

**European Economy**

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**TRENDS AND CHALLENGES  
OF INNOVATION ECONOMY****Abstract**

The paper deals with the issues, trends and challenges of modeling the development of innovative economy amid modern globalization.

**Key words:**

Globalization, models, innovative economy, national economy, innovation system, scientific knowledge, technology, innovation clusters.

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**Issue Significance.** At the beginning of the 21<sup>st</sup> century the series of national economic models was formulated that demonstrate the wide range of combination of market economy and state regulation, of national market entrepreneurship and social orientation, and of economic patterns and non-economic factors in inter-state relations.

Nowadays globalization has dramatically increased the degree of openness of social systems, and simultaneously increases the degree of non-equilibrium processes occurring in them. Under the terms of non – equilibrium thermodynamics, this fact gives rise to an objective tendency of self-organization. The society faces an alternative: self-organization, or degradation. The ability to self-organize through complexity and enhanced value, information, and social relationships enabling to develop and implement the resource, human and social capital of the society is an adequate response to the challenges of globalization.

There is an apparent attempt to overcome the negative trend of post-industrialization that is, excessive absorption of resources threatens the existence of mankind. One of the most drastic ways to avoid disaster is to move to an innovative stage of development. It is an objective requirement of time to overcome resource and institutional constraints of globalization.

**Analysis of recent research and publications.** Both domestic and foreign scientists are actively engaged in the development of the theory and practice of modern innovation modeling of the economy at the state level, including Bilorus (2007), Sazonets (2003), Mazurok, Odiahailo and Kulishov (2006), Kulishov (2006), Bohma (2008), Radionova (2009), Porter (2001), Fukuyama (2004), and others.

**The objective of the paper** is to discuss the theory and practice of modern innovation system modeling of national economy in the context of globalization.

**The main material.** Analyzing competitiveness of countries, their welfare and the efficiency of corporations in global business F. Fukuiama, the American scientist concludes that the most successful among them are those where the dominant universal cultural feature is confidence. It is manifested in the form of spontaneous socialization. It allows different business participants to **pool** their resources, capabilities and knowledge, concentrating them in the required direction of activity. The origin of such associations, in economy primarily is corporate mergers with a professional (separated from property), but having a definite result, i.e. where is the highest level of spontaneous socialization, there is the highest efficiency (Fukuyama, 2004). These are voluntary associations of non-relative type in Japan, the U.S. and Germany, where the basic form of socialization is communal solidarity. And vice versa, where the socialization is based on

family relations, business is a little international success. In family-related societies (China, Italy, Taiwan, Singapore and others) there are few large corporations, and small firms are weak for transnational expansion, their options are limited in the choice of the scope of activity on the global market. Little success is the economic structure of the authoritarian culture (France), as well as that of state socialization (Russia). In this case, confidence is replaced by laws, contracts, intervention of the authorities that requires additional transaction costs. The above suggests that the society on a global scale has not yet reached the required socialization and cultural phenomenon of confidence, and is highly differentiated in this respect. The question arises whether the innovative development is the path that will enable to eliminate resource, institutional, and in a broader sense, cultural constraints of globalization? Could not the scientific ideas be a special instrument and field to create a new universal human culture?

This means that, first, creative human resource (not nature) is preferred to be a source of economic development and, second, real economic activity is promoted. The economy is a part of the human world, and primarily its psychosocial constant that provides appropriation of material and spiritual wealth in order to provide its livelihood. The man is a special element, a generator for transformation of the mental into economic through socialization and personification. It relates to creating of economic forms. On the other hand, a person becomes a driver of innovation process in every area of his/her activity, as Radionova (2009) noted in her paper.

The economic literature has already formed the point of view respectively inevitable transition to a new, more progressive model of development based on the economical use of resources, on meeting mainly intangible human needs (creative self-expression, leisure, mastery of knowledge and culture, etc.), and what is most important, on the scientific innovation. Such an economy is called an innovation economy. To give at least the general outlines of a model of innovative development, we turn to the theory of Porter (2001), in which he identifies seven stages of the competitive growth of the countries:

- First, tested and refined consumer demand dominates on the domestic market.
- Second, the main factors do not play a significant role any longer, and their lack is substituted through the introduction of innovative processes; specialized and developed factors are improved; industry, agriculture and intangible area compete on the basis of advanced technologies and differentiated products and are not rather vulnerable for fluctuations in prices (commodity prices, exchange rates and interest rate); competitive industries develop.
- Third, the competition is now primarily based on product differentiation, which requires high demands on the quality and qualification of labor; gradually price competition is rejected in favor of the countries that produce simple products.

