diversity and quality of goods and services. It is no accident that in the last two decades, a dramatic increase of financial speculation has created a sense of domination of financeial capital over industrial capital. It is a manifestation of the release of capital from the aging process that sets technological structure, whose further expansion which is no longer supported by the market. The information revolution in the financial sector and the removal of a number of legal restrictions on speculation stimulated this process by enabling an infinite capacity of speculative operations in the form of virtual transactions on future obligations and rights. Under these circumstances, countries and regions that have similar products and technologies have advantages and security [12].

This competition is the engine of personal development, economic, social and human capital as the main factor of intensive development.

Innovative market economy involves simultaneous growth of all sorts of markets, which is provided if there is a diverse redundancy, which can be obtained only at very high productivity and high technologies. Redundancy scientific discoveries, inventions, ideas, professionals, etc. initiated research and innovation systems, depending on the customer needs and demand. At the same time the creativity of scientists and innovators and the competition between them move them ahead of the curve of the growth of innovation proposals of and their demand on the part of the economy and society. This is manifested through the accelerated evolution of human capital and its leading role in the modern economy as a development factor. As part of the innovation system in conjunction with the science and the education system, happens to stimulate the creation of different companies - the developers of innovation happen to be stimulated. This is due to the construction of centers for common use of scientific equipment, technology parks, benefits and subsidies. At the same time, an excess of financial institutions involved in the innovation economy should be created so that investors compete among themselves for the purchase of shares in startups. However, only 8 per cent of economic growth in Russia is achieved by high-tech sectors, while in economically developed countries this number reaches 60 per cent. The demand for technological innovation of enterprises (CIS) in CIS countries is generally relatively low and does not meet the conditions to achieve sustainable economic growth and security. The development of nanotechnologies and processes make up one side of the coin. To implement innovations, development of new markets for implementation of a new generation of products is required. Likewise, the question arises as to who is the first to make a breakthrough in this direction. Innovative economy is based on the formation of new markets. In the emerging markets there are much more ideas, development, intellectual property; also, innovative products have replaced the old structure of the economy and tacked it

to a new level of quality (Table 1). Different types of market development of new organizational forms for firms and institutions are created in the innovative economy.

Organizational forms are used as industrial parks at universities, corporate training centers, clusters of small businesses, business incubators, technology transfer centers, specialized trading platforms for innovation.

ed by international organizations. The strategy of international community for the new century, which is presented in the "Agenda XXI century", adopted at the UN Conference in 1992. The leaders of all countries of the world says mention that as much of the planet's natural resources are exhausted and it is threatened by overpopulation, the environmental situation becomes increasingly unfavorable.

Table 1. **Basic direction of technological structures.**

4th technological structure	5th technological structure	6th technological structure
1940-1980 year	**1980-2020 year**	**2020-2060 year**
-automation - oil, coal and nuclear energy -EVM data banks -chemical engineering -green revolution -plain building -machine building	-microelectronics -oil and gas energy -personal computers, Internet -biotechnology of microorganisms -information technology -robotics	- nanotechnology -alternative energy, including hydrogen -global information networks, multimedia -plant biotechnology, animals drugs (? what is meant? medications **for** animals? or made from animals?) -photonics and optoinformatics

Source: author's representation based on [1].

The present and future states are inseparable from the development of science on and the strength of its innovation potential, its intensive development and use in public interest that requires the creation of innovative economy. Ensuring economic security, according to the author, can be effective only in an economy in which there is unemployed able-bodied human nu este clar and material resources to increase the total social product, material, information, energy and spiritual values. This vision of an efficient economy is largely consistent with the model of sustainable development adopt-

Hence the need to move towards a model of sustainable development, such that meets the vital needs of the present generation and ensures maintaining such possibility for the next generation.

