

Methodological Features of Educational System Modernization in the context of the “Economy of Knowledge”

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ABSTRACT

The article is devoted to some methodological features of modernization in modern education in the context of “the knowledge economy” development which is aimed at shaping new mental potential of the modern state. Features and prerequisites for the emergence of the knowledge economy, the priorities of which include the development and spread of information technologies, development and introduction of innovations, investment in human capital formation, have been clarified. It has been shown that in the socio-economic development system of the country, the knowledge economy as a social labor resource is one of the most important criteria of efficiency of organization of the socio-economic system of the country. Preconditions for organization of innovative-educational sector of economy of the Russian Federation are stated. The article focuses on the strategic landmarks of the formation and development of the innovative-educational sector of economy in the Southern Federal District. Network integration is considered to be the factor which enables to treat education as a separate, innovational sector. As for the preferable form of its organization, the authors mention private-public partnership with attraction of businesses. The paper also covers technical characteristics of implementing the model in the innovative-educational sector of economy of the Southern Federal District. The article presents promising areas of the study of this problem, which involves further development of the theory of intellectual capital development in education, subject-oriented methodology of educational system modernization in the applied aspect, as well as technologies of management of the national innovation-oriented educational system of the Russian Federation.

KEYWORDS

knowledge economy, educational system modernization, innovations, human capital, human capital investment, public-private partnership, innovation-driven economy, the process of development forecasting, management of modernization processes, innovation- educational sector of economy, the network approach, a model of formation and development of innovation-educational sector of economy.

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Introduction

The end of the 20th and the beginning of 21st centuries saw transition from industrial to innovative type of economy based on the priority of new knowledge, production of the new type of information. It has caused necessity of modernization in education sphere [1].

The development of post-industrial economy, knowledge-intensive industries, specializing in high-tech products, modern processes of development of the global economic system are characterized by the emergence of a new paradigm, according to which the nature, main trends, the pace of development of post-industrial innovation-driven global economy are influenced not so much by ideological, military or financial factors, as by the development and accumulation of scientific knowledge, the intellectual potential of society, the intellectualization of labor processes, giving the highest priority to the processes of development of new knowledge that only can ensure social and economic progress [2].

The mechanism of knowledge production includes fundamental and applied sciences, system of communications, educational establishments, system of patents, etc. The conditions offered by a well-established educational system define the level of knowledge and cause creation of new technologies. Technological rise characterizes economic growth of the state.

In conditions of new economy, “economy of knowledge” when knowledge and information are the main productive resources, formation of the mental potential, capable to generate new knowledge, becomes one of the main tasks of the state.

The term “economy of knowledge” and “knowledge-based economy”, introduced into the scientific sphere by F. Machlup in 1962, was widely distributed in the Western and Russian science since the late 90-ies of the twentieth century. This new type of economy is different from the preceding it agrarian and industrial ones in that, although natural and material resources continue to serve as a basis for creating economic wealth, growth and development of the entire economic system, they provide a greater degree of internal, nonmaterial factors, the most important of which are the knowledge and human capital.

The analysis of sources allows to separate the most important features which in aggregate give an idea of the knowledge economy:

- production of services, information and culture plays a major role;
- the leading role of industries that are not based on the physical infrastructure;
- imposition of new infrastructure elements on old viable infrastructures and the gradual replacement of the latter;
- a permanent increase in the share of scientific research works in the total expenditure of the state and private companies;
- stable growth of capitalization of highly scientific companies;
- transformation of a person who can think creatively into the “resource”, the main component of national wealth;
- priority of investment in the development of fundamental knowledge of a person;
- geographic shifts of production capacity, the concentration of development around educational and research centers.

The experience of both developed and developing countries shows that long-term competitiveness of the national economy is provided by the transition to

the “knowledge economy”, the priorities of which include the development and spread of information technologies, development and introduction of innovations, investment in human capital formation [3].

