

## ECONOMICS, MACROECONOMIC

---

Zueva O.A., Gorovoy A.A.

### METHODOLOGICAL APPROACHES TO RESEARCH OF THE ROLE OF SUBJECTS OF NATIONAL INNOVATIVE SYSTEM: REAL AND FINANCIAL SECTORS

Zueva O.A., Russia, Candidate of Economic Sciences,  
associate professor of business and commercial activity of  
St.Petersburg State University of ITMO

Gorovoy A.A., Russia, Doctor of Economic Sciences,  
associate professor of business and commercial activity of  
St.Petersburg State University of ITMO

#### Abstract

In article authors allocate different approaches to research of a role of subjects in national innovative system and the organization of process of interaction of real and financial sectors: the first approach is based on consideration of innovative activity either subjects of real sector, or financial sector, the second approach – or on research of a problem of economic growth at the expense of innovations taking into account recurrence of development, or on the analysis of a role of innovations in market uncertainty; views of such domestic and foreign economists as A. Gorovoy, S. Dyatlov, O. Zueva, O. Zybin, N. Ivanova, N. Kondratyev, B. Lundval, V. Maryanenko, F. Makhlop, G. Mensh, J. Metcalf, R. Nelson, K. Freeman, Yu. Yakovets, etc., the high rates of economic growth and economic activity of subjects of the studied sectors investigating problems of achievement are analysed at the organization of their interaction thanks to introduction of innovations; the essence of such categories as «national innovative system» is opened; need of

**8th International Scientific and Practical Conference  
«Science and Society» 2016**

transformation of subjects of a hi-tech split of Russia and the organization of interrelation with subjects of financial sector on the basis of development of national innovative strategy is proved.

**Keywords:** methodological approach, innovation, national innovative system, state innovative policy, convergence, divergence, interaction, real sector, financial sector, hi-tech split

The analysis of essence of national innovative system and role of subjects of real and financial sectors in development of national economy demonstrates that there are different approaches to research. In – the first, one domestic and foreign economists place emphasis on research of innovative activity of subjects of real sector, others - financial sector [1], allocating for either one, or another a leading role national innovative system. In – the second, one scientists are based on research of a problem of achievement of high rates of economic growth at the organization of interaction of real and financial sectors at the expense of innovations taking into account recurrence of development, others – on the analysis of a role of innovations in the market uncertainty strengthening divergence [2], the studied sectors. Therefore, in our opinion, this problem of research is rather actual.

As part of the institutional approach to the consideration of the real and financial sectors, as a result of the study «japanese economic miracle» the american scientist K. Freeman [3] in 1987 revealed the essence of the concept of «national innovation system» (NIS), taking into account different levels of technological development. From his point of view, the national innovation system is a set of institutional real and financial sectors of national economy, which is the active interaction begins, creates, transforms and promotes the penetration of new technologies. In this concept, he drew attention to the institutional aspect of the innovation activity of the real and financial sectors. These institutions include not only the institutions responsible for scientific - research development, but also the «course of action, by which develops the organization and its effective management is carried out its own capital and borrowed funds of subjects of real and financial sectors». In addition, the efficiency of the elements of the national innovation system affects the level of economic development at both micro - and macro-level. For example, thanks to the organizational innovation in the production system of the real sector in Japan as «just-in-time», allowing to create sufficiently strong horizontal links between the different departments of the company in the manufacturing industry, and competitive engineering, managed to create the basic elements of the national innovation system of the national economy. In

**8th International Scientific and Practical Conference  
«Science and Society» 2016**

addition, the american system of Ford and Taylor, establishing vertical linkages between research and production departments in the company and become organizational innovation are the basis of the formation of the US national innovation system.

Further, the concept of NIS and improvement of interrelation of the studied sectors of the american scientist R. Nelson was based also on an institutional basis. From his point of view, the concept "NIS" is based not on system approach and includes not set of elements of national economy: real and financial sector, and «a set of institutes of the studied sectors which interaction defines innovative characteristics ... national firms» [4] besides researches are carried out not only at the macrolevel, development at the microlevel is considered.

Within new institutional approach to research of a role of NIS and improvement of interrelation of real and financial sectors, general in concepts is an institutional aspect. At the same time, in national innovative system institutes of national economy and structure their stimulating and defining speed and a trend of the technological training or volume and composition of transformation generating activity of institutes of real and financial sectors in national economy [5] are considered main.

