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REPRODUCTION OF THE INTELLECTUAL CAPITAL OF THE NATIONAL ECONOMY IN THE CONDITIONS OF FORMATION OF A NEW TECHNOLOGICAL ORDER

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Abstract: The success of a country in the world economy in modern conditions is determined by the size of its intellectual capital. In the conditions of the formation of the sixth technological order, the state, which increases the intellectual and human potential, will have strategic advantages. The article defines the criteria for the development of intellectual capital in the transition to the knowledge economy and information society. The authors of the article aim to answer the question: how to build an innovation-oriented economy in Russia and what are the obstacles for it. It is concluded that the conditions for the reproduction of intellectual capital in the Russian Federation do not allow us to respond to global economic challenges at the current stage. Besides, there is a discrepancy between the high level of human development and the low level of workforce productivity, which indicates an ineffective state policy in this

area. The article founded the conceptual approach to the formation of a new technological order by creating an "ideal knowledge structure of society", defines the key requirements for the creation of such a structure in terms of the development of the education system, health care, investment in the development of people and society.

Keywords: technological way, knowledge economy, intellectual capital, human capital, innovative development, investment in human capital, the hypothesis of the "ideal knowledge structure of society".

INTRODUCTION

The global challenge of the current stage of economic development is the formation of a new technological order. The strategic prospects for sustainable growth and high competitiveness of the national economy depend on how complete the compliance of productive forces and industrial relations correspond to the conditions, changing in the direction of the predominance of such industries as nanotechnology, high-tech medicine and pharmaceuticals, biotechnology, artificial intelligence systems, information and communication technologies. At the same time, the domestic economy is distinguished by its technical backwardness and a negligible number of developing technologies that correspond to the sixth technological order.

The state of the material-technical base corresponds to the criteria of III-IV stages, while only 10% of the developed technologies are related to the V-th, 50% belong to the IV – th, and 30-to the III – th. Claiming to win the fight for the role of the world leader, the starting positions of technologically advanced countries look different. So, about 5 % of the productive forces correspond to the VI order, 60 % – V, 20 % – IV, and only 15 – III [1].

In his work" The mystery of economic growth", E. Helpman notes that when there are no international knowledge flows, the country that has the initial advantage in innovation activity increases its gap from the rest over time. Such a country dominates in the high-tech sector for a long time, and the standard of living of its population is higher than in other countries [2, p.124]. In a situation where the results of the assessment of the compared positions for the Russian economy are unsatisfactory, the question arises about the principal possibility and mechanisms of its refraction. It seems that the key factors that will lead to positive results are the intellectual resources and intellectual potential of the Russian economy.

In modern economics, "intellectual capital" is interpreted as a specific factor of production based on knowledge and information. J. Galbraith (1969) represented the concept into scientific circulation, which defined it as a set of employees ' knowledge that contributes to the formation of a company's market competitive advantage. Scientific research on the problems of intellectual capital has made it possible to clarify its structure, formed by such elements as human, organizational, and consumer capital [3].

V. A. Suprun believes that the structure of intellectual capital is similar at the macro level. At the same time, the national intellectual capital includes the information structure of society, the system of scientific and design institutions, all levels of education, and the state management structure. The factors influencing the intellectual capital reproduction are identified as the geographical location of the country, its

climate, features of national culture, religion, mentality, and the state of the social sphere. [4].

The combinations of elements of intellectual potential and capital form the intellectual resources of the economy at the macroeconomic level. In the knowledge economy, they are a significant factor in production, determine the level of development of science and technological progress. The basis of intellectual resources is human capital (a set of individual qualities and abilities). At the same time, individual human capital proves and realizes itself only when it is part of the human capital of a business entity. In other words, it is an element of the labor force, because it is during labor activity that a person gets the opportunity to develop their knowledge and abilities.

The human capital of employees, a set of intangible assets that embody knowledge, professional skills, and the results of their application form the intellectual resources of the enterprise. Thus, intellectual resources are a factor of production concerning the micro level, the condition for optimal use of which is to minimize costs, and for the macro level - it is the potential for economic growth and development. The ability to reproduce and implement intellectual resources is limited.

