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**EDUCATIONAL CAPITAL AS THE FACTOR OF INNOVATIVE  
DEVELOPMENT OF THE RUSSIAN ECONOMY**

Speciality: 08.00.05 - Economics and Management of National Economy (Innovation  
Management)

Dissertation for the degree of Candidate of  
candidate of economic sciences

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**Relevance of the topic.** From a theoretical point of view, a high proportion of the educated population is important for economic development, as new technologies cannot be adopted into production without a skilled workforce and developed and adapted without the involvement of highly skilled researchers. In this respect, our country's innovation potential is probably greater than in most other countries, as in 2019 Russia recorded the third highest percentage of people with tertiary education after South Korea and Ireland: 62%, compared to the OECD average of 45% (for the population aged 25-35).

However, this has not facilitated structural transformation and the emergence of an innovative model of economic development in our country. There is a growing imbalance between the demand by businesses for skills and knowledge and their supply by graduates of educational institutions. Assessments of the quality of educational services provided by these organisations are ambiguous. The massification of tertiary education has been accompanied by a reduction in the number of researchers and researchers with advanced degrees employed in R&D.

In this regard, the choice of optimal approaches to reforming the system of higher and secondary vocational education (HPE) and development of personnel potential of high-tech companies requires studying the impact of the used educational capital structure on the dynamics of innovative development at macro-, meso- and micro-levels, identifying the most promising forms of personnel training in Russian conditions and identifying opportunities to improve their effectiveness with due regard to the best foreign practices of personnel potential formation for innovative

**Extent of the problem's development.** The thesis is based on a comprehensive study of foreign scientists who have made a significant contribution to the development of educational capital theory: G. Becker, S. Brown, J. Gans, I. Garcia-Maynard, S. Castanetti, S. King, J. Mintzer, G. Patrinos, G. Psacharopoulos, J. Sessions, G. Soldatos, R. Stonunsh, E. Tan, J. Heywood, B. Chiswick.

When studying the impact of educational capital on economic growth, innovation and patent activity of the economy, the results of studies by such authors as P. Aguilon, H. Badinger, R. Barro, A.V. Bozhechkova, Z. Griegiles, E. Denison, R. Dür, D. Yogerson, M. Kaneva, L. Kwan, A. Komarova, A. Koritskii, J. Liang, H. Liu, J. Lew, G. Mankiew, R. Nelson, L. Pritchett, R. Ramos, P. Romer, R. Solow, J. Surinak, B. Sand, T. Tondl, G. A. Untura, S. Phelps, Ch. IO. Chiu, T. Schultz.

When studying the role of educational capital in the development of regional innovation systems, research results of such authors as V.A. Barinova, V.V. Butenko, G. Grötzinger, A. Jaffe, S. P. Zemtsov, R. Krechenzi, E. S. Kutsenko, M. Langholz-Kaiser, A. Lewandowska, K. Longhi, B. Lundval, O. S. Mariev, R. Moreno, R. Nelson, O. Ondau, R. Pater, S. Rochia, I. V. Savin, J. Schienstock, D. Felsenstein, S. R. Halimova, S. Charlot, T. A. Sterzer, A. T. Yusupova.

This work also relied on the results of theoretical and applied research on the role of universities and secondary vocational education organizations in the formation of educational capital and development of innovation activities, which were conducted by such scientists as A.R. Alaverdov, E.V. Balatsky, B.I. Poor, J. Wissema, V.E. Gimpelson, L. M. Gokhberg, L.R. Graham, V.A. Gurto, A.I. Danilov, I.G. Dezhina, F.F. Dudyrev, G. Itskowitz, B.R. Clark, T.L. Klyachko, J.I. Kuzminov, V.I. Kushlin, Y.N. Lapygin, T.N. Leonova, P.Y. Makarov, A.M. Margolin, V.A. Mau, R.M. Melnikov, D. Nikolaev, J. Perret, M. Ranga, S.G. Sinelnikov-Murylev, E.V. Ponomarenko, A. Smolentseva, E.S. Sudarushkina, E.B. Tyutyukina, V.S. Ustenko, I.E. Frolov, etc.

