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Popov Roman Evgenievich

WORLD-CLASS SCIENTIFIC AND EDUCATIONAL CENTERS AS A FACTOR OF HUMAN CAPITAL DEVELOPMENT IN THE REGIONS OF RUSSIA

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Pavel Petrovich Deryugin

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Contents

Introduction

Relevance of the research topic. In modern conditions of the active transformation of Russian society and the formation of a new world order, the assertion of the economic and social sovereignty of the country, ensuring the scientific and technological independence of Russian society, the problems of the formation of new human capital come to the fore. Human capital is one of the most valuable assets of society. In the modern world, the role of human capital is increasing, and its development is becoming one of the key factors in the competitiveness of national society. In this regard, world-class scientific and educational centers are catalysts for innovation and progress, providing training for highly qualified specialists and conducting scientific research at the forefront of world science. Thus, the new human capital is aimed at shaping the future of Russia, and scientific and educational centers in this study are considered as locomotives of modernization and improvement of strategies and technologies for the formation of modern human capital. This is all the more important at the present time, when a new world order is taking shape, and Russia's internal forces are called upon to strengthen state and technological sovereignty.

The range of scientific problems. Human capital as an object of study has long attracted the interests of researchers. It began to be interpreted as a scientific category in the 1960s - 1970s in economics. It is important to note that for more than fifty years there have been a large number of theoretical approaches to its understanding, many author's definitions have been given, but the understanding of the meaning and characteristics of human capital is continuously evolving and being clarified. In this regard, the study of human capital remains an urgent interdisciplinary problem in various sciences, including sociology.

In traditional methodological approaches, it is considered that human capital is a set of knowledge, skills and abilities of a person or investments in them, allowing to further increase profits. However, more and more researchers note that the key components of a person's human capital are not only knowledge, skills and abilities, but also many other indicators, in particular social and personal characteristics of a person. For this reason, there is every reason to believe that human capital should be considered not only from the point of view of economics, as has been traditionally accepted, but also from the standpoint of sociology, since human capital includes a social component.

The problem of strategy and technologies for diagnosing human capital remains unresolved. This problem is currently formed mainly due to the contradictions that develop between the modern understanding of the essence of human capital and the methods by which it is measured. Such contradictions are related to the fact that by the present stage of society's development, the core of human capital is increasingly associated with the socio-personal characteristics of a person, as well as the fact that the modern measurement of human capital, in addition to investments and the results of activities based on their results, involves an appeal to a set of objective factors and subjective characteristics, in

the integration of which the human capital. In particular, there remains an unresolved issue of research models and diagnostics of human capital – a separate analysis of human capital as an object of research and an independent study of the factors that influence its formation, which reduces the scientific reliability of such diagnostics.

The study of the human capital of students themselves also remains an urgent task for modern sociology. The human capital of students is subject to the most active changes in comparison with other social groups of society. The fact that students are the intellectual and cultural vanguard of the future remains important. The total human capital of the future society largely depends on the transformation of the human capital of the student youth. Therefore, attention to the research of students' human capital will allow us to qualitatively predict its level in the future development of Russian society.

Applied problems. The relevance of the chosen research topic is also confirmed by statistical data. In particular, in the ranking of countries in the world on the human capital index, Russia in 2020 had an indicator of 0.68, which corresponds to 41st place among other countries in the world[1]. Despite the fact that there are a number of methodological issues to the calculation of the human capital index, nevertheless, this result takes place. The data shown confirm that Russia needs to activate and raise the level of human capital. One of the factors of raising human capital in Russia to a new qualitative level is the creation of world-class Scientific and Educational Centers (SEC).

The creation of the SEC was approved by the Decree of the President of Russia in 2018 "On national goals and strategic objectives of the development of the Russian Federation for the period up to 2024". In this Decree, the Government of the Russian Federation is instructed, when developing a national project in the field of science, to ensure the creation of at least 15 SEC by 2022[2]. Further, the provision of the activities of the REC MU was recorded in the national project "Science and Universities". It should be noted that scientific and educational centers in Russia existed in different variations before. The first attempts to integrate science were made back in the XVIII century, however, such ambitious goals and objectives that are set for newly created RECs in national projects, the amount of funding that the state currently invests in their activities, were not previously the main distinguishing feature of RECs MU from ordinary scientific centers – the key participation of the state in their formation. The budget of the REC MU for the period from 2021 to 2023 amounted to 56 billion rubles.

