

FROM THE HISTORY OF FORMING AND DEVELOPING THE CONCEPT OF THE NATIONAL INNOVATIVE SYSTEM



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ABSTRACT

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The field of my scientific studies during last period have included extremely active field – innovations and the problems related with them. The Article touches upon historic issues of formation of the effective national innovation system. Particularly, the factors determining the concept of national innovation system are represented, together with the main stages of its evolution. We tried to represent the image of scientific study of origination, formation and development of the concept in logical order; the role of the researchers, who are famous worldwide and scientific merit in the establishment of the theory of the concept of national innovation system.

Contribution/ Originality: This study contributes in the existing literature to improve studies in the conception of innovative system. This study uses new estimation methodology which are adopted in the world and new methods of conception of the concept in Georgia this study is the first original news in our country in national innovative concept. The main purpose of our work is to develop and implement the correct concept.

1. INTRODUCTION

Several phenomenon of historical importance, which took place at the beginning of the third millennium of our Era, gave rise to the transformation of social, political and economical conditions of civilization of the world. Innovative, technological revolution shall be deemed to be principle and key phenomenon, formed at the base of information technologies and transforming material grounds of the society in cardinal way. National economies of different countries became related globally, which, in their turn, influenced upon the form of relation between economy, government and society.

During last years, they have spoken and written much about development of innovative economy in the countries of transitive economy. Unstoppable rhetoric regarding the fact that the country of post communist domain is necessary to transfer to the innovative model of economical development, may be considered to be the

necessary precondition to their sovereignty. Truly, main fault of the economy with directive plan was that the ideologists of market capitalist reforms in the first place noted low innovative level of economical systems of every field, which took place under the conditions of "command-administration dictate". According to them, refusing state regulation of economy (including ignoring innovative and industrial policy), its liberalization and moving to the "market rails" shall work up innovative activities of economical subjects

Principle task of modern social and economical development of the country is its moving to the innovative trajectory, as well as maximal using of principally new factors of economical growth characteristic to the postindustrial informational era. This task is extremely important for the modern Georgia, where necessity of moving to the innovation way of economical development requires strong activation of innovation activities, in the first place of the industrial subjects, scientific-technical processing at the enterprise level, and investment and other conditions. This gives opportunity for the national economy. Based on the science-intensive it becomes possible to overcome great and traditionally increasing backwardness (in the different fields of economy, compared with the high-developed countries of the world).

As you can see above, solving the problems of innovation development of Georgian economy is of immediate importance. Today, we consider establishment of the national innovation system to be the necessary term for modernisation of the economy of the country. Purpose of the Work is learning scientific-research materials regarding national innovation system existed recently, in the concept of development of already existed scientific innovation development in the developed and developing countries; analyse, particularly evaluate and finally, represent the project of the concept of national innovation system of our country.

The article "From the History of Forming the Concept of National Innovation System" will be the first step from the point of solving distinguishing problem in the said article.

2. REVIEW OF LITERATURE

K. Freeman (Sussex University Scientific Policy Research Institute, Great Britain), B.A. Lundval (University of the city of Upsal, Sweden) and R. Nelson (Columbia University, USA) to be founders of the theory of formation of national innovation system, who analysed development of innovation activities in different countries and gave definition of the national innovation system based on it. Herewith, the research was grounded on the outcomes of the researches of I. Schumpeter's (The Theory of Economic Dynamics), F. Haiek's (The Concept of Distributed Knowledge), D. Nort's (Institutional Theory), R. Sollow's (The Role of Scientific-Technical Progress in Economic Growth), P. Pomer's and R. Lukas's (New Theory of Growth) carried out earlier. Each author offers own description of the national innovation system, focusing on its separate element and ties. Herewith, each of them share common methodology principles, they are:

- Knowledge perform special role in economic development;
- Main factor of economic dynamic is competition between entrepreneurs, which is grounded on the innovations;
- Institutional contexts of innovation activity directly influence upon its context and structure.

Activation of researches of the innovations, essence of innovation activities, their influence on the production, and improvement of the management of scientific-technological progress is noticed in the national literature. Works of the Academician L. Chikava, Professors E. Baratashvili, A. Abralava, T. Chikvaidze, R. Kutateladze and others are noteworthy; however, it shall be emphasized that still we have no materials about scientific research materials. Except the monograph issued by our authors (Innovations (2015)). Where we have represented the Concept of Development of Science and Innovations, no unified opinion about the essence, structure and functions of this term has been developed until today in Georgia.