Within the spectrum of positive scenarios for the development of economies such as innovative ones in the long-term, several main stages exist, which determine the specificity of the content and priorities of industrial policy, and the difference is determined by the steps, in turn, opportunities to mobilize different sources of economic growth. Among them, the authors

identify the step activating the demand for innovative products and services. Given a small economic growth observed now all this reserve will be exhausted in the coming years. Accordingly, the timeframe of the first phase is limited to 2015. The greatest opportunities to increase production by tapping into the reserve capacities are the light industry, chemical industry, mechanical engineering, ferrous metallurgy, food industry and oil refining. It is for these industries that favorable conditions in the domestic market should be created, at the same time, if possible, stimulating their expansion in the global market. Innovation will gradually become the most important factor in radical modernization and reengineering of production, restructuring its industrial and product structures. Another phase of investment activity and normalization of the structure of production is shown after 2015, when economic growth is impossible without a significant input of new capacities and radical renewal of the production structure. The main objective of this phase is to mobilize financial resources for investment in economic restructuring. With regard to its own funds for investment in the manufacturing industries, this problem can be partly solved at this stage due to the normalization of price proportions and redistribution of added value for the benefit of the real sector. The next phase of innovation can be identified. It starts with the 2020 - 2025 period (Table 1.1). The main objective of this phase of industrial policy is a substantial increase in the technological level and innovation potential of key industries through the use of national scientific and technological achievements. This can be achieved only by concentration of provided resources on the priority areas of applied research that have been identified during the first phase. In this case, we are not talking of the production of entirely new knowledge and fundamental discoveries but of the use of existing backlog in applied science [2].

Innovation process is a concept that has currently the most diverse and broad interpretation. Development and dissemination of these concepts in the processes related to everything new, including new ideas and inventions, new scientific achievements, new knowledge and technologies, new results of fundamental and exploratory research projects etc. are generated by domestic performance and mixing of the two concepts: innovative and new. A broad interpretation of innovation as new includes all that is meant by scientific and technological progress and mixed priorities that create misconceptions about the identity of infrastructure requirements, providing scientific and innovative development. To substantiate this research, we will proceed from the following understanding: scientific and technological progress should be divided arbitrarily into two main interconnected and complementary components namely component of science and technology and component of production and technical achievements. The results of scientific and technological progress is a scientific achievement - new knowledge, new scientific and technological ideas, discoveries and inventions, new technologies to fundamentally new physico-chemical and biological principles.

From the foregoing, we conclude that, aimed at the realization in social practice of the "turnkey" production and technical achievements by the collective activity of people is meant the innovative activity – innovation, use of existing advanced technologies, systems, machines, and equipment based on the use and implementation of scientific and technical achievements of national and world science and technology. It should ensure the elimination of the gap between the available capacity and the level of already existing and verified scientific

and technical achievements, and their use in developing countries (established) companies.

Therefore, the saturation of innovative activity is the most important condition for the formation of an effective innovation economy and economic security. The effectiveness of innovation activity is largely determined by innovation infrastructure. Consequently, innovation infrastructure is a basic component of innovation economy, the innovation potential of the company.

Innovative infrastructure is a key tool and mechanism for an economy that concentrates innovation. Based on this understanding, we see innovation infrastructure as mutually reinforcing production and technical systems, organizations, companies and the corresponding organizational and management systems are necessary and sufficient for effective implementation of innovations. Innovative infrastructure determines the pace (speed) of the country's economic growth and well-being of its population. The experience of developed countries confirms that in the conditions of global competition in the world market the one who has a developed infrastructure creation and implementation of innovations as well as owns the most effective mechanism of innovation will inevitably win. Therefore, for effective functioning of the country's innovation economy innovation infrastructure should be fully functional [16].

Conclusions. It is necessary to have a set of properties that would contribute to the full implementation of engineering technologies for the creation and implementation of innovations across the regions and the country as a whole. It is our deep conviction that the population should possess a set of features, which are distributed throughout the region in the form of innovation and technology centers and engineering firms to solve problems of functionally full innovation cycle with the delivery of the object of innovation activity "turnkey"; versatility, which allows competitive assurance of the realization of the innovative project "turnkey" in any field of industrial or service sectors of the economy; professionalism, which is based on honesty and quality service to the customer or the consumer; constructiveness, which provides a focus on the end result. Development of the innovative project must be accompanied by continuous analysis of the final results. Availability of accurate feedback on the achieved outcomes allows to develop constructive priorities which a the development of innovation and thus ensure a closed innovation management system according to the scheme: Innovations - Investments - monitoring outcomes - investment, etc.; a high level of scientific and technological capacity; first and foremost employment leaders of innovative projects and the possibility of continuous updating and improvement of the personnel of the innovation infrastructure; financial security (availability of working capital); high level tools that accelerate the final result; flexibility, providing innovative infrastructure adaptation to changing market requirements and external environment.

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