The purpose of the SEC is to build a modern model of research and development based on scientific, educational and industrial cooperation in the chain "science-universities-business", contributing to the socio-economic development of the territories of the subjects of the Russian Federation[3]. SECs are designed to integrate all levels of education, the capabilities of scientific

[1] URL: https://databank.worldbank.org/data/download/hci/HCI_2pager_RUS.pdf?cid=GGH_e_hcpexternal_en_ext.
[2] Decree of the President of the Russian Federation on May 7, 2018 "On national goals and strategic objectives of the development of the Russian Federation for the period up to 2024".
[3] URL: https://ноц.рф/about.

organizations and businesses for powerful technological development and ensuring technological sovereignty, and, accordingly, the sovereignty of Russia as a whole. From the point of view of sociology, SEC are special social organizations that form one of the promising social institutions in Russia, which is aimed at solving the strategic task of developing Russian society – ensuring the integration of science, education and the economic industry, in order to form a significant increase in socio-economic indicators.

One of the flagship federal projects in the implementation of the national project is the project "Development of human capital in the interests of regions, industries and the research and development sector", which especially confirms the relevance of this study. In a changing Russian society, SECs should become one of the real opportunities to achieve a significant increase in the level of human capital.

The SEC includes state (representatives of the administration of the territories, regions) and scientific organizations (research institutes, federal research centers, etc.), organizations of the real sector of the economy (organizations of a predominantly industrial nature) and educational organizations of higher education. The education of students at universities that are part of the SEC should ensure the implementation of one of the goals set in the national project "Science and Universities" - the development of human capital in the interests of the regions. For this reason, the study of the human capital of students in modern Russia using the example of the SEC is an urgent problem for sociology.

Summing up, it should be noted that in modern science, methodological approaches to the study and diagnosis of human capital are constantly being developed and refined. Due to the development of modern society, in particular its digitalization, traditional approaches to human capital research suggest new research directions. More and more researchers are coming to the conclusion that human capital is not only an economic category, but also a category that includes social components. Currently, a new social institution is being formed – the SEC, one of the goals of which is the development of human capital for the benefit of the regions. Students studying at universities included in the SEC are one of the most important social groups for the formation of human capital in Russia both now and in the future. Thus, the topic of this study is relevant.

The degree of development of the problem. The proposed research is based on a comparative analysis and generalization of numerous domestic and foreign works devoted to the methodology of human capital. A large number of Russian and foreign scientific studies have been devoted to various theoretical approaches to understanding human capital, strategies for its diagnosis, and methods of analysis.

A significant contribution to the formation and development of the theory of human capital was made by such researchers as: A. Smith, D. Ricardo, K. Marx, A. Marshall, G. Becker, J. Mintzer, T. Schultz, L. Turow, M. Armstrong, T. Davenport.

Among the Russian researchers of human capital, it is necessary to single out: R.I. Kapelyushnikov, A.V. Koritsky, M.M. Kritsky, Yu.A. Korchagin, S.A. Kravchenko and others.

In the issues of periodization of human capital development, the works of: V.A. Anikin, Z.R. Khabibulina, N.P. Lemanova are of the greatest importance.

Strategies for the diagnosis of human capital are reflected in the studies of: W. Petty, T., Schultz, G. Becker, L. Dublin and A. Lotka, M.M. Kritsky, R.I. Kapelyushnikov.

Value relations are considered the backbone of human capital in the works of Panfilova (2013), Razin (2018). A similar position on the role of people's values in the formation of capital was expressed by the classics of sociology K. Marx (1974) M. Weber (1990), G. Simmel (1996), A. Marshall (1890).

The founder of the use of the network approach in research is M. Grannoveter.

In considering the Russian experience of the formation of scientific and educational centers, the key researchers are S.A. Potachev, M.N. Potemkin, L.O. Kocheshkova.

In the presentation of foreign experience of integration of science, education and economics – I.V. Semenova, S.S. Lachinisky, N.A. Medushevsky.

Walrave (2018); Radziwon, Bogers (2019), I.V. Kuptsova, N.E. Laktaeva, V.V. Akberdina and E.V. Vasilenko contributed to the sociological analysis of the activities of the SEC.

Thus, the presence of a significant number of popular scientists in the study of human capital proves the fact that the problem of its research has been developed quite extensively and has several previously established theoretical concepts. However, it should be noted that all established concepts relate exclusively to economic theory, and in this study there is every reason to believe that human capital has a social component.