J. Metcalf [6] not only pays attention to value of institutes of real and financial sectors in national economy, but also designates an active role of the state in innovative process, gives to the concept «NIS» cultural characteristics, representing it the driver of innovative process, and also as a certain filter of technological and social and economic culture of the last periods of time.

N. Ivanova [7] pays attention to a role of different subjects innovative process, giving great value to subjects of real and financial sector. She considers NIS, on the one hand, as a complex of the related organizations of real sector realizing new knowledge and technologies within national borders, and, on the other hand, as set of the institutes of financial, legal and social character providing innovative activity of subjects of real sector and reflecting national, cultural and political characteristics.

The danish scientist B. Lundval [8], within system approach to research of real and financial sectors on an innovative basis, defines NIS as set of elements of national economy: real and financial sectors, and the communications interacting in production, distribution and use of new, economically effective knowledge within national economy.

Today one of the dominating approaches to consideration of essence of NIS and role of different economic entities of national economy is network and information approaches.

## **8th International Scientific and Practical Conference «Science and Society» 2016**

In our opinion, according to the first approach to research of a role of NIS and subjects of the studied sectors it represents a difficult network of the interconnected subjects: business, the state, universities, the non-profit research organizations, to the second approach - difficult system of interrelation between subjects of a scientific split and the industrial enterprises of real sector according to circulation of flows of information and new knowledge.

Yu. Krylova [9] notes that productivity of NIS is defined by efficiency of interaction of innovative subjects of real and financial sectors in the course of generation and dissemination of knowledge. At the same time, backbone value is the share of the organization of cooperation communications between subjects of the knowledge-intensive split and hi-tech split, the state and subjects of real and financial sectors.

In our opinion, the formation of the strategy of innovative development of the real and financial sector entities, to make important strategic decisions, bearing the long-term nature, such as infrastructure projects in the national economy, is an integral task of the state. At the same time, activity of subjects of scientific sub-sector, in general, can not be attributed to the market sphere, and the subjects of the real and financial sectors tend to adopt short-term projects.

The above two approaches, in our view, not fully describe the essence of the phenomenon of innovation, NIS, mission study subjects. Therefore, the integration of network and information approaches to the consideration of NIS and the role of the subjects of the real and financial sectors in the innovation activities into a single information network approach represents the most comprehensive research data.

According to this approach, in our opinion, it is the movement of NIS multiple streams of information and new knowledge that mediate the interaction between the enterprises of the real sector; real sector entities, universities and state scientific - research institutions; between subjects of scientific technology and high-tech sub-sectors, sub-sectors of high-tech entities and financial sectors, and their networks. The basis of the effectiveness of the NIS is, above all, the analysis of multiple information flows between actors of the real and financial sectors.

Thus, in the conditions of formation of information-network approach an important factor in the economic development of the interaction of real and financial sectors are innovators who are carriers of new knowledge and innovation, and acting as subjects scientific technology and high-tech subsectors. Transformation of relationships studied sectors of the system on the basis of innovation

**8th International Scientific and Practical Conference  
«Science and Society» 2016**

is carried out primarily through the development and implementation of the state innovation policy, which is directly linked with the scientific, technical and industrial policies. For the main purpose of this policy in Russia include the formation of a national innovation system, including the system of relationships studied sectors based on innovation, providing high rates of economic growth, primarily due to the subjects of export structure transformation of raw materials and products of high-tech subsector. Due to the fact that in the late twentieth century. in the global economy has formed a new paradigm of development of the national economy – «the economy based on knowledge» [10], the nature and role of the NIS is now becoming a key for the realization of social and economic development of the national economy and the system of interconnection of the real and financial sectors based on innovation. The concept of «an economy based on knowledge» began to be used in the scientific circulation by the american scientist F. Machlup in 1962 [11].

The market of new information and knowledge inherent in the global nature of formation and application of new knowledge, materialized in technology, specific products, industrial and domestic high-tech services subsector. Currently, «the economy based on knowledge» is present in the most developed national economies of the European Union, USA, Japan, Canada and other countries. As an effective model for the institutional development of the national economy of the economy based on knowledge it was adopted in China and India. A special way of transformation of the national economy based on innovation and the transition to an economy based on knowledge, in Russia.