They are determined by the number of economic resources allocated by business and the state for the formation and development of appropriate infrastructure that ensures the formation of productive forces, production, accumulation, and transfer of knowledge. Thereby, investment in science and education is a necessary condition for making new discoveries and their commercialization. In addition, the spread of scientific knowledge causes intersectoral effects, contributes to the rise of public consciousness, development, and culture, changes values, life, attitude to the environment. The term "technological order" was proposed by S. Y. Glazyev.

The scientist defines it as an integral complex of technologically-related industries. In the formation of the technological order, the key factors are technologies, institutions, and management methods. The last determines the possibility of reproduction of other factors. The structure of the way of life consists of the core, technological innovations, and supporting industries. Based on the content and features of the new, sixth way of life, it seems that within its framework, the most important role belongs to those areas that provide the reproduction of the human potential of the economy and its transformation into human and intellectual capital.

In the conditions of transition to the knowledge economy and information society, intellectual capital has become structured as a system of information-intellectual and human components [5, p.110 – 112]. In turn, the information and intellectual sphere include intellectual and educational capital and intellectual property objects. Humans can be defined as one of the forms of development in labor resources. Its level is determined by the ability of members of society to think and learn, generate new knowledge, and transform it into specific innovative technical and technological solutions.

Intellectual and human capital is the result of ensuring and effectively realizing the corresponding forms of the economic potential of society. In the context of the scientific problem considered in this article, the following definition is of interest: "Human capital is what "works" or "could work" in a particular economy, taking into account its structure, features, integration, and human potential is what could work if the conditions for the disclosure of this potential were 100 % [6, p.33].

In scientific sources, strategies, conditions, and factors of innovative development are studied in detail. It is possible to generalize the conceptual approaches. The most

reasonable position is the positions of scientists. They prove the need for the practical implementation of the conceptual provisions of the neo-industrial paradigm, according to which the key conditions for the refraction of the current situation and overcoming de-industrialization are the formation of a new technological basis, productive forces that correspond to the nature and level of difficulty of the tasks facing the economy.

According to the ideologists of the concept of neo-industrial modernization (S. S. Gubanov, V. Ryazanov, A. Amosov, etc.), the immediate result should be the achievement of a Technotronic level of development of productive forces, based on the triad as a highly qualified employee, computer equipment, and automated tools of production. Supporters of the "catch-up development model" argue the position where a high level of competitiveness is achievable if the "points of innovation growth" are activated, i.e. industries focused on import substitution. The main point of another approach is a reasonable combination of individual elements of the catch-up development model (first of all in those kinds of businesses where a critical mass of technologies can be obtained as a result of borrowing) and independent research and development (in areas where there are the necessary innovative bases for obtaining results).

Intellectual resources, intellectual and human capital is not just crucial within each theoretical concept, but it is also an element of the productive forces of an innovation-oriented economy. A. Aganbegyan notes that "the creation of knowledge, its dissemination through training, its transmission over a distance, its transformation into skills and abilities, its use to improve productivity, quality, and innovation is in a basis of modern human capital" [7].

Sharing the author's opinion, we note that the reproduction of human and intellectual potentials is carried out in modern conditions within an interconnected complex of sectors, defined as the" knowledge economy". It includes research and development, all types of education, information, and communication technologies (they provide the transfer, transformation, storage, and use of knowledge). The health sector is important. It is necessary to assess the state and prospects for the development of these sectors in the context of their accordance with the task of forming the productive forces of the economy in the conditions of transformation of the technological order.

With reference to the above mentioned, the authors of the article aim to estimate the possibilities of Russia's intellectual and human potential, which is necessary for the transition to a new technological order.

MATERIALS AND METHODS

The research methodology includes both general scientific methods (method of system analysis, method of generalization, analogies) and special research methods, in particular, the method of expert assessments, economic and mathematical methods. Method application of system analysis makes it possible to identify cause-effect relation between the processes of General economic development of the country and increasing its competitiveness and trends in the development of human and intellectual capital.

RESULTS

In the leading countries, investments in research and development repeatedly exceed the volume of real investment in the sphere of innovative development. According to existing estimates, the result of the development of research and

development is an increase in the total productivity of factors (from 40 to 60 %). [2]. As regards lagging countries, the development of research and development, including the improvement of borrowed technologies, helps to reduce the gap with the leading countries. In the Russian economy, the share of domestic expenses on research and development was 1.0 % of GDP in 2018, while in the G7 countries is 2.5 %, in the member states of the Organization for Economic Cooperation and Development - 2.2 %; in the United States - 2.56 %, in Finland-3.09 %, in Germany – 2.38 %.