- Fourth, capital is exported on the basis of foreign direct investment.
- Fifth, the government and companies develop strategies of internationalization, international and global strategies of their development; full-scale horizontal and vertical integration is implemented.
- Sixth, international positions of the country are becoming stronger in the area of service provision; such sophisticated services develop as financial, information, marketing and engineering.
- Seventh, new methods of state regulation are introduced, which are dominated by indirect leverage on the national economy.

Thus, as seen in this model a full cycle of intellectual innovations motion should be created. It all begins with the formation of sophisticated demand, its broadening and deepening. The result should be a steady customer. Modern history knows cases of the society preparedness to accept the product, which does not exist yet in mass production. So, before expansion is done in the information market, the U.S. companies formed the mentality of the advanced information nation through the advertising media. The society had been prepared to have relevant individual expenses before the qualifying product (computers, internet services, etc.) was manufactured. And this problem is not only ideological but also cultural. The next thing is to obtain the necessary intellectual resource that could be used for technological, technical, organizational and other improvements. And then, of course, the problem rises with respect to the source of this resource. It is clear that this source is creative human abilities.

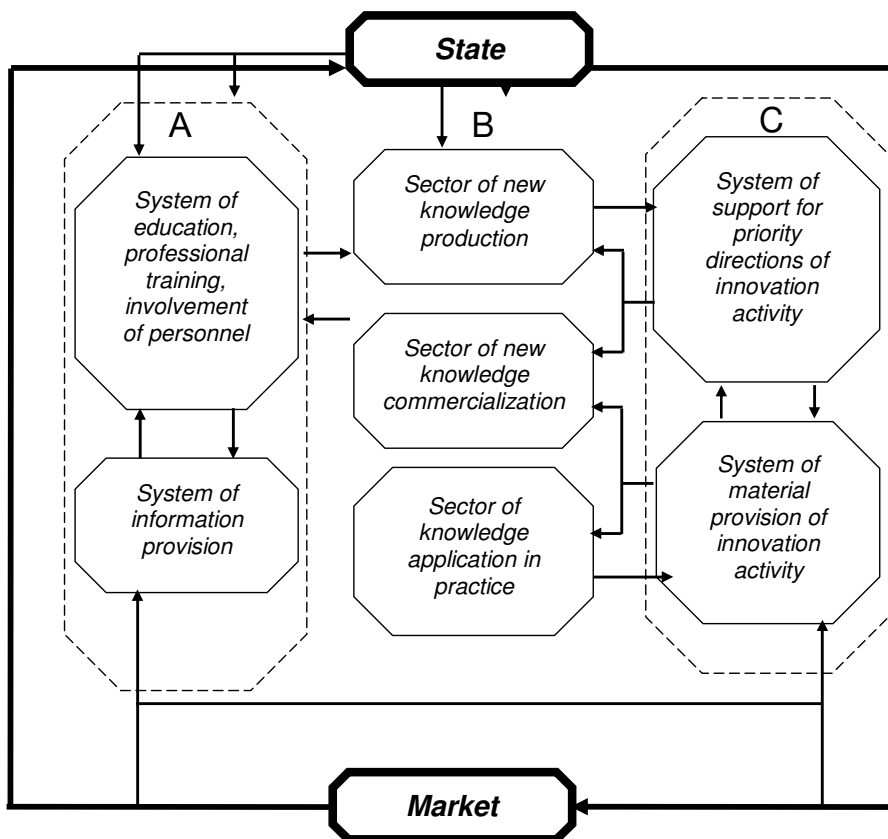
Another step is associated with the production of the scientific idea as such and its implementation into production, creation of advanced technologies and specialized factors.

In the process of technological structures changing within individual countries national innovation systems are being forming and evolving. Russian scientist N. Ivanova considers the emergence of a new body – innovation systems – in national economies to be the main result of the development of the innovation sphere in the twentieth century (Ivanova, 2001). This body is a collection of structures and institutions of production, legal and financial support and commercialization of scientific knowledge and technology within national borders (Fig. 1).

The concept of national innovation systems (NIS) takes an increasingly important place in modern economics. The concept is based on the rejection of a simplified model of relations between intellectual potential of the society and its implementation for socio-economic development. The NIS allows the most direct interaction of social and public institutions, educational institutions and business community in the strategy implementation of general long-term development. Decisive role in shaping this strategy and provision of the required institutional conditions for its implementation belongs to the state.