For the main driving force of the structural transformation of the national economy of Russia, in our view, include the national innovation strategy to improve the interaction between the real and financial sectors [12] and an active science and technology policy scientific technology and high-tech sub-sectors, aimed at supporting the creation and development of cutting-edge innovations in the sixth technological order.

On the basis of the system - a network approach to the study of innovation and system interconnection of the real and financial sectors in theory can justify the transformation of the existing linear models of perfection of interaction studied sectors partial innovation process [13], to today's non-linear systems-network models of industrial clusters in different regions of Russia's national economy, national systems of relationships studied sectors of the national economy and the world as a whole, as a complex interaction of real and financial sectors of subjects at different levels and innovative

**8th International Scientific and Practical Conference  
«Science and Society» 2016**

base. Therefore, a great scientific and practical importance is the definition of the concept and structure of NIS, which is at once the object and the subject of the state innovation policy.

From the viewpoint of S.A. Dyatlov and V.P. Maryanenko [14], the national innovation system is a technological hypersystem evolution of the new economy, and under it is to be understood the institutional complex of the new economy and the relationships between the different actors of the new economy, which calls for a detailed analysis of the economic - social infrastructure, because that data subjects can not function this system is not for it.

Thus, there is no single approach to the consideration of NIS and the role of its subjects. In our view, an integrated approach to the study of the real and financial sectors of the convergence to determine the nature, conditions and mechanisms of functioning and evolution of the NIS and the role of the sectors studied subjects. There are several reasons that lead to the eventual use of an integrated approach for the description of the organization and structure of NIS. In - the first, the development of new information technologies and other innovations that lead to sufficiently flexible and secure communication of subjects studied sectors, predefined global information flows. In our view, a comprehensive approach laid a further proof of the inherent integration of all the above presented approaches to the study of nature and the role of NIS business entities: the system, network and information. The existence of a network as a specific operation of the system is not permitted without the exchange of forming effective communication, which triune content [15]: trade, information and finance. In - the second, appearance, thanks to globalization and the characteristics of the phenomenon of innovation, hyper, promotes the maximization of surplus value, which includes rents intellectual javascript::property. In - the third, due to the formation of a new industry cluster, supplying new markets with innovative products, generating new horizontal relationship between the subjects of the real sector, the subjects of the real and financial sectors and other NIS actors, there is a global restructuring of the previous network structure.

Efficacy is determined by the effective functioning of the NIS activity is not excluded, and the interaction of real and financial sector entities in the process of creation and dissemination of new knowledge, as well as the form of integration is determined by the interaction of subjects scientific technology and high-tech sub-sectors, the state and the different business entities, which are formed as a result of innovation. At the same time, active subjects of the national economy in the organization of interaction of subjects

**8th International Scientific and Practical Conference  
«Science and Society» 2016**

studied sectors are the subjects of the public sector, since they are responsible for translating innovative projects nationwide. Thus, in our opinion, NIS is a complex socio-economic system, consisting of institutions that promote the transformation of interaction of subjects of the real and financial sectors on the basis of innovation through networking, information flows, generation and dissemination of new knowledge between them, taking into account the key priorities and the direction of the state innovation policy.

This category emphasizes that national innovation system is in - the first, a complex socio-economic system, as evidenced by the following symptoms: organization system (the possibility of a certain isolation of not losing the properties of accessory system, its components, or subsystems, namely, institutions and organizations of national economy), internal interconnectedness and interdependence of the constituent elements of the NIS, (only NIS components having a functional relationship with at least one element of the NIS, may be included in its composition); external interrelatedness and interdependence of NIS with other NIS world economy (part NIS elements global process of generating, distribution and accumulation of new knowledge); goal-setting NIS (the creation of conditions for effective generation and development of innovative processes in the studied sectors of the national economy and the organization of their relationship).

In – the second, the notion of states that NIS is a network structure. On the basis of important conclusions [16] that «innovative activity subjects of the real and financial sectors is complex and non-linear, includes an excess amount of feedback and network interconnections», we can conclude that long-term and interrelated socio - economic relations in the network of NIS structure subjects studied sectors attached to one another. In addition, the network structure of the national innovation system is predetermined essence and main features of convergence [17] and interdependencies in the socio - economic relations between the real and financial sector entities and destination entities, forming a network both on the micro - (industrial networks) and macro ( socio-economic networks). In – the third, the representation of the category of NIS emphasizes the existence of different types of NIS networks, which contain the different types of entity relationships.