Due to the above circumstances, we have targeted to establish a cycle of the scientific articles, regarding origination, formation and development of the concept of national innovation system. The first article is dedicated

to the history of forming the concept.

3. THE MAIN PART

During last several years the term “National Innovative System” is often met in official documents and scientific works. Establishment of the effective national innovative system was considered in Russia as the necessary stage for modernization of the country economy, based on the principles of innovations and modern technological principles. On the other hand, together with the principle enthusiasm of the supporters of the concept of national innovation system, criticism of the said method of approach takes place. Often this criticism is based on the evidence that the concept of national innovative system is the fee paid to the terminology fashion. According to the critics, the concept of national innovative system was formed in particular foreign countries for implementation of the purposes of special political rhetoric of particular foreign countries and receiving resources for funding particular business-projects. It is noteworthy that there is no accurate and unambiguous explanation of the concept of national innovative system in Russian publications. The concept of the national innovative system is not considered by the critics as independent line of economic theory and, correspondingly, as possible theoretical ground for the purpose of forming state economic policy. One of the purposes of such critical understanding of the concept of national innovative system is that in the most of the works of Russian scientists and economists, using the concept of national innovative system in particular way, are ignored in its historical context, as during last 10 years said concept has passed several important stages of its development, and we considered it necessary and useful to review the history of its formation.

As currently the object of our scientific studies is innovations and we are working on establishment of the national innovation concept of Georgia, we consider it necessary to review the history of its establishment in present Work.

The concept National Innovative System entered scientific economic literature from the 80s of 20th century. Initial source, this term was used in was the Article of the Professor of Sussex University (Great Britain) Cristopher Freeman: “Technological Infrastructure and International Competitiveness”, commenced in 1982. This work was written for the group of experts of Economic Cooperation and Development Organization in the scientific fields of technology and competitiveness, Freeman was the advisor to. The Article has not been published upon its preparation, as the manager of the Experts’ Group considered in to be provocation. The reason for rejection of the provocation, subject to Danish researcher B. Lundgal, could be the fact that Experts’ Group made decision according to which analysis of competitive ability of the Country, being founded on the reviewing of only salaries and exchange rates, is vague and insufficient. In course of writing the Report, said conclusion was of sufficiently contradictory nature (Lundvall and Freeman’s, n.d).

To our mind, contradictory nature of the said conclusion was understand by Lundval as follows: In course of writing the Article, analysis of salary and exchange rates of national currency was main instrument of analysis of international competitiveness of the country. Said methodology instruments in Freeman’s Article were strictly criticized. The Researcher justified their essential restriction. It is quite logical that Economic Cooperation and Development Organization, as official international organization, using said analytical instruments in its operation, made decision to reject publication of the Article, thus contradicting its methodology provision.

Opinion of Fransua Chesnay is interesting, who was main administrator of the Direction for Sciences, Technologies and Industry of Economic Cooperation and Development Organization that time. Cessnas considered the Article not to be published in 1982, as Freeman had been actively using he theoretical and methodological methods and rules, which had been going beyond the frameworks of neoclassic economic theory of Mainstream (Sharif, 2006).

In his article K. Freeman (Article, n.d) determines two different methods of approach for learning international competition and international trading, foreseen in the studies for economic cooperation and development. Principle

distinction of these methods of approach is their independence towards technologies for technological development. Freeman writes: the first type of studies reviews the technologies, as quasi-autonomic factor, forming traditional theories of relative preferences and based on the prices of production factors. Another scientific method of approach considers the technology, as one of the most important elements of competitive fighting between firms and agromational states.

The Researcher supports his research with the second type and forms it as one of the main objectives. He determines quality of influence upon science and technologies upon international competitiveness. Original text of the said article conclusion can be made, that articles of Lundvald and Cessnas about rejection for publication of the said article may be considered to be correct, as article of Cristopher Freeman truly was provoking by that time, as the Author referred to the innovative attempts to use qualitatively new instruments in course of the analyses, thus contradicting the methodology of Mainstream.

The issue about the first published written source, where the concept about national innovative system was first represented, is contradictory and disputed. In 1985, publishing of the University of the City of Aalborg (Denmark) published Prof. B.A. Lundval's Article "Product Innovation and User-Producer Interaction". The Article gave brief description of the innovative systems. However, in the name of the Concept no adjective "National" was used.

In 1987, Cristopher Freeman published a book: "Technology, Policy and Economic Performance: Lessons from Japan". In his work the Scientist actively used the concept of National Innovative System and the concept for the analysis of economic development of Japan in the second half of the 20th century.