The degree of elaboration of the issue of human capital diagnostics also has a high level, researchers present such approaches as: profitable, investment, cost calculation and others. Nevertheless, these diagnostic approaches have a number of contradictions that require theoretical and practical solutions.

There are a number of studies that characterize the experience of the formation of scientific and educational centers in Russia and abroad.

It is important to note that there are no empirical studies that diagnose the human capital of students studying at universities that are part of the SEC, despite the fact that this is one of their goals of activity.

Thus, there is an objective need for a systematic consideration of human capital, as well as for the formation of a sociological approach to the study and diagnosis of human capital, as one of the most important factors in the development of the regions of Russia and the entire Russian society as a whole. The presented facts determine the formation of the goals and objectives of this dissertation.

The object of the study is the human capital of students studying at universities that are part of world-class scientific and educational centers.

The subject of the study is the sociodynamics of human capital of students studying at universities that are part of world-class scientific and educational centers.

The purpose of the research is to identify, analyze and systematize the scientific and theoretical foundations of the sociological concept of human capital, as well as to analyze the main trends in the formation of human capital of students studying at universities that are part of world-class scientific and educational centers.

To achieve this goal, it is necessary to solve the following tasks:

1. To analyze and summarize theoretical approaches to the study of human capital by Russian and foreign scientists in order to substantiate the most relevant approach to achieve the stated goal of research in sociology.

2. To analyze diagnostic strategies and empirical methods of measuring human capital and to substantiate the most adequate methodology for analyzing the sociodynamics of human capital of students studying at universities that are part of world-class scientific and educational centers.

3. To carry out a sociological analysis of the activities of world-class scientific and educational centers.

4. To carry out empirical testing of conceptual provisions, as well as to analyze the sociodynamics of changes in the human capital of students studying at universities that are part of world-class scientific and educational centers.

Theoretical and methodological foundations of the study. Due to the fact that there is no unified scientific approach to understanding the essence of human capital, and human capital itself is an interdisciplinary category, various methods of scientific cognition were used in this study, in particular: general scientific methods – analysis, system method, structural and functional method; private scientific - empirical method, functional method.

Classical theoretical approaches to the study of human capital were widely considered in the study, however, the integrative approach proposed by MGIMO Professor S.A. Kravchenko is used as the most suitable for achieving the stated goals and objectives of the study. Due to the fact that human capital is a phenomenon that, on the one hand, is the result of the interaction of a number of factors, and on the other is a continuously developing phenomenon, traditional approaches to the study of human capital will become obsolete with the transformation and development of society. Due to the complexity of the object under study, according to the professor, the most adequate approach to human capital research is an integrative approach to research and a specially developed integrated methodological toolkit.

In the sociological analysis of the activities of the SEC, the concept of Kuptsova I. V. and Laktaeva N.E. is used, which is based on the idea of creating a unique eco-environment that promotes the unhindered conduct of scientific and innovative activities. In this regard, the methodological foundations for the sociological analysis of the activities of SEC are built on the principles of the analysis of the activities of SEC as innovative ecosystems aimed at the formation of human capital.

The empirical basis of the study was an integrated approach to the diagnosis of the human capital of students studying at universities that are part of the SEC. A comprehensive empirical study based on the triangulation of methods was conducted, which included 4 parts:

1. A study was conducted that includes a combination of content analysis technologies and the method of associations in the interests of conducting sociological research. The technology of the methodology involved addressing respondents with the task of expressing their opinion (idea) about the relationship between the acquired knowledge, skills and abilities as basic elements of human capital, on the one hand, with the values and value orientations of the individual during the period of study at the university, on the other. (200 respondents were interviewed).

2. A comparative analysis of the sociodynamics of business qualities was carried out, the respondents were students who studied at the university and young people who do not study there. The sample included students of the 1st and 4th courses - 249 people, as well as residents of the region - 647 people who made up two age groups.

3. The analysis of the development of the regulatory framework for the activities of world-class scientific and educational centers, the analysis of the coverage of the problems of the activities of the SEC in scientific publications;

4. A pilot Internet survey of the Russian population was conducted on the modern ideas of citizens about human capital and the activities of the SEC. (201 respondents were interviewed).