Figure 1

Structure of basic model of national innovation system



Innovative systems are influenced by a set of objective factors for each country, including the country's size, its geographical location, climate, natural resources, the peculiarities of the historical development of state institutions and forms of business. In addition, each innovation system is characterized by a certain degree of organization that ensures sufficient stability of institutional interaction: national foundations of innovation in the presence of existing at the beginning of this century global movement of production, labor and financial resources substantially modified. Globalization in the innovation area is primarily manifested in the growing share of foreign funding of research in the most developed and new industrialized countries, also in creating a growing number of TNC's research units in favorable regions for such activities.

On average, for example, in the developed countries, the share of foreign funding for research and development in the late 90s of the last century accounted for about 10%. Nevertheless, in some countries these figures are very different. For example, in Japan the share of foreign funding for research is only 0.3%, while in the UK – 15% as Sazonets (2003) notes.

The scientific literature highlights the importance of inter-agent information links as a special component of the National Information Systems (NIS), which defines the velocity of the conversion rate of new knowledge into technology, and its diffusion in the economy. The logical consequence of increased attention to this aspect is a sufficiently developed methodological apparatus of measuring and evaluating of the flow of knowledge and information as an indicator of dynamic processes occurring within the national innovation systems. The developed countries practice to examine systematically the following flows of knowledge and information:

- cooperation between enterprises in the field of innovation. The data for the analysis are obtained by examining firms through literature (review of the papers and specialized publications, annual reports of corporations);
- dissemination of technologies, mainly in the form of new machinery and equipment. The data for the analysis are obtained as a result of the firm's research and metering inter-firm R & D flows through the purchase of machinery and equipment;
- diffusion «of new implicit knowledge» as a result of labor mobility. The analysis is based on the labor market statistics, particularly in terms of the dynamics of the skilled staff within and between sectors of production, between business sector, research sector, and higher education sector.

It is noted that the most ambitious corporations wish to create a global corporate culture, and make their contribution into the global science. But the majority of TNCs open the research units in some countries primarily to meet the needs of their own production capacities. The main function of these units is to finish goods in accordance with local needs, either to develop new products and technologies according to the needs of the local market. But the globalization is giving itself felt. In recent years the activities of foreign multinational units is more often aimed at the use of the global scientific and technological potential. This includes the involvement of highly qualified scientific and engineering personnel, likewise the participation in the implementation and financing of joint research projects. Some sectors (communications, biotechnology) are characterized by the creation of various informal agreements, alliances for joint research of the riskiest high-tech projects. Yet, the global innovation market is still in its infancy, while there are sufficient preconditions for that, including institutional ones.

In the global information environment scientific ideas are able to instantly disseminate. And this high mobility is a very favorable condition for the motives implementation of quasi-rent. The symbolic form of expression is peculiar initially for the scientific ideas, and their dissemination by means of networks does not cause any problems. But the specific nature is that the velocity of the ideas spreading to some extent is limited by the necessity to have some time for their learning. Moreover, in the scientific field negative chain reactions have been complicated. Yet scientific ideas are almost endless, and their reliability is substantiated by the hypotheses that can be generated at any level. It should be added that scientific discovery is not limited though being repeatedly used.

All that above mentioned refers to the formation of a global innovation market. In practice, the elements of the market today are primarily used in science funding. Information networks are still used for the exchange of scientific ideas, but they have not made a scientific basis for the formation of free market. Meanwhile, the establishment of a global science market based on the principles of supply and demand, accounting for the quality of a particular project, so far is the subject of debate. And there are some doubts that it is just the market that will become a driving force for the development of basic science in the long run.

Of course, the ideology of an open society assumes the presence of a free market, and the development of such a market will (exclusively), depend on the capabilities of the information society. Information- communication networks are a universal tool, but their use in various areas of social life has its own specifics. If in trade and finance they provide an opportunity to create a global free market, but with different degrees of mobility and accessibility, in science such a market is definitely possible. But its specifics can not help taking into account the specifics of particular goods, i.e. innovation that should be focused on long-term goals.

In fact, scientific, academic and entrepreneurial culture, ethics and motivation are very different, and sometimes conflicting. The combination of scientific creativity and entrepreneurship is not always successful. But the practice of recent years shows that the scientific enterprise on an individual basis is becoming the ever more dynamic segment and the driving force of modern science.