The **object** of the study is the mechanism of formation and use of educational capital in the transition to an innovative type of economic development.

The **subject** of research is economic relations between organizations engaged in educational activities, innovation-active companies and public authorities on the formation and use of educational capital to solve the problems of innovative development of the Russian economy.

The **aim** of the dissertation research is to assess the impact of educational capital provision on innovation activity and to develop recommendations for improving the mechanism of management of formation and use of educational capital in the interests of innovative development of the Russian economy.

In order to achieve this goal, the following **tasks** were set:

1. Identify the main types of educational capital and disclose their role in innovative development of economy, propose the specification of the knowledge production function that takes into account the contribution of different types of educational capital in creation of new knowledge and technologies and their development.

2. To substantiate and empirically test the hypotheses about the nature of influence of different types of educational capital and instruments of state educational policy on innovation and patent activity of Russian economy.

3. Evaluate the impact of using postgraduates' scientific potential by Russian high-tech companies and identify the factors determining the involvement of Russian scientists in innovative activities.

4. Identify the most efficient personnel support mechanisms for innovative development used in international practice and substantiate recommendations for their use in the current Russian context.

5. To develop proposals for improving the mechanism of educational capital formation in the interests of innovative development of the Russian economy at the levels of secondary vocational education, higher education and postgraduate studies.

The theoretical basis of the thesis research is based on scientific works in the field of human capital theory, the theory of endogenous economic growth and the theory of national innovation systems.

The methodological basis of the research is the use of the principles of system approach, formal logic, synthesis of theoretical and practical material. To solve the problems of assessing the impact of educational capital provision on the innovation activity of the Russian economy, econometric modeling methods were used.

The **hypothesis** of the study is that there are untapped opportunities and reserves to increase the impact of educational capital as a factor of innovative development of the Russian economy.

The study was based on statistical data and materials of the Federal State Statistics Service of the Russian Federation, Ministry of Science and Higher Education of the Russian Federation, Organization for Economic Cooperation and Development (OECD), World Bank, European Bank for Reconstruction and Development (EBRD), Agency for Strategic Initiatives (ASI), Russian Venture Company (RVC), rating of high-tech companies "TechUp", data of the Russian Cluster Observatory of the Higher School of Economics, Russian Monitoring of Scientific and Innovation Activity. The paper used normative legal acts regulating the Russian education system, materials of interviews with education system specialists involved in the implementation of research orders for commercial structures, materials of scientific conferences, as well as publications in periodicals and materials posted on the Internet.

The **main scientific result** of the research is a theoretical and empirical substantiation of the role of different types of educational capital in innovative development of the economy and identifying the reserves for improving the management mechanism of formation and use of educational capital, allowing to increase its importance as a factor of transition of the Russian economy to innovative development model.

The main elements of **scientific novelty** of this result of the thesis research are:

1. A new specification of knowledge production function has been proposed which differs from the following features presented in the literature: considering qualitative differences between different types of educational capital, each of which can play an independent and important role in the process of innovation development; considering the possibility of diminishing returns to use of some types of educational capital when rational proportions between them are violated; considering elasticity dependence of innovation output index on the volume of educational capital. The paper shows that the dynamics of innovation output and patent activity in the Russian economy are adequately described by this specification of the knowledge production function. The paper identifies

the effects of decreasing returns to use of educational capital of individuals with higher education and increasing returns to use of educational capital of scientists involved in research and development as the volume of research and development funding grows (see Section 2.2 "Development of Methodology and Methods of Evaluation, Analysis, Modeling and Forecasting of Innovation Activity in Economic Systems").

2. A methodology was developed to assess the impact of state educational policy instruments aimed at developing higher education (development programmes of national research universities and supportive higher education institutions) and improving the training of skilled workers at the secondary vocational education level (programmes for training workers who meet the requirements of high-tech industries on the basis of dual education) on the results of scientific, technological and innovation activities, distinguishing The positive effect of presence of national research universities in the region and implementation of dual mode of secondary vocational education as factors stimulating transition to innovative model of economic development in long-term period was revealed (point 2.2 "Development of methodology and methods of assessment, analysis, modelling and forecasting of innovative activity in economic systems").