The materials of the study were tested at international and Russian scientific and practical conferences, interuniversity seminars in 2020-2023, including: International Conference on Natural Sciences and Humanities "Science SPbU - 2020" (St. Petersburg, 2020); X International Scientific Conference "Sociology of Religion in Late Modern Society: Religion and Values" (Belgorod, 2021); International scientific Conference "V Gottlieb Readings: Oriental Studies and Regional Studies of the Asia-Pacific region in line with transdisciplinary regionology" (Irkutsk, 2021); All-Russian Scientific Conference XIV Kovalev Readings November 12- 14, 2020 "Digital society - a new format of social reality: structures, processes and development trends: materials" (St. Petersburg, 2020); XVIII-th All–Russian Scientific Conference "Information– Communication-Society" (ICO-2021, St. Petersburg), All-Russian Scientific Conference "XVII Kovalev Readings Russian Society Today: Values, Institutions, processes" (St. Petersburg, 2023). The author also published 7 materials on the topic of research work in periodicals indexed in the RSCI database, in particular: "Institutionalization of world-class scientific

and educational centers within the framework of digitalization of society: Russian and world experience"[4]; "Formation of human capital in the digital educational environment: Russia and China - social aspects"[5]; "Own world" of values of students of IT specialties"[6]; "The conversion of a manager's human capital into the socio-structural relations of a corporation (empirical verification)[7]", "Methodological foundations for measuring the values of IT specialists"[8], "Sociological research of human capital: value measurements"[9], "Empirical research of the sociodynamics of human capital of students studying in world-class scientific and educational centers"[10]. Also, 3 articles were published on the research topic in periodicals included in the list of the Higher Attestation Commission: "Social and professional awareness of the coming digitalization by students of engineering and technical specialties (pilot research experience and first results)"[11]; "World-class scientific and educational centers as drivers of the formation of human capital of Russians: sociological analysis of the problem field (to the 300th anniversary of St. Petersburg State University)"[12], "Values of education in the views of graduate students of IT specialties (results of a pilot study)"[13].

The dissertation consists of an introduction, two chapters, including 7 paragraphs, a conclusion, and a list of references. The structure of the study is determined based on the stated purpose of the study, tasks and is reflected in the table of contents.

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[6] Deryugin P.P., Sidorova A.N., Bannova O.S., Popov R.E. "Own world" of values of students of IT specialties". Collection of materials of the International Conference on Natural Sciences and Humanities. Saint Petersburg State University, 2021, pp. 889-890.

[7] P. P. Deryugin, R. E. Popov, E. A. Kamyshina, O. S. Bannova. The conversion of the human capital of the head into the socio-structural relations of the corporation (empirical verification) / // Scientific results of sociology 2021: A collection of articles based on the materials of the I International Scientific Online Forum, Belgorod, February 16-18, 2022. – Belgorod: Epicenter Limited Liability Company, 2022. – pp. 61-70.

[8] P. P. Deryugin, O. S. Bannova, R. E. Popov. Methodological foundations for measuring values from specialists // Sociology of Religion in Late Modern society. – 2022. – Vol. 11. – pp. 35-39.

[9] R. E. Popov, P. P. Deryugin. Sociological research of human capital: value measurements // Sociology of religion in Late Modern society. – 2022. – Vol. 11. – pp. 101-106.

[10] Popov, R. E. Empirical research of sociodynamics of human capital of students studying in world-class scientific and educational centers / R. E. Popov, P. P. Deryugin // Information–Communication–Society. – 2023. – Vol. 1. – pp. 309-314.

[11] Deryugin P.P., Bannova O.S., Kamyshina E.A., Popov R.E., Sidorova A.N. Social and professional awareness of the coming digitalization by students of engineering and technical specialties (pilot research experience and first results). Discourse. Volume 7, number 1, 2021, pp. 43-56.

[12] Popov R.E., Baruzdin I.A., Salakhutdinov A.A., Deryugin P.P. World-class scientific and educational centers as drivers of the formation of Russian human capital: sociological analysis of the problem field (to the 300th anniversary of St. Petersburg State University). Discourse. 2022;8(3), pp. 41-55.

[13] Deryugin P.P., Ziyaeva M.M., Gluhikh V.A., Popov R.E. Values of education in the representations of students-graduates of OT-specialties (results of pilot research) // Society: sociology, psychology, pedagogy. 2023. No. 9. pp. 22-29.