An important component of the institutional environment of innovation area in the developed countries, are scientific and industrial agglomerations and complexes as «science parks» (in the U.S.) or «techno-poles» (in Japan), innovative banks, investment companies of venture financing, non-profit organizations for coordination of innovative projects and programs. Thus, in the U.S. there are three types of «science parks» including: « science parks « covering the whole cycle of research and development, experimental and technological development with their introduction into manufacturing; «research parks» that differ from the first ones that new developments are made only prior technical design stage; «incubators» (technical firms), where universities, companies and government agencies for a small rent provide land, facilities, premises, laboratory equipment depreciation and other services.

«Incubators» of companies and organizations greatly facilitate the complex and labor-consuming process of forming new institutional units in innovation area and that process in economically developed countries is growing rapidly. «Incubators» are usually oriented at providing a specific set of technical services, but there are universal, specialized by sectors, or in the high tech sector, where innovation businesses are consulted on management, marketing, finance and others. For this purpose, highly qualified experts of training centers, industrial corporations, and banks are attracted, thus providing high efficiency of the technical firms. To reduce the risk of venture business the technical companies control up to 80% of the newly established company's capital during the first year of its operation, and management is provided by the managers of the technical firm, a scrupulous and substantiated selection of innovative projects is made, also financial assistance is strictly regulated

The activity of Japanese corporations should also be taken into account, which amidst the globalization of world economy practically every month open new research centers in all the world countries with the aim to create new markets and increase their competitiveness.

Technology parks are also widely used in Western Europe. So, in England there are 35 parks, in Germany there are about 60 scientific and technological parks, and their number is growing, in France 11 parks are functioning.

In Russia technical or science parks, created at the universities, in fact, serve as «incubators» that promotes commercialization of researches. In addition, other Technopark structures are created, in particular, such as innovation and technology centers (ITC), which cover innovative firms and service companies. As the world practice shows radical institutional tool to accelerate scientific – technological and economic development in some regions of the country have become the free and special economic zones. Impressive positive results with the use of economic and legal framework China reached during the period of its economic revival

Innovative banks in the world industrial countries finance or lend the whole cycle of creation and replication of scientific and technical products; also they promote selection of the most effective developments, and implement the process of mass distribution of the latter. Innovative Bank on its own account makes all-embracing expertise of innovations involving highly qualified experts to evaluate the scientific and techno-economic importance of the projects. The Innovative Bank becomes a co-owner of the developments. It reimburses its expenses due to the income from the innovation realization, and that induces the bank to take great responsibility for the examination of innovative projects and their funding.

Investment companies engaged in venture financing make risky loans and financing of small innovative companies that develop new technologies. The sources of venture capital may be different in each country, including for example, charitable foundations, government grants, funds of special investment com-



panies and others. To reduce the risk, the venture funding provides for the allocation of funds for not entire project at once, but in stages: the first stage includes the financing of the group performers formation, the second stage is funding of the development of a technological design or prototype products, and the third stage consists in the financing of new products replication of «non-risky funds», and gaining access to the stock exchange.

Nonprofit organizations coordinating innovative projects and programs provide services in management and administration of large government programs. In the majority of the developed countries innovation activity is regulated through patent law, copyright law and other aspects of intellectual property.

Today the most important and most popular way that involves all economic stakeholders in the advanced scope of motivations is clustering, including the innovative one.

Innovative clusters concentrate innovations in places with high density of specialized resources for innovative development, of highly qualified scientists, engineers, technicians, close proximity to universities and other research institutions and, what is more important, availability of other innovative firms. Innovative Clusters in the course of their development outgrow the limits of individual countries and become centers of attraction for both, foreign direct investment, and foreign scientists and specialists. There are many examples proving the mentioned. Thus, in addition to Silicon Valley in California there should be called Silicon Fen in Cambridge, Wireless Valley near Stockholm, Bangalore in India, and in Ukraine a modern research and education cluster – the state higher educational establishment «Kryvyi Rih National University» started operating in the city of Kryvyi Rih.

The creation and development of innovation clusters is impossible without close cooperation between corporations and the state while pursuing a long-term science and technology policy. An important element is to increase its funding for research and development. Increase in appropriations for R&D can give impetus to the innovative development of this or that country especially within a certain national innovation system.

**Conclusion.** The information development in recent years has created a real opportunity for a dramatic speeding up of economic, scientific, educational and cultural development of peoples in different continents, for uniting the whole humanity into unique community. It should be noted that in recent years in most countries the revival of national consciousness increases, which is a defensive reaction of the society against the damaging effects associated with globalization.

In general, the innovation sector is a strong factor in the globalization of the systems of cost and social capital accruing, and it requires specific solutions of global problems.

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