For example, in China the construction of the “knowledge economy” is a national strategy and is aimed at turning the country from the “world workshop” into the “world laboratory”, a reduction of dependence on foreign technologies from 80% to 30%. For this purpose, the following measures are taken: an increase in educational system funding (from 1.2% to 2-2.5% of GDP), creation and promotion of the “cult of education and knowledge”, the creation of the conditions in which transnational corporations locate in the country both production and research centers (currently there are about 750 of them), the creation of technology parks and clusters – “areas of promoting the development of high and new technologies”, sending talented young people to study in the best foreign universities, support of theoretical developments in the knowledge economy, the creation of a special agency for employment of “returnees” – scientists who, having reached the peak of their scientific career abroad, intend to return to their homeland. The Indian experience is no less interesting – in this country in the construction of the “knowledge economy” the primary focus is on the development of a strong national sector of services. At the same time, the government increases education funding, promotes tolerance as a basis for a new society, supporting only a few technical industries (pharmaceutical, nuclear power, automotive industries) that create a competitive platform [4-5].

At the same time, the development and modernization of the educational system is a critical factor in the formation of a knowledge society. The conditions offered by the educational system define a technological rise and characterize an economic growth of the state, the result of which is the national competitiveness of the country in the international arena [6].

The heart matter of modernization in education consists in transformation of the system for its steady development on the basis of advancing impact of innovative scientific findings. Basic studies in the field of methodology of education should be focused on defining and grounding an integrative set of strategies that are to turn into the mechanism of modernization and theoretical background for development of innovative pedagogical technologies [7].

Research methodology

1. Substantial features of the concept of “modernization”

The concept “modernization” was coined in the 1950s and used in Western sociology for characteristic of public, social and economic development [7]. The term “modernization” reflects various stages of modern industrial society development, from the epoch of the first industrial revolution. It also refers to the process of transformation of traditional societies into industrially developed ones.

The concepts of political modernization appeared in the 1950s when the problem of working out Western policy in relation to developing countries occurred. It was based on the theory of modernization which served: a) as the main direction of development – from traditional to rational society; b) as practical means of its realization – scientific and technical progress, social and structural changes, transformations of regulatory and value systems. The general model of global process of civilization was created. The most known representatives of the theories of political modernization are G. Almond, S. Verba, L. Pai, S. Huntington, D. Dahrendorf, & R. Dahl [8-9].



In terms of the general model of global process, two types of modernization are distinguished. This differentiation is caused by various social and economic conditions. *Original modernization* is typical for the countries which face transition to rational public structures as a result of gradual development of their inner processes; *secondary (reflected) modernization* is peculiar to the countries which get modernized by “catching up” with others. Russia can be referred to the countries which carry out modernization of the secondary type [10-11].

Modernization is considered in various aspects. Thus, for example, M.P. Voytekhovskaya interprets inconsistency of modernization processes in Russia that were revealed in alternation of reforms and counter reforms since the period of the second half of the 17th century [12].

The issues of socio-cultural modernization are considered in terms of certain modernized consciousness and human behavior by which people support modernization initiatives [13-14].

Studies into transformation of outlook and behavioral norms of studying youth form the necessary empirical basis for realization of modernization in modern education and nurturance. In terms of modernization paradigms, scientists analyze ethno political processes (E. Pain, L. Drobizheva, etc.), demographic (A. Vishnevsky, S. Zakharov, etc.), socially-ecological aspects (O. Yanitsky), socio-cultural spheres and institutions (A. Akhiezer, T. Zaslavskaya, S. Kirdina, V. Krasilnikov, N. Lapin, V. Yadov).

Steady social and economic development of the state is closely connected with development of education. Educational system becomes a determinative factor for formation of the society of knowledge. The mechanism of knowledge production includes fundamental and applied sciences, system of communications, educational establishments, system of patents, etc. The conditions offered by a well-established educational system define the level of knowledge and cause creation of new technologies. Technological rise characterizes economic growth of the state.

In conditions of new economy, “economy of knowledge” when knowledge and information are the main productive resources, formation of the mental potential, capable to generate new knowledge, becomes one of the main tasks of the state. Economic growth of the country, in turn, is determined by “investment in a person”, including the quality of its educational system which shapes well-educated and highly qualified labor resources, providing an increase of efficiency and adaptability of manufacture.