Subject to the presented chronology, the concept of the National Innovative System may be prioritized in the academic circles of B. A. Lundval. However, taking into account the fact that further the term "National Innovative System" was established in the economic science. The proof that K. Freeman was the first to introduce the concept of National Innovative System is much fairer. Naubahar Shariff, one of the researchers of the history for forming the concept of national innovative system, wrote that there is contradiction between Freeman and Lundval in academic circles, in regards with the priorities for development of the concept, herewith, each of the researchers tries to justify that his opponent was the first (Sharif, n.d). Currently, most of the researchers recognises that first the concept for the national innovative system was represented by Freeman in the book "Technology, Policy, Economic Performance – Lessons of Japan". Approximately on the same time, in 1988, a book was published which was the outcome of the work of the project performed under the management of the International Federal Institutions of Prospective Studies. The project also united researchers working on the problems of the concept for technology changes in the economic theory. In the book Technical Change and Economic Theory and under the edition of Jovany Doss, entire section was dedicated to the concept of national innovative system, which is comprised of several chapters. The works represented by the famous authors dedicated to the studies of the national innovative system was included in the Section: articles of N. Lundval, K. Freeman and some other economists, as well as the work of Richard Nelson, which is the third economist, who played great role in formation and development of the concept of national innovative system.

In 1992-1993, two fundamental works dedicated to the study of national innovative system was published: National System of Innovation: towards a Theory of Innovation and Interactive Learning) under the edition of B.A. Lundval and National Innovation Systems: a Corporative Analysis under the edition of Richard Nelson (Edquist, 2005). The fact that the books were simultaneously published, may be explained by the fact that the Economists were working together within the frameworks of single research project. Notwithstanding simultaneous working, Lundval and Nelson consider the system of national innovations from different sides. In the introduction of the book, which was published under the edition of R. Nelson, purpose of the work is determined as follows: "This project was focused on detailed description and comparison of the understood national innovative systems, first shall be understood theoretically and further the concept shall be confirmed or verified" (Nelson, 1993). Main accent

in Lundval's work is made on the theoretical studies, purpose of which was development of alternative theory of neoclassic theory, based on the three key concepts – cooperation, manufacturers and consumers - Innovation” (Edquist, 2005).

Initially, at the beginning of 1990s, the concept of national innovative system was used by the international organization (Economic Cooperation and Development Organization). In March of 1992, based on the achievements of the international program “Technology/Economy” (commenced from 1988), studies were published with the title: “Technology and Economy; Main Relations”, the studies were dedicated to the researching of interrelation of innovative process and institutes and organizations, within the bounds of innovative process. According to B. Lundval, these studies may be called the first works, published under the aegis of the International Organization, dedicated to the concept of national innovative system, as the research instrument (Naubahar, n.d).

The fact that the concept of national innovative system recently got into the academic studies of economists, in fact it was primarily used in the official studies of public organizations and this is not accidental.

One of the preconditions of forming the concept of the national innovative system, as written by B. Lundval, is the interest expressed by the national government and international organizations in the 60s and 70s of the 20th century, in the developed countries of different levels of economic growth (Lundvall *et al.*, 2002). In this direction, special groups were formed for development of the studies. Often such groups included the scientists, who carried out researches in this direction – for example in academic circles of economic sciences. Working in the groups supported development of their own studies. Together with the publishing of the report, according to the outcomes of activities of the group the articles were being published for governmental structures in specialized economic magazines, who had no relation with the governmental circles. The concept of national innovative system was submitted to the political circles from 1992 (Edquist, 1997). Together with the academic circles, development of the said concept was performed in the academic circles, as by already stipulated authors, so – other economists. In 1993, B.A. Lundval published an article with the title: “Comparing Danish and Swedish Innovation Systems”. In 1997, Charles Edquist independently published a book, dedicated to the national innovative system with the title “System of Innovations: Technologies, Institutions and Organizations”. However, within the framework of the said studies, Ch. Edquist rejected the formulation: “the concept of national innovative system” and introduced the concept of innovative systems. Such difference of the subject concerned is explained by Edquist with the fact that he does not see the necessity of using one level within the framework of the concept of innovative system – in this case – national innovative systems may be represented in the regions, economic sectors and may be supranational. Selection of particular level of analysis may be justified by the reasons of the research, as desirable outcome may be distributed to all levels of economy. Edquist's concept of innovative systems unifies all starting levels of studies (Golichenko, 2006). The issue of nationality of the concept also is disputed between the economists working on the concept of the national innovative systems. In fact, Edquist's book is continuance of the concept of national innovative system of Lundval, Freeman and Nelson, though with the different name.