Currently, it is social relationships begin to play a more and more important for the organization of innovative activity subjects of the real and financial sectors. This type of relationship involves not just economic, but also institutional influenced by various entities NIS. On the one hand, social relationships can hinder innovation and the relationship of subjects studied sectors, and on the other hand,

**8th International Scientific and Practical Conference  
«Science and Society» 2016**

serve as a determining factor in the innovation behavior of NIS entities. Favourable social relationships between NIS entities contribute to lower transaction costs in innovation thanks to mutual trust of the real and financial sector entities. So, very often in international economic forums [18] discusses the problem of trust between the different actors, not only the national economy but the world economy. On the one hand, should be confidence of the public sector entities to the subjects of the real and financial sectors, promoting, including the reduction, simplification, reduction in price of the procedures of examination of innovative projects. On the other hand, the credibility of the subjects of the real and financial sectors in the state, including the ability to control and security issues, reducing the number of cybercrimes. Researchers estimate that confidence in the field of state regulation of innovative activity in the most present among the US business entities, Great Britain, India, Iran, indifference in China, and to a lesser extent - in Israel [19]. In - the fourth, based on the above arguments about the consistency and structure of the NIS network in the category in question is S emphasized structuralization management relationships are established based on the principle of hierarchy system and a reflection direction of the dislocation of economic and political power of the subjects of the national innovation system. The structure of the national innovation system management is a chain of command between the public, of the real and financial sectors, that is a hierarchical deployment of the degree of control over the subject belonging to the network operation of its other entities, paying attention to the relationship with those entities, which it is subject. Thus, in the NIS constantly searches for compromises between the personal interests of the subjects of the real and financial sectors, promoting innovative ideas for an award in the form of surplus value (in the form of certain rents on knowledge, but also the rent, formed by the interaction of the test subjects and create through direct or indirect regulation of the functioning of the other actors in the NIS network) and in the hierarchical management structure. It is necessary to make the important conclusion that the implementation of the main goal of the network shows the gradient of the resultant force of subjects studied network sector, a trend which is due not only to the relative strength of each of the subject network of the national innovation system, or their combination, but also the presence of convergence and subordination.

In our view, an active role in each of the NIS should be the State, in order to ensure the expanded reproduction of the system, which is the main result of the state innovation policy. As part of an integrated approach to the study of the national innovation system



**8th International Scientific and Practical Conference  
«Science and Society» 2016**

the main tasks on the indirect impact on the innovation activities of the subjects of the real and financial sectors is to create and support safe and undistorted communication between the main elements of the national innovation system, as well as the creation and maintenance of institutions that encourage scientific and inventive activity of level individuals to the level of organizations.

In - the fifth, in particular it should be noted in the category of «NIS» such a feature as the availability of network virtualization, which is manifested primarily in the fact that none of its network may not be the same, pre-planned and hardened structure, which is formed by a system of convergence of the real and financial sectors on the basis of innovation. At the same time, the real «center of decision-making» for transformation of a network of national innovative system can't be fixed and not necessarily coincides with the initial center, as well as his location moved over time, and deployed in space. In addition, globalization and virtualization of the conditions of the real and financial sectors, not only the national economy but also the world economy as a whole, the virtual enterprise from eventual existence has become a reality thanks to the generation of global availability and branching information and transport communications, minimize cost and greatest ease of use. This fact is indicative of the eventual existence of virtual clusters, above all, regional and industrial clusters, where the geographic concentration of the property of losing its decisive role. For example, a cluster of Apple owns its own components in different, often quite distant from the State of California points of our planet.

In - the sixth, in the category «NIS» denotes not only the development of the phenomenon of innovation and the complexity of the evolution of innovative interaction of the subjects studied sectors in practice because of the economy of new knowledge and the formation of networks, but also need to continue its formation and interaction of national economy entities on the basis of the main priorities and directions state innovation policy laid down in the strategy of improving the interaction between these sectors.