Main scientific results

1. A systematic characteristic of the evolution of scientific ideas about human capital is presented, which is associated with the dynamics of social and economic development of society, transformations of its social structure and social institutions, arising in connection with the formation of new types of society that predetermine and modify the content and characteristics of human capital in different epochs. It is proved that starting from the traditional society, and further in the conditions of industrial and post-industrial society, the concepts and theoretical and methodological foundations of the study of human capital are continuously transformed, expanded and increasingly go beyond purely economic approaches to understanding its essence, content and characteristics as socially significant and interrelated with many other social phenomena. The main trend of the scientific explanation of human capital in sociology has been identified and determined, which lies in the socially conditioned nature of its changes, which involves considering human capital in conjunction with a variety of characteristics of the social and socio-psychological order.

2. The strategies of human capital research within the framework of private theoretical and methodological approaches are systematized. It is shown that the one-dimensional and mainly pragmatic analysis of the multifaceted and multidimensional characteristics of this capital contradict its real nature and characteristics in modern society. It is proved that, on the contrary, sociological research involves the integration of many internal and external characteristics, conditions and factors that allow us to talk about an integral conceptual paradigm as an adequate research platform for studying the human capital of a modern personality, the foundations of which were formulated by P.A. Sorokin and modified to the conditions of a network society by S.A. Kravchenko.

3. The article presents a sociological analysis of the activities of universities included in the structure of world-class scientific and educational centers, considered as drivers of the formation of students' human capital, as well as an analysis of Russian and foreign experience in ensuring the integration of science, education and economics as the leading principle of the formation of students' human capital. The main data characterizing the activities of scientific and educational centers are summarized: the stages of their institutionalization; social factors affecting the development of the human capital of students of the SEC; characteristics of SEC as social organizations; the main differences in the formation of students' human capital in SEC and the results of the study of the activities of SEC, the problems and difficulties of their formation.

4. It is proved that scientific and educational centers should be considered from the standpoint of the principles of formation of a special social organization - an innovative ecosystem with a set of important characteristics that ensure the co–evolution of its participants throughout their interaction. The following are presented: analysis of the development of the regulatory framework for the activities of

the SEC; analysis of the coverage of the problems of the activities of the SEC in scientific publications; analysis and evaluation of the problem field of the formation of this social institution.

5. The nature of the sociodynamics of the growth of students' business qualities during the period of study at the university as the main indicators of the success of the formation of human capital is revealed. The features of the sociodynamics of human capital growth depending on the socio-demographic characteristics of students representing different strata, groups and regions are shown. It is proved that obtaining higher education significantly affects the formation of general human capital (according to G. Becker), as well as the success of graduates.

6. V.P. Tugarinov's conceptual ideas on the unity of cognition-evaluation-practice, revealing the basic strategy of value formation in the process of teaching students at universities, are empirically confirmed. It is proved that obtaining new knowledge cannot be an impartial act of formal mastering of information, but it is always a trigger for changing values.

Provisions submitted for the thesis defense

1. The transformation of scientific ideas about human capital is associated with the changing social structure and the development of social institutions of society. The formation of modern ideas goes through a number of periods, at each of which this phenomenon is interpreted more and more extensively and increasingly acquires a social orientation and social characteristics. At the present stage, the most adequate representation of human capital reflects the sociological integrative paradigm, within which the understanding of human capital integrates a variety of diverse characteristics, conditions and factors that determine the multifaceted manifestations of human capital in various fields of human activity, corresponding to the characteristics of post-industrial (information, digital) society.

2. Operationalization of the concept of human capital in the interests of sociological research, can be represented as a set of knowledge, skills and abilities of the individual, which are in causal relationships with a variety of personality structures, including its values and orientations, providing orientation and dynamics of satisfaction of social needs. The causal relationships of values and human capital provide orientation to the development of social values and recognition of their priority, as well as the perception of the needs and interests of society, which requires the acquisition of such knowledge, skills and abilities that allow you to identify valuable, important and significant objects, both in the internal structure of the individual and in the external environment – society, and provide interaction with them. Personality values can be considered as indicators of network analysis, revealing both the immediate characteristics of human capital and the multiple connections that develop around it.

3. The formation of human capital in a post-industrial society involves the creation of special conditions conducive to the most successful integration of knowledge and experience. In this regard, world-class scientific and educational centers have important potentials of an innovative ecosystem, where relevant social interaction is provided, contributing to the formation of human capital. Among the

important advantages of such universities are: state guarantees of their activities; the use of regional advantages of the economy; the involvement of the scientific community in project developments and programs; the direct participation of students studying at universities and the involvement of their educational process in solving real problems of regional development.