3. Using TechUspech rating data, it is shown that recruitment of highly qualified employees with academic degrees by Russian high-tech companies significantly contributes to growth of their patent and innovation activity, and for successful postgraduates specialising in technical and natural sciences in modern Russia, a trajectory of further professional development related to effective use of their potential by high-tech Russian companies is really available.

Using data from the Russian Higher Qualification Scientific Personnel Monitoring, the authors identify the factors that determine the involvement of Russian scientists in innovative activities. It is shown that internships at leading Russian organizations, job changes and part-time work increase the innovative activity of Russian researchers, but no such influence is revealed for internships at foreign organizations and foreign language skills, which indicates a weak degree of integration of the Russian innovation system into the global one. The inverse correlation between experience of pedagogical work and activity of participation in innovative activities is revealed, which indicates that the "triple helix" mechanism is not formed in modern Russian conditions (paragraph 2.2 "Development of methodology and methods of assessment, analysis, modeling and forecasting of innovative activity in economic systems").

4. The imbalance in the implementation of the state educational policy of the Russian Federation has been revealed, which consists in insufficient funding of universities that specialize not in world-class fundamental research, but in training personnel that meet the priority needs of economic

development of Russian regions, and organizations of secondary vocational education. The article proposes a mechanism of state support for universities that are able to perform the functions of universities of applied sciences and actively cooperate with regional business in solving the problems of training and conducting applied research, necessary for the implementation of the programme of innovation development of the region. The article substantiates the necessity of implementing the target programme to support the development of agrarian universities, focused on bringing agrarian universities closer to large agricultural holdings, creating joint educational programmes with agricultural producers and implementing joint projects with business and research institutes to create innovations in the agricultural sphere (point 2.29 "Improvement of human capital management methodology for innovative development").

5. Recommendations have been developed to implement in the Russian context for training research and engineering personnel for high-tech companies the "industrial postgraduate" model, which provides for performing dissertation research in the interests of the employing company with a longer training period, dual research supervision, a reduced class load and funding of research at the expense of the employer. The necessity to stimulate high-tech companies with high R&D expenditures to participate in implementation of "industrial postgraduate" programs through grant programs, provision of preferential rates of insurance contributions to extra-budgetary funds and preferential treatment in procurement by large companies with state participation is substantiated (point 2.6 "Development of methods and mechanisms of university science integration into the national innovation system and global innovation process").

6. The necessity of providing federal financial support to regional chambers of commerce and industry and their members, aimed at enhancing their role in establishing effective interaction between the regional system of secondary vocational education and employing companies, is substantiated. Organizational and economic mechanism of target programme "Turnkey Personnel" has been developed, which provides for solving tasks of collecting orders for personnel training from employing companies, organizing work with potential applicants, improving training process of SPE organizations, organizing internships in employing companies for SPE students, and training teaching staff for SPE organizations with active participation of regional CCI and financial support from federal budget (item 2.29 "Improvement of human capital management methodology in the interest of innovative development")

### **Theoretical and practical significance of the work**

Theoretical significance of the study lies in the fact that the results obtained allow expanding scientific ideas about the impact of educational capital and state educational policy on the intensity and effectiveness of innovation development of the economy.

The practical significance of the study lies in the substantiation of recommendations to improve the management mechanism of formation and use of educational capital, which can be used by public authorities at the federal and regional levels in the development and implementation of educational, scientific, scientific-technical, innovation, regional and industrial policy. The materials of the research can also be used in the educational process of higher educational institutions within the framework of implementing the courses "Innovative type of economic development", "National innovation systems: formation and development", "Public sector economics", "Development economics", etc.