During 1990s, the concept of the national innovative system has not been developed with its original version, represented by Fregmen, Lundval and Nelson in their studies, but it suffered evolution. The objects of analysis became innovative systems of separate regions, as well as international innovative systems.

Some researchers abstracting geographic criteria, dedicate their works to the innovative systems of economic sectors. The theorists of the national innovative systems distinguish the studies of Swedish Economist B. Karlson as separate phenomenon. These studies are dedicated to the technological systems.

Parallel to the development of the concept of national innovative system, in the academic circles its strengthening as within the frameworks of the political programs of separate countries, so – within the frameworks of the methodologies of researches of international organizations took place. In 1993, Finland officially adopted the Concept for National Innovative Systems. The Country used it the reviews issued by the Ministry of Science and Technology Polices in 1993 and later in 1996 and 2000 [13]. In 1997, the Organization for Economic Cooperation

and Development published a report with the title: National Innovation Systems). According to the Report, the concept “National Innovation System” is considered and explained. It is determined within the framework of the system of information flows, opportunities for using the said concept is analysed in the formation of the state policy, further possible directions of the research are determined: in 1999, the Organization for Economic Cooperation and Development published outcomes of new studies “Managing National Innovation System”. The materials represented herein touch upon formation and management of the national innovation system of the country.

According to Lundval’s article (Naubahar, n.d) as at the year 2002, the Organization for Economic Cooperation and Development, the Conference for Trading and Development of United Nations of EU Commission, included the concept of national innovation system in the listing of the applied analytical instruments. US Academy of Science included the term of National Innovation System into its dictionary and uses this concept for the analysis of scientific and technological policy of the country. Specialized institution is established in the government of Switzerland, which is responsible to the development of the innovative system of the country.

Further development of the concept for national innovations system in the beginning of 21st century was termed with the following principle factors:

First, in the beginning of the 90s of the 20th century, diffusion of the said concept was being continued. Increasing number of researchers global wide used the concept of national innovation system in their studies. In the beginning of 2000s, works were being published in Russia, underlining said concept in course of analyzing innovative institutions of the country. Parallel to this, further distribution and development of regional and sectorial innovative systems take place. Increasing number of researchers is being interested in studying and using main principles of the national innovative system.

Second, works appear in economic literature, dedicated to the study of the stages of forming the concept of national innovative system. For example, in the work of Nauber Shariff, “Formation and Development of the Concept of National Innovation Systems”, study and formalization of methodology grounds of the concepts take place. Within the framework of particular studies, main disputed issues of the concept are being formed, and its advantages and disadvantages are determined. In 2007, B. Lundval published several articles, expressing own opinion about main unsolved issues of the concept. Advantages and disadvantages of the national innovative system are considered by Ch. Edquist. Consistent analysis of main problems of the concept is provided by the Finnish sociologist Reio Mietenen. Each authors represent circle of problems, which shall be reviewed in the future for the purpose of solving asked and yet unanswered issues on the concept of national innovative systems.

The **third** important factor determining the concept of national innovative system is development of specialized unions of researchers, carrying out studying and processing key issues of innovative systems. Such unions are formed, for example, on the basis of universities, where theorists of national innovation system are working. Examples of such union is Innovation Knowledge and Economic Development (IKE) Group, formed on the basis of Alborg University, where B. Lundval worked. This group is the main component of Denmark Research Union for Industrial Dynamics (DRUID). One of the most famous projects of this Group is Globelix – international network of scientists, recognising the concept of national innovative system as main research instrument. All said organizations play active role as in the process of research, so – in the organization of interaction of the scientists, through organization of scientific conferences and training of students.

In fact, one of the main functions of the organization is establishment of infrastructure and institutional environment for the specialists of different training levels, who are concerned in the research of innovations, technology development, national innovation systems and their accompanying issues. Existence and development of such organization uniting researchers of entire world of this direction, significantly assist dynamic development of the concept of economic theory in general and particularly, the concept of the national innovative system.

The **fourth** principle factor determining development the concept of national innovative system, is its diffusion in the modern global political circles. Active use of the concept, as analytical instrument by the Organization for

Economic Cooperation and Development, as well as the recommendations for forming the policy for development of innovative systems of separate states and consistent application of such recommendations in strategic documents – all these influences greatly influence upon the trends of further evolution of the concept of national innovation system. Similar situation takes place in Russia.