Remarkably, research and development expenses accounted for 3.9 % of GDP in the USSR. In the context of the analyzed trends, the following data are significant: in terms of purchasing power parity, Russia accounts for only about 2 % of global research and development expenses, while China accounts for more than 14 %, the United States for more than 31%, and Japan for 11 % [5, p. 55]. At the end of 2017, the share of innovative and active enterprises and organizations was only 8.5 % (while in the USSR, the share of enterprises that conducted research was 2/3 of their total number). The result of the low level of funding for research and development and low innovation activity of economic entities is that the products of domestic manufacturers are practically not represented on the world markets of high-tech products by the present (with rare exceptions).

The share is estimated at only 0.2 %, which is 6-8 billion US dollars. The modern technological wave and the growth of the global market for high-tech goods and services open up opportunities for Russia to make a technological breakthrough, while at the same time creating new challenges. To expand the presence in the global high-tech market, Russian exports of these products should increase by 15-20% per year and achieve at least 60-100 billion US dollars by 2020, which will account for about 1 % of the world market [8]. The low level of private sector participation continues to be one of the most significant problems in research and development financing.

From a methodological point of view, the task of a practical assessment of the cost of human capital is difficult. The value of the indicator is formed over several years and even decades under the influence of some factors, including consumer spending, education in institutions of school, University, and subsequent education, the use of medical services to preserve health, and others. The World Bank has developed a methodology for calculating the human capital index. Its value can range from 0 to 1 (Figure 1).

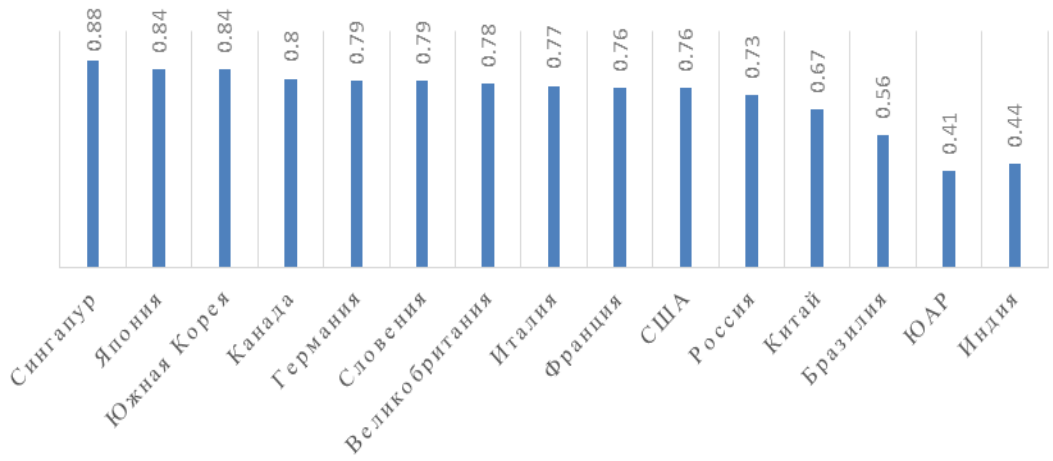

Figure 1-human capital Index in selected countries for 2018

(Сингапур-Singapore, Япония- Japan, Южная Корея-South Korea, Канада-Canada, Германия-Germany, Словения-Slovenia, Великобритания-United Kingdom, Италия-Italy, Франция-France, США-USA, Россия-Russia, Китай-China, Бразилия-Brazil, ЮАР-South Africa, Индия-India.).

The indicator under consideration measures the level of productivity of the next generation of employees based on the assumption of complete completion of the training course and a high health indicator. According to World Bank calculations, Russia ranked 34th out of 157 possible countries in 2018. It is noteworthy that the value of the indicator that characterizes the level of human capital in Russia is quite high and comparable to the values of the indicator for countries that belong to countries with a high level of per capita GDP. The current rating value is due to the still high quality of all levels of education in Russia. In the ratings calculated by various organizations, higher education occupies the 20th-30th positions (among them developed countries), conceding in terms of the level of spending on education (Figure 2).