Dissertation research is executed according to the passport of HAC specialty at the Ministry of Education and Science of Russia 08.00.05 "Economics and management of national economy (innovation management)": item 2.29 "Improvement of methodology of human capital management in interests of innovative development", item 2.2 "Development of methodology and methods of assessment, analysis, modeling and forecasting of innovative activity in economic systems", item 2.6 "Development of methods and mechanisms of integration of university science into national innovation system and world innovation system".

#### **Approbation and implementation of the research results.**

The main provisions and conclusions of the thesis research have been approbated at the following international scientific conferences: international scientific conference of students, postgraduate students and young scientists "Lomonosov-2018" (Moscow, Moscow State University, 2018), international conference-session "Public administration and development of Russia: challenges and opportunities" (Moscow, RANEPA, 2018), VI International scientific and practical conference "Management sciences in the modern world" (Moscow, Financial University, 2018), 8th International conference "The future of France and Russia in the modern world: civil society dialogue in education, science, economy, spatial development" (Nice, France, 2018), the international conference session "Public administration and development of Russia: global threats and structural changes" (Moscow, RANEPA, 2020).

The main provisions of the dissertation research were used in the preparation of reports on the following research works of the State Assignment of RANEPA under the President of the Russian Federation: "A new model of university development in the world in the context of the digital revolution: integration of education, science and territorial development" / E. V. Ponomarenko, Sh.V.

Tagirova, F. Vidal, A.A. Oganessian, V.A. Teslenko; under the scientific supervision of E.V. Ponomarenko (2017); "Assessing the Effectiveness of Investment in Human Capital in Modern Conditions" / R. M. Melnikov, V.S. Ustenko, P.N. Klukin, V.A. Teslenko, A.B. Ginoyan, A.M. Margolin, E.A. Turanova; under the scientific supervision of R.M. Melnikov (2018. ); "Comparative Analysis of Modern Higher Education and Science Reforms in Russia and France Based on Assessment of Effectiveness of Current Instruments to Improve Competitiveness of Leading Universities" / E.V. Ponomarenko, Sh.V. Tagirova, V. Oddo, A.A. Ohanesian, S. Ngo-Mai, V.A. Teslenko; under academic supervision of E.V. Ponomarenko (2018), "Digital Technologies in Education, Science, Territorial Development: French and Russian Experience" / E. V. Ponomarenko, V. Oddo, Sh.V. Tagirova, V.A. Teslenko, A.A. Oganessian; under the scientific supervision of E.V. Ponomarenko (2019), "Scientific research and its implementation as a key factor of university and territory competitiveness: a comparative analysis of cluster development in France and Russia"/ E.V. Ponomarenko, V. Oddo, O.G. Chuprova, V.A. Teslenko (2020).

The main provisions of the thesis research were also used in the research work within the framework of the Research Project Support Programme under the agreement between RANEPА and BP Exploration Operating Company Limited "Assessment of Efficiency of Investment in Education in Modern Conditions" / R. M. Melnikov, V.S. Ustenko, P.N. Klukin, D.S. Kozhikin, V.A. Teslenko, A.M. Margolin, E.A. Turanova; under the scientific supervision of R.M. Melnikov (2018).

The author has published 20 scientific papers on the topic of research with a total volume of 46.2 p.p. (including the author's contribution of the dissertant -11.3 p.p.), including in peer-reviewed scientific journals in economic sciences from the list of the Higher Attestation Commission under the Ministry of Higher Education and Science of the Russian Federation - 4 articles with a total volume of 3.7 p.p. (including the author's contribution - 1.75 p.p.), 2 of which are included in the list of those recommended by RANEPА, in the journals indexed in Scopus - 5 articles with a total volume of 5.475 p.p. (including the author's contribution - 2.8 p.p.).

**The list of the author's major publications includes:**

Articles in journals recommended by the Academic Council of RANEPА for publication of articles in economic sciences

1. Melnikov R. M., Teslenko V. A. Assessment of the impact of human capital on the economic dynamics of Russian regions // Region: Economics and Sociology. - 2018. - No. 1. - pp. 93-115.

2. Ponomarenko E. V., Oganessian A. A., Teslenko V. A. Development of E-Learning in English in Russian Universities // Public Service. - 2018. - Vol. 20. - No. 6 (116). - pp.88-95.