Brief review of the history of development of the concept of national innovation system makes it possible to allocate following stages of its evolution:

- 1) **Stage of forming the concept.** Commenced in the middle of 1980s and completed by publishing of the works of B.A. Lundval and R. Nelson. This period is characterised by formation of the international research groups, working on the studying and researching of the issues for technology development. One of the outcomes of working of such groups is formulation of new concept for economic scientists – the concept for national innovation system. At the initial stage, the concept takes completed image in Lendval's and Nelson's works. Notwithstanding the fact that Chenquist's book was published in 1997, it may be alienated to the stage of forming the concept.
- 2) **The stage of distribution and diffusion of the concept in the academic and political circles.** Temporary frameworks of this stage are – 1993-2000. It is characterised by the growth of the number of works dedicated to the researches of the concept of national innovative system, and analysing national innovative systems of separate countries, as well as emerging of the methodology of national innovative systems in the official state studies of separate countries and international organizations.
- 3) **Discussion development stage of the concept.** This stage is commenced in the beginning of 2000s. This is the time, when particular contradictory provisions are identified regarding the concept of national innovative system. This trend is in progress till today. This stage is characterized by the works of the founders and other researchers of the Concept, where unsolved issues are responded, and further theoretical lines of development are determined. On such background, international unions of scientists are functioning actively, working on the concept of national innovation system and they are stimulating diffusion and further development of the concept. Herewith, increasing number of political organization officially recognizes the concept of national innovative systems.

The concept of national innovation systems is being developed under relatively new, modern conditions. This is supported by the activity of funding scientists leading the concept and the fact that the concept is being actively used as theoretical ground, and basis for development of economic policy of national government.

To our mind, the issue of development and diffusion of the concept of national innovation system in the close future will remain active. This will be supported by the development of the theory, forming methodology grounds of the concept. The researchers of concept of the national innovation system use institutionalism, evolution theory, innovations theory, the theory for economic study, general theory of systems and particular modern scientific concepts outside the economic theory (for example, unbalanced thermodynamics) in the form of basic theories.

The analyses of the concept of forming and development of national innovation systems carried out by us shows that this theoretical construction is formed within the framework of modern economic science and not suddenly and unexpectedly. Its formation became extension of the logical researches, carried out by the scientist and economists, in course of studying the principles of common theory for economic development. Development of this process was supported by the fact that the scientific economists recognise innovations and technological development as main endogenic factor of economic development.

4. CONCLUSION

Establishment of the new innovation system in Georgia is considered to be the necessary stage for economic development based on the innovation and modern technological principles. Currently nobody argues the fact that the system of scientific knowledge, new and innovation forms of business organization are becoming dominant of

economic growth. The innovations are being transformed into the strategic factor of economic growth, influencing upon stabilization of social situation in the country.

The process of formation of national innovation systems is being intensively developed in the developed economy. In accordance with the national peculiarities and economic potential, different concepts of national innovation system is being formed.

Notwithstanding the fact that multiple works were dedicated to the research of national innovation system during different times, yet there are no generally adopted definitions, prescribed structure, functions, stages of development of this concept, and unified system of the models of innovation development etc.

We have considered above issues with the order of historic development, which was greatly supported by the works of the following authors: Freeman (n.d); Nelson (1993); Edquist (1997); Sharif (2006); Golichenko (2006) etc.

National innovation system is the complex of legal, and financial and social nature, totality of private and public organizations and their interaction, within the framework of which, establishment, as well as implementation of the activities related with the maintenance and diffusion (distribution) of new knowledge and technologies is provided. Innovation system of economic development is of particular qualitative and quantitative characteristics.

- First, it shall be oriented towards modernization of the traditional sectors of economy;
- Second, innovations shall be transformed into the leading factor of economic growth in each sector of economy, rising labor provision in the sectors determining national competitiveness;
- Third, it is necessary to form economy of new economical knowledge and high technologies.

Following stages of evolution may be identified through brief review of the history of development of the concept of national innovation system:

1. The stage of forming the concept (1980-1997);
2. The stage of distribution and diffusion of the concept (1993-2000);
3. The Concept of the Stage of Discussion Development Concept (2000-until now).

Thus, the analyses of formation and development of the concept of national innovation system made by us shows that it was established within the framework of modern economic science; it is logical continuance of the studies, performed by scientific economists in course of surveying the principles of common theory of the systems of economic development.

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