For the first time a term “investment in a person” was used by Theodore Schultz at the plenary meeting of the American Economic Association in 1960. Schultz and Gary Becker are rightly considered to be the founders of a new direction of economic science. Human capital is primarily an existing stock of knowledge, abilities, health, skills and qualifications obtained by the person in the process of education and practice. Therefore, human capital investment involves education, information search, accumulation of practical experience, health care. Over time human capital investment is compensated by income growth – a significant part of the salary depends on education and work experience. Knowledge becomes a major economic resource. Despite some disagreement about the components of human capital, almost all researchers recognize the dominant role of education in the growth of future human income. For example, it is estimated that the total impact of all other factors, besides

education, is no more than 40%, while 60% of the difference in earnings can be explained by the level of education, and this share will grow [13].

The key point of modernization in education consists in transformation of the system aimed at its steady development on the basis of advancing character of innovative scientific findings. Basic studies in the field of methodology of education should be focused on defining and grounding an integrative set of strategies that are to turn into the mechanism of modernization and theoretical background for development of innovative pedagogical technologies [14].

Integration complex characterizes the forecast for long-term development of the system and is the basis for the state programs aimed at development of education during next 7-10 years' period. Realization of the programs sets forth working out indicative regionally-focused short-term (1 year) and medium-term (2-3 years) plans. In terms of indicative planning, the use of scenario forecasting becomes relevant. It allows providing development of alternative strategy of development in view of the region-specific features.

Modernization in education refers to the process focused on transformation of society and values as attributes of culture. Globalization trends lead to unification of transformation processes in the sphere of culture and society. Equal statuses of culture and society in education modernization make it possible to consider social and cultural development as a non-equilibrium system. The objective reality of occurring transformations enables to keep a certain, primary condition not only in the sphere of culture, but also in society. The primary condition of culture is the basis for society development, initial condition of society – the heart matter of cultural development.

Modernization process solves the problem of harmonized interconnection between culture and society, and this process is aimed at realization in the global world. Harmonization of relations between culture and society is considered to be the methodological characteristic feature which defines the strategy of development of the Russian education in the space of globalization [15].

Education is the object of state management; hence, modernization in education is also controlled by the state. Thus, innovative scenario of education development can be predicted and made out in the form of strategy, but realized by volunteers “from lower levels”: students, post-graduate students, doctoral degree seekers, staff members. Counter-modernization strategy (D.V. Trubitsyn) as socio-cultural mechanism of “rolling back” to the former form of organization of society, culture and manufacture may be possible.

Modernization is a conflict-like process of struggle between “innovations” and traditions. The conflict, on the one hand, encourages development; on the other hand, the threat of counter-modernization turn is quite real. The priority of innovations and, as a consequence, a decrease in the risk of counter-modernization is provided by educational system which, in its turn, contributes to the dynamic development of economy.

However, institutional structure is inert. Inertness of institutions, i.e. nonresistance to changes, proceeds from the nature of institutions as those. According to G. Hodgson, institutions are steady systems of the existing and deep-rooted public rules and customs, structuring social interactions. Language, money, law, systems of measures and weights, table etiquette, business firms and other types of organizations – all these are institutions. Stability of institutions is partially defined by their ability to successfully create stable expectations concerning behavior of people [16]. We shall note that inertness causes the



possibility of rather effective institutions, which may be characterized as innovative ones, being blocked (B. Arthur, P. David) [17-19].

The problem of monitoring dynamic changes in values, identity and labor motivation of the Russians as phenomena of socio-cultural modernization is relevant enough. Studies in the field of the humanities are, as a rule, based on the following thesis: changes in the social and economic conditions of development in society cause changes in the sphere of education. However, special focus on any of the named above interconnected aspects is unfair. Social and economic characteristics of society define the strategy of education development. Education prepares the staff for work for the sake of growth and efficiency of economy of the state.

Social, economic and educational spheres are integrated by the phenomenon of intellectual resources as the dynamic factor of modern society development. Social, economic and educational projections are components of human life and society.

2. Forecasting of the education development as methodology of its modernization

Modernization can be seen as awareness of interrelation and interdependence of development of society as a whole and its institutions, in particular, educational system.