Articles in journals included in the Scopus database

3. Teslenko V., Melnikov R. & Bazin D. Evaluation of the impact of human capital on innovation activity in Russian regions // *Regional Studies, Regional Science*. - 2021. - Vol.8. - Iss.1. - pp. 109-126. - DOI: 10.1080/21681376.2021.1900744.

4. Teslenko V.A., Melnikov R.M. Prospects for the Development of Industrial Postgraduate Studies in Russia // *Higher Education in Russia*. - 2020. - No. 5. – pp.157-167

5. Teslenko V. The impact of the quality of human capital and state educational policy on the development of high-tech companies in Russian regions // *Regional and Sectoral Economic Studies*. - 2020. - Vol. 20. - No. 2. - pp. 51-64.

6. Ponomarenko E., Oganesyanyan A., Teslenko V. The evolution of electronic education in English language in Russian higher education institutions // *The International Science and Technology Conference 'FarEastSon'*. - Springer, Cham, 2018. - pp. 544-550.

7. Ponomarenko E., Oganesyanyan A., Teslenko V. New trends in higher education: massive open online courses as an innovative tool for increasing university performance // *International Journal of Economic Policy in Emerging Economies*. - 2019. - Vol. 12. - No. 4. - pp. 391-406.

Articles in Journals on Economic Sciences, recommended by VAK under the Ministry of Education and Science of Russia

8. Teslenko V. A., Melnikov R. M. Scaling the dual model of secondary vocational education as a factor in the economic development of Russian regions // *Regional Economy: Theory and Practice*. - 2020. - Vol. 18. - No. 5. - pp. 810-828.

9. Melnikov R. M., Teslenko V. A. Assessing the impact of changes in the structure of human capital on the growth dynamics of the Russian economy // *Economic Analysis: Theory and Practice*. - 2021. - Vol. 19. – No.2. - pp. 200-222.

Monographs

10. Melnikov, R. M., Margolin, A. M., Ustenko, V. S., Ginoyan, A. B., Teslenko, V. A., Turanova, E. A. Efficiency of investment in human capital in modern conditions / monograph - Moscow: Prospect, 2019. - 352 pp.

11. Ponomarenko E.V., Chuprova O.G., Oddo V., Teslenko V.A. Comparative analysis of cluster development in France and Russia (scientific research and its implementation as a key factor of university and territory competitiveness) / monograph - Moscow: Scientific Library, 2020. - 100 pp.

Other publications

12. Melnikov R.M., Margolin A.M., Ustenko V.S., Ginoyan A.B., Teslenko V.A., Turanova E.A. Evaluation of Efficiency of Investments in Human Capital in Modern Conditions. - Moscow: RANEP, 2019. - 56 p. URL: <https://ssrn.com/abstract=3387344>

13. Teslenko V.A. Value of investments in human capital in innovative economy // Partnership of France and Russia: internationalization of education and science, the role and opportunities of the Russian language Collection of articles. Ed. by E.V. Ponomarenko. - Moscow: Delo, 2017. - pp. 175-185.

14. Grinshkun V. V., Krasnova G. A., Teslenko V. A. Evaluation of the volume of Russian and world e-Learning markets // Bulletin of Moscow City Pedagogical University. Series: Informatics and Informatization of Education. - 2017. – No. 4. - pp. 8-16.

15. Krasnova G. A., Nuhuly A., Teslenko V. A. Main trends in the development of e-education market in the world // Bulletin of Moscow City Pedagogical University. Series: Informatics and Informatization of Education. - 2017. - No. 3. - pp. 93-98.

16. Krasnova G. A., Nuhuly A., Teslenko V. A. E-education in the world and Russia: state, trends and prospects // Bulletin of Peoples' Friendship University of Russia. Series: Informatization of Education. - 2017. - Vol. 14. - No. 3. – pp.371-377.

Structure and volume of the thesis. The work includes: introduction, three chapters, conclusion, bibliography, 21 tables, 11 figures, 3 appendices.