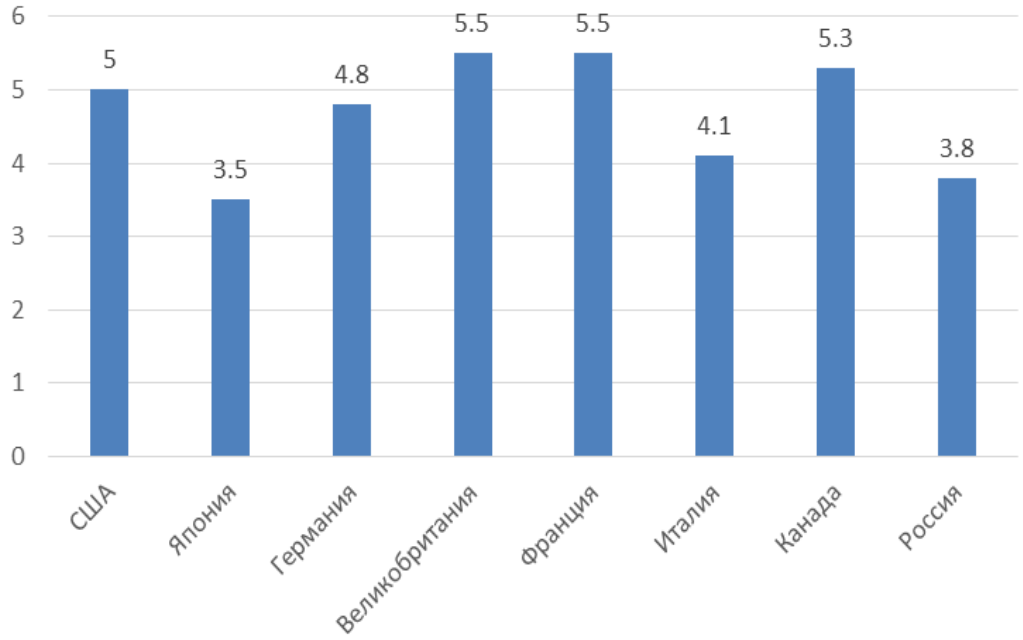

Figure 2. - Spending on education in the G7 countries and the Russian Federation in 2017, as % of GDP

(США-USA, Япония-Japan, Германия-Germany, Великобритания-United Kingdom, Франция-France, Италия-Italy, Канада-Canada, Россия-Russia.).

Education should reproduce and maximize the quality of the social structure of society (and the state), optimizing it for sustainable development. Sadovnichy V. A., Akaev A. A., Korotaev A.V., and Malkov S. put forward and justified the hypothesis that there is an optimal structure of society for sustainable development, which is a pyramid of knowledge levels. It is set by the Pareto ratio (20 to 80). The top-level of this pyramid is scientists-researchers and teachers of higher education, who extract knowledge. [6].

Analysis of statistical data (Table 1) reveals a decrease in the number of researchers in Russia. Thus, in 2018, their total number decreased by 6,920 people (by 11.34 %) compared to 2010. Today, Russia is one of the few countries where such a trend takes place. The indicator under consideration tends to grow in the United States,

EU countries, China, and, for example, in Korea. Its growth was 329 % over 15 years [9, p. 58]. The decrease in the number of researchers under the age of 29 is another obvious problem.

Table 1-Dynamics of the number of researchers in Russia by age group, people

Age group, years old	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018/2010	
										people	%
up to 29	71194	71194	75498	73869	75715	76813	71492	66376	60634	-10560	85,17
30-39	59910	59910	68415	74961	78756	85972	88782	91429	92109	32199	153,75
40-49	54113	54113	50122	50149	49373	50171	50193	51149	52801	-1312	97,58
50-59	88362	88362	81612	75995	72992	69552	65196	59893	54832	-33530	62,05
60-69	60997	60997	61863	60952	63866	63943	60915	57414	54077	-6920	88,66
70 and older	34339	34339	35110	33089	33203	32960	33801	33532	33401	-938	97,27
Total	368915	368915	372620	369015	373905	379411	370379	359793	347854	-21061	94,29

According to the International Labour Organization, opportunities for the development of the industrial sector are quite limited in those countries where there are disproportions in the structure of citizens on educational criteria, and the share of people with higher education exceeds the share of those with vocational secondary education by more than 20 %. V. S. Ustenko proposed a classification of countries based on the educational structure of society. In its framework, our country belongs to the group with the "missing middle+" (MM+) [10]. In the system of statistical indications, this educational structure is described as follows: about 60 % of the total population have higher (or incomplete higher) education in the age group from 15 to 64 years, and the share of the population with an average level of education does not exceed a third of the total population. [9, c.39].