Thus, in our view, in the context of the methodological idea «NIS» as a complex socio-economic system determines the awareness of the need for an integrated approach to the study of innovative interaction of subjects of the real and financial sectors of its generation and transformation. In addition, the social significance of a generation of the integrity of a flexible and dynamic interaction of subjects studied sectors within the NIS, is caused by a process of transformation or upgrade existing technological structure, rather than individual attempts to use specific scientific results in a separate

**8th International Scientific and Practical Conference  
«Science and Society» 2016**

production of the real sector, not individual measures to establish certain elements of infrastructure innovative interaction of economic agents. Therefore methodology of holistic approach is relevant not only in the theoretical interpretation of «national innovation system», but also in its extended reproduction in practice.

**References:**

- [1] Zueva O.A. Gorovoy A.A. The role of innovations in economic development of real and financial sectors of national economy // 3rd International scientific-practical conference «Innovations in science, technology and the integration of knowledge» 23-28 February 2016 / London - 2016.
- [2] Zueva O.A., Molchanova O. A., Hypothesis of a divergence of real and financial sectors of Economy / Zueva O. A., Molchanova O. A.//Scientific notes of the St. Petersburg university of management and economy. –2014. – No. 2(46) – pp. 13 – 18.
- [3] Freeman C. The economics of industrial innovation, 1974.
- [4] Nelson R. National Innovation Systems. A Comparative Analysis. - Oxford, Oxford University Press, 1993.
- [5] Metcalfe J. S. The Economic Foundations of Technology Policy: Equilibrium and Evolutionary Perspectives // Handbook of the Economics of Innovation and Technological Change, Blackwell Publishers. – Oxford (UK)/Cambridge (US). 1995.
- [6] Metcalfe J. S. The Economic Foundations of Technology Policy: Equilibrium and Evolutionary Perspectives // Handbook of the Economics of Innovation and Technological Change, Blackwell Publishers. – Oxford (UK)/Cambridge (US). 1995.
- [7] Ivanova N. National innovation systems // Problems of Economics. - 2001. - № 7. - pp 60 - 64.
- [8] Lundvall B. A. National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning. - London, Pinter Publishers, 1992.
- [9] Krylov Y. Integration of stakeholders in the innovation sphere // National innovation systems: problems of formation and development of «Innovation Management – 2006». Proceedings of the international scientific-practical conference. Moscow, 2006, part III.
- [10] V.P. Maryanenko. The phenomenon of innovation. Experience in conceptualizing a multidimensional space: Monograph. - Spb .: Scientific and production company

**8th International Scientific and Practical Conference  
«Science and Society» 2016**

«Growth», 2008.

- [11] F. Machlup. Production and dissemination of knowledge in the United States. - M.: Progress, 1966. - 462 p.
- [12] Zueva O.A. Strategy of improvement of convergence of real and financial sectors of national economy of Russia taking into account foreign experience // Economics, agriculture, engineering, education, psychology, clinical, history: 8th International Scientific Conference Science and Society», 24-29 November 2015. / London - 2015. pp. 87-94.
- [13] S.A. Dyatlov, V.P. Maryanenko. System-network approach to the analysis of the innovation system // Economics of Education. - 2002. - №2. - pp. 180-186.
- [14] S.A. Dyatlov, V.P. Maryanenko. System-network approach to the analysis of the innovation system // Economics of Education. - 2002. - №2. - pp. 180-186.
- [15] S.A. Dyatlov, V.P. Maryanenko. System-network approach to the analysis of the innovation system // Economics of Education. - 2002. - №2. - pp. 180-186.
- [16] Golichenko O.G. Fundamentals of analysis and synthesis processes of formation and development of the national innovation system // National innovation systems: problems of formation and development of «Innovation Management – 2006»: materials of the international scientific-practical conference, Moscow, 2006, Part III. - URL: <http://www.econ.asu.ru/lib/sborn/innov2006/sod3.html>.
- [17] Zueva O. A. Hypothesis of convergence of real and financial sectors of economy // Economy and ecological management. 2014. -No. 3. - pp. 192 - 204.
- [18] The International Economic Forum «Open Innovation», Moscow, 28 October 2015 // Informational and analytical agency "RBC" / [Electronic resource] /<http://www.rbc.ru>.
- [19] The International Economic Forum «Open Innovation», Moscow, 28 October 2015 // Informational and analytical agency "RBC" / [Electronic resource] /<http://www.rbc.ru>.