Forecasting education development should be carried out as a part of forecasting social and economic development of the country. Thus, we would like to note that the forecast includes the account of new factors. Therefore, possible qualitative changes in the condition of education system and social and economic development of society are not considered. However, it is the quality factor that can become the basis for describing intellectual resource of the state. In this connection, the multivariate phenomenon of high quality seen as perfection becomes the methodological principle for forecasting development of educational system as the institutionalized structure. Meanwhile, the process of forecasting development is considered to be the key methodological characteristic of modernization in education [6].

Running modernization processes, one has to solve the problems of working out strategies, programs, projects, educational initiatives, etc. and their realization in the context of regionally organized, innovative educational sector of economy of the Russian Federation. The preferable form of the organization of innovative-educational sector of economy of Russia is the private-public partnership with attraction of businesses.

Private-public partnership is aimed at uniting resources and experience of the state and businesses for working out and implementing socially significant innovative projects at the least expenses and risks by rendering high-quality services to economic agents.

Development of innovative economy of the region and Russia as a whole leads to integration of science, education and business in the format of a cluster. The network cluster-like structure is the institutionalized form of private-public partnership. Cluster format provides integration of joint activities of representatives of businesses, authorities and educational establishments aimed at formation of innovation-focused, favorable business setting. Favorable business environment is the condition for becoming and development of innovative economy of the modern Russian state.

Integration models of science, education and industry define the structure and content of preparation and retraining of personnel for innovation-focused economy of the modern Russia. Already existing and newly created models are preferable for integrating into the cluster structure. In this case, cluster is characterized as academic-research-and-production model which provides innovative development of a multilevel educational system and economy of the region, in particular, the Southern Federal District [20].

Network association of regional clusters will organize the model of virtual and real cluster for innovative development of the interconnected education systems and economy of Russia. Cluster management is based on the methodology of private-public partnership which enables to model and adjust corporate/individual needs of economic relations subjects, consolidating and summoning up resources for achievement of the overall objectives.

The network approach provides regulation of investment policy of the state and business. The competence-based format allows defining the structure of cluster participants, building interactions between them by creating the key assets. As for these assets, the key ones include systems for commercialized knowledge, financial support of businesses and science, supplying small businesses with information and some others.

The institution of private-public partnership provides stability, while innovations may cause uncertainty. A project can be seen as the means of overcoming contradictions between innovations and institutionalization. Projects are united by the idea of advancing development of education and form "project network". Consecutive implementation of projects in view of economic resources of the region will provide creation of innovative educational infrastructure of the Southern Federal District [22].

Let us define the strategic landmarks of the projected model of the formation and development of the innovative-educational sector of economy of the Southern Federal District.

1. *Innovations Expertise*

It is necessary to enhance activity of expertise institutions by using a toolkit of foresight-projects, by attracting experts-representatives of scientific community (of various domains), as well as public figures and leadmen in the spheres of economy and education to evaluating innovative projects. Long-term (for 25-30 years) development strategy should be worked out on the basis of this foresight. Foresight covers possible scenarios of development, meanwhile directions of science and technologies are estimated, technological horizons and the range of conditions for possible future are defined.

2. *Formation of intellectual capital of the nation*

Modernization is based on intellectual resources. Thus, education determines qualitative characteristics of the knowledge based capital of the state. Realization of strategic initiatives puts forward the development of the program "Formation of the intellectual capital of the nation". The purpose of the program is to improve professional skills and preparation of the leading advisers concerning development of economy and education.

3. *Updating technologies for learning*

Intellectual capital is formed as part of human innovative activity. Updating learning technologies provides development and self-development of the people involved and as a result contributes to self-development of educational system. Financial, organizational and human components define the structure of



intellectual capital. It is necessary to emphasize that it is intellectual capital which provides steady development of innovative-focused systems of economy and education.

Research results.

As results of the research undertaken, let us present the methodology for projecting a model of the formation and development of the innovative-educational sector of economy of the Southern Federal District.

The methodological construct of the projected model is created on the basis of the network approach. The network structure allows following dynamic development of the modern economic environment.