It should be noted that in the context of a paradigm shift in economic development, the system of vocational school (alongside higher education) is a significant factor in the formation of Neo Industrial productive forces. In this regard, it is necessary to popularize working professions and move away from mass higher education. At the same time, we need qualitatively new approaches to teaching disciplines and forming educational programs so that graduates ' competencies allow them to work with the latest equipment, develop and expand existing knowledge, skills, and abilities. Young professionals should be focused on continuing education, capable of creativity, free from stereotypes. It should be considered that the dynamics of scientific and innovative development significantly affects the structure of professions and

specialties.

At the beginning of the XXI century, the standard of obsolescence of professions in developed countries was 5-7 years [11]. The education system should be adapted to a high degree of updating of scientific and technical knowledge and be able to satisfy the needs of the real sector in training, retraining, and advanced training of personnel.

One will address to the definition of "intellectuals", formulated by H. Donovan: "Intellectuals are people who, by vocation and profession, deal mainly with ideas rather than products, have a sufficiently deep or original mind, and feel an urgent need to share their thoughts with others on paper or out loud" [12]. Graduates of institutions of higher and secondary education must correspond to the criterion of intellectuality in this sense. This is the most important task of the education system as the most important factor in the reproduction of intellectual potential and the development of intellectual resources of the economy.

Some sources identify such concepts as "Neo Industrial type of socio-economic development", “fourth industrial revolution", and "digital economy " [13]. In our opinion, the digital economy is one of the criteria of the Neo Industrial way of life. The competence of the digital economy is an important factor in the development of the intellectual potential of modern society and its capitalization. The information presented in Table 2 describes the impact of new technologies on labor productivity.

Table 2- Productivity growth due to new technologies [14, c.5]

Period, years.	**Innovations**	**Productivity growth, %**
1850 – 1910	Development of machine and flow production	0,3
1993 – 2004	Mechanization and early automation of production	0,4
1995 – 2005	Computer and digital technologies	0,6
2015 – 2065	Robotization of production	0,8 – 1,4

The table data confirms the validity of K. Shvaba's remark that the fourth industrial revolution is based on the digital revolution (its distinctive features are the widespread use of the Internet, including mobile, various kinds of gadgets, artificial intelligence, and training machines). However, the contribution of the digital segment to the development of the world economy is still not decisive. It accounts for an average of 6 % of GDP in industrialized countries; Information and Communication Technologies account for between 3 and 5% of the workforce in OECD countries. The contribution of the digital segment to global GDP growth does not exceed 0.25 % [14, p. 10]. The role of Information and Communication Technologies in the Russian economy is also insignificant (2-3.6 % of the corresponding indicators in the country, Table 3).

Table 3. - Key performance indicators of the Information and Communication Technologies sector in Russia in 2017 [14, c.19]

Index number	**Total**	**In % of the relevant index number in Russia in common**
The number of organizations, thousand units	119,5	2,6
The number of employees, thousand people	1219,6	1,7
GVA, billion rubles	2211,1	2,7
Shipped goods of own production, performed works, services, billion rubles	3375,2	3,6

According to the rating of Agency Bloomberg, Russia ranked 95th out of 169 possible countries in terms of health in 2018. The estimates were based on data from the World Health Organization, the United Nations, and the World Bank on the expectancy of life, undertaken measures to control smoking, obesity, and access to health services, and the state of the environment. One of the factors that determined the low value of the rating indicator is the low current level of funding for the healthcare sector. For example, the share of healthcare spending in the United States is 17 % of GDP. The value of the same indicator in Switzerland, Germany, and Canada – 10 %, Finland, Great Britain, Italy-9%, Bulgaria, Chile, Hungary, Slovakia-8%. The value of this indicator in Russia in 2016 was equal to 5.3 %, while the share of public spending on health care was 3.2 %.

DISCUSSION

According to forecasts, the share and number of elderly people will increase soon at an accelerated rate (7.2 million people for the period from 2015 to 2027), and the share and number of citizens of working age, on the contrary, will decrease (by 5.6 million people). Based on this forecast, we should expect an increase in the number of identified pathologies, chronic diseases and, as a result, an increase in the need for medical care. To ensure economic growth rates at a level not lower than the global average (3 – 3.5% per year), it is necessary to find solutions to the problem of saving the working-age population. Russian healthcare should help to increase the return on human capital by increasing the length of active working life, reducing periods of temporary disability, rehabilitation, and reducing disability.

Thereby, we must note that the conditions for the reproduction of intellectual capital in the Russian Federation do not allow us to respond to global economic challenges at the current stage. In this regard, it is necessary to implement a set of measures aimed at ensuring them. At a minimum, it is necessary to reverse the trend of underfunding of knowledge economy sectors. Increasing the educational and scientific levels proposes increasing the demand for knowledge and state stimulations in this area.

Taking into account the fact that the reproduction of intellectual capital is a knowledge-intensive process, and that the current situation, it is necessary to increase private and public investment in the field of research and development, by at least 2 % till 2020, 2-2.5 % till 2025, and 2.7-3 % till 2030. Based on the hypothesis of the "ideal knowledge structure of society", the optimal level of staffing would be the ratio of 8 researchers per 1000 economically active population (the number of researchers would be 600 thousand people) [6].

One of the existing inconsistencies is that the results of economic activity are much lower than is possible at the current level of potential. The Russian economy, which ranks high in the world rankings in terms of education, is characterized by a low level of labor productivity. Thus, if labor productivity in our country was estimated at $ 26.5 per hour in 2017, the average value for the OECD is $ 54.8 per hour. It means that high knowledge is not used effectively enough. Such an unsatisfactory result is partly due to the low level of equipment and technologies used, as well as insufficient skills, experience, and skills. In most cases, the current level of salary is unacceptably low and does not encourage effective work.

The response to global economic challenges implies eliminating the problem of the shortage of highly qualified engineers, which is currently estimated at 35 % [6, p.

179]. It is also necessary to consider the need for retraining to master new technologies, and, consequently, competencies, knowledge, skills. The solution to such tasks could be facilitated by increasing attention to education, the formation of a culture of professional activity, expanding the practice of internships during training, mentoring professionals with high qualifications.

Taking into consideration the poor quality of traditional medicine, its focus on assisting an already ill person, the high cost of medical services, and the insufficient level of efficiency in maintaining health, it is necessary to find fundamentally new ways to improve the results and optimize the cost of treatment. Currently, there is no such link in the healthcare system as personalized and precision medicine. Its model is based on preclinical detection of disease signs and the next preventive measures, disease prevention, and promotion of a healthy lifestyle. The influence of these factors on the health of a particular person has no less effect than provided using expensive methods of treatment [16].

CONCLUSION

Summarizing the results of the research, we consider it possible to conclude the following.

1. The Intellectual capital of the national economy is the basis of the productive forces of the future and the most important prerequisite for strategic competitiveness in changing technological order. Its level is determined not only by financial and economic factors, but also by innovative culture, mentality, and the state of the social sphere.

2. The research allows us to note that the problem of reproduction of intellectual capital of the national economy of the Russian Federation is one of the most relevant. Even though its human capital is relatively high (due to the positive features of the current education system), several destructive trends are obvious. Among the most dangerous are the unacceptably low level of education financing, science and Research and development, healthcare; the imbalance in the knowledge structure of society; and the low share of the digital segment in GDP. The total negative impact of these factors does not allow us to respond adequately to innovative challenges and limits strategic competitiveness, which is determined by the availability of technologies that correspond to the sixth order, the potential ability to generate and effectively use them in the production sector.