As for the strategic purpose of the projected model of innovative-educational sector of SFD economy, we'd like to mention development and introduction of the network infrastructural complex. The infrastructural complex stands for a set of incorporated general-service facilities.

Network integration enables to separate education from the tertiary sector of economy into a separate, strategic, innovative-educational sector. It will allow providing priority of education development in the society of knowledge.

Network integration is defined by the following issues:

- Education is a strategic, innovative sector of economy;
- Network structure of activity is an adaptive model of a complex social and economic system which includes some discrete processes/projects, programs, etc.;
- Network management structure is optimal in conditions of unstable interaction between organizations.

Let us consider technical characteristics of managing the model of the formation and development of the innovative-educational sector of economy of the Southern Federal District.

The network organization stands for the modernization of management. Managing network organizational structures can be seen as a multicomponent model which includes resource management, management of relations between partners, management of changes, management of investments and risk management.

The network approach in modernization management determines a combination of vertical and horizontal network organizations. Vertical organization makes it possible to perform strategic management, providing stability to the vector of development at the stage of programs and projects realization. Horizontal network structure refers to activity focused on "breaking through" areas and technologies which strengthen competitiveness of partners and provide creation of new competitive resources.

Applying the network approach in the format of government-public modernization of education and economy will allow realizing the investment policy that provides a transition to socially-invested way of accumulating reproductive tangible wealth, human capital being the accumulation priority.

Creation and development of innovative-educational sector of SFD economy will make it possible: to prevent dominating innovative activity of businesses out of the district; to provide integration of higher school and academic science; to provide continuous improvement of vocational training quality; to create the infrastructure of innovative activity; to coordinate interaction between innovative educational systems and economy within the Southern Federal District.

As for indicators of the offered model, they are as follows: effectiveness of the project characterized by achievement of the objective in view; conformity of the project and toolkit for its realization to the format of the practical task; elaborated mechanisms of interaction of the project within the infrastructure of the national innovative system; available options of innovative development which take into account possible risks and opportunities for growth in the context of long-term forecast of the development of economy of Russia; conformity of the project to the state policy in the sphere of economy and education.

Discussion of results.

The Centre of Control over innovative development in education of the Southern Federal District (based on the Southern Federal University) was created to implement the project. The Center is called to provide development and carry out uniform state and regional policy of modernization of economy and education.

For the purpose of development and uniform state-regional policy of modernization of economy and education, the Center is supposed to carry out strategic forecasting of development of economy and education seen as interconnected systems, in particular: departmental coordination in network projects; monitoring of development in scientific and innovative sphere of the Southern Federal District; involvement of the potential of branch, academic and higher school science; coordination of management by process of modernization of economy and education with participation of the state, business and science.

Network organization structures management is a complex model, including resource management, management of relations between partners, change management, investment management and risk management. The basis for the control of network organization management is a continuous monitoring of network efficiency.

Network approach in the modernization of education in Russia management makes the combination of vertical and horizontal network organization. The vertical organization allows for strategic management, ensuring stability of vector of education development in the implementation of programs/projects. The horizontal network structure characterizes a concentration of operations on the priority ("breakthrough") areas and technologies, leveraging on-net and gateway competitiveness, actualizing the creation of new competitively significant resources.

Implementation of a network approach in the form of state-public management of education modernization will implement the investment policies to ensure the transition to social and investment path of reproducible wealth accumulation with priority of human capital accumulation [21].

Conclusions

1. Modernization in education is the process aimed at the transformation of the system for the maintenance of its steady development on the basis of scientific innovative development of theoretical and applied kinds.

2. The mechanism of modernization refers to the integrated complex of strategies which define the forecast of development of modern educational system of Russia.



3. The project aimed at the formation and development of the innovative educational sector of economy, exemplified by the Southern Federal District, is theoretically grounded.

The undertaken study opens up new promising directions in the study of this problem:

- development of the theory of formation of intellectual capital in education;
- development of subject-oriented education modernization methodology in applied aspect;
- development of technologies of management of national innovation-focused education system of the Russian Federation.

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