3. Considering the identified problems to increase the level of intellectual potential, we consider it necessary to implement the following: revise the principles of financing the education, Research and development, and public health service and provide the volume of budget expenses in these areas at a level not lower than the global average; provide a ratio of 8 researchers per 1000 economically active population; provide salary increases for employees that employed in intellectual work to a level that exceeds the average for the region's economy by at least two times; the structure of health system performance indicators should include the following criteria: increasing the return on human capital by increasing the length of active working life; provide the introduction of transparent financing mechanisms and stimulation of competition among professional education organizations; continue to implement a competency (result-oriented) building approach - implement a set of measures aimed at improving the social status of teachers and researchers; provide for the formation of state order for professional training,

retraining, and professional development of personnel, considering the principles of long-term forecasting and targeted training; develop and implement a model of integration of educational institutions at all levels with enterprises and organizations; provide the necessary conditions for the entry of the national education system into the world with the saving of national specifics and achievements.

REFERENCES

1. Nikonova A. The potential and tools of innovative production growth in the process of forming a new economic mode: system approach. Ekonomist=Economist, 2018 – № 10. – P. 20 – 40.

2. Helpman, Elhanan. The mystery of economic growth [Text]: Harvard univ. press, 2004 translated from English by A. Kalinina, ed. by M. Khanaeva, E. Sinelnikova. M: ed. Gaidar Institute, 2011, 240 p.

3. Thomas A. Stewart. Intellectual capital: the new wealth of organizations / translated from English. – M., 2007. – 368 p.

4. Suprun V.A.Intellectual capital: The Main factor of competitiveness of economy in the XXI century. – M.: LENAD, 2016. – p. 110 – 115.

5. Kushlin V.I. (Ed.). Innovatsionnoe napolnenie investitsionnoi politiki: monografiya [Innovative content of the investment policy: monograph]. Moscow: Prospekt, 2016. 240 p. (In Russian).

6. Education quality, Research and development efficiency and economic growth: quantitative analysis and mathematical modeling/ Scientific Council for the Fund Program. Research. Presidium of the Russian Academy of Sciences « Ekonomika i sociologiya nauki i obrazovaniya »(in Russian). – M.: LENAND, 2016. – 352 p.

7. Abel Aganbegyan. Human Capital and Its Main Component — the “Knowledge Economy” Sphere as the Main Source of Socio-Economic Growth. // Economic strategy. – 2017. – № 3. – 68 p.

8. Sovershenstvovanie institucional'nyh i finansovyh mekhanizmov formirovaniya i realizacii investicionnoj politiki gosudarstva: monograph/ Doctor of Economics, prof. O. M. Belousova. M.: Financial University, 2013. - p. 37.

9. Efficiency of Investments in Human Capital in Modern Conditions / ed. by R. M. Melnikov. – Moscow: Prospekt, 2019. – 352 p.

10. Victoria Ustenko. Izmeneniya v podhodah k formirovaniyu obrazovatel'noj struktury chelovecheskogo potenciala v period smeny tekhnologicheskih ukladov // Gorizonty ekonomiki.– 2015. – №6. – p. 79 – 84.

11. Hozyajstvennye sistemy innovacionnogo tipa: teoriya, metodologiya, praktika / ed. by A. N. Folomeeva. –Moscow: Economy, 20111. – 397 p.

12. Donovan H. How to work with intellectuals //America. – 1991. – № 8. – 27 p.

13. Tolkachev S. Kiberfizicheskaya cifrovizaciya v kontekste neoindustrial'nogo razvitiya // Economist. – 2019. – № 5. – p. 20.

14. Ryazanov V. Ot analogovoj k cifrovoj ekonomike: tekhnologicheskij determinizm i ekonomicheskoe razvitie // Ekonomist. – 2019. – № 6. – p. 3 – 24.

15. Abel Aganbegyan. Human Capital and Its Main Component — the “Knowledge Economy” Sphere as the Main Source of Socio-Economic Growth// Economic strategy. – 2017. – № 4. – p. 12.

16. S. V. Suchkov., Thilly W., Studneva M. Personalized Medicine as an updated model of national health-care system/ S. V. Suchkova, W. Thilly, M. Studneva, J. Mendelsohn, E. Antonova, E.Gulik, D. Smith, A. Notkins, D. Scherman, N. Shapira, B. Kobrinsky, F. Bunz, N. Rose, O. Makhova, J. Oppenheim, S. Murphy // Economist.– 2019. – № 6. – p. 51 – 80.