4. The sociodynamics of students' human capital during the period of study at the university is primarily expressed in the expansion and greater connectivity, both in strength and quality of value network connections. In general, during the period of study at the university, business qualities are most dynamically formed, by the time of graduation, business qualities are becoming increasingly important. These qualities form the basis for the formation of human capital in the future. Network connections of business qualities - as the most indicative indicators of human capital - with qualities of other orders are formed ambiguously.

5. The nature of causal relationships between the knowledge, skills, and abilities obtained at the university on the one hand and the value system on the other: this is mainly a direct positive relationship; the study of subjects of the socio-humanitarian cycle plays the role of a leading principle in the formation of a system of values. Special subjects, professional knowledge and their impact on the value system are perceived by students as less significant; the important role of social conditions and specially conducted events, modern organizational and methodological approaches in the university's activities, information, knowledge and experience are factors contributing to strengthening the relationship between knowledge and values; a number of strategies for the relationship of knowledge and values are fixed, which are formed as a conscious / unconscious and voluntary / involuntary change (transformation) of the value system; the process of studying at the university – obtaining new knowledge - significantly transforms the thinking of students, which ultimately affects the revision of previous values and the emergence of new ones, as well as the growth of subjective self-esteem and their new place in society.

Chapter 1. Human capital as an object of sociological analysis: theoretical and methodological approaches and diagnostic methods

This chapter is devoted to the study of the theoretical and methodological foundations of the analysis and scientific characteristics of human capital, its main system indicators relevant for empirical research. As N.Y. Fedorov notes, the theory of human capital, formed in line with institutionalist economic theories, was and remains mainly an element of economic science[14]. To date, the problems of human capital have long acquired an interdisciplinary character. At the same time, without further in-depth study of this concept, "in sociology, the category of human capital remains only a hypothesis, especially losing its concrete content with its increasingly filling with other concepts"[15].

Theoretical understanding of essential characteristics allows to build strategies of sociological diagnostics based on adequate principles and methods of studying human capital. The first two parts of the chapter will be devoted to theoretical and methodological issues of sociological research of human capital.

In the final part of the chapter, an analysis of the activities of scientific and educational centers as an emerging social institution will be proposed, which significantly compensates for some difficulties and limitations in the formation of students' human capital that are inherent in traditional forms of training.

The first chapter is aimed at systematization and closer attention to the methodological principles of building a strategy for diagnosing the values of students studying at universities and their relationship with human capital, which is the main interest of this study. From a methodological point of view, the key task is to conceptualize the provisions that prove the need to consider values as the central object of diagnostics in the structure of human capital.

1.1. Evolution of the principles of theoretical and methodological analysis of human capital: from an economic paradigm to an integrative social concept

Currently, the study of human capital is becoming a significant interdisciplinary problem. Most modern studies prove that the key components of a person's human capital are not only knowledge, skills and abilities, but also many other indicators, some of which are human values and the study of this phenomenon within the framework of only one scientific discipline is futile. At the same time, we can

[14] Fedorov N. Yu. To the sociological interpretation of the concept of "Human capital" // MNIZH. 2014. No. 10-3 (29). p. 81.
[15] Fedorov N. Yu. To the sociological interpretation of the concept of "Human capital" // MNIZH. 2014. No. 10-3 (29). p. 83.

agree with the point of view that "economic approaches dominate the understanding of human capital in modern Russia."[16] In Russian science, many theoretically multidirectional steps have been taken to identify its essence. Consider the most significant:

- "human capital is considered as a universal concrete form of human life activity, represented in the form of an economic process, and is in a constant cycle, similar to the movement of economic capital"[17];

- human capital is studied as the central moment of education and economic activity in a post-industrial society[18];

- the economic, demographic and other components of human capital have been studied and confirmed empirically[19].

- human capital is presented as a phenomenon integrating the economy of industrial society (M.M. Cretsky and a group of authors);

- human capital is considered as dependent on the dynamics of education and qualifications of employees[20];

- changes in human capital in the coordinates of social time and investment, providing this measurement with mathematical analysis models[21].

The approaches shown to the research of human capital are only a small fraction of what is considered by modern science. There are dozens and even hundreds of such points of view[22]. In any case, it becomes obvious that initially the category of human capital was purely economic in nature[23], but now, more and more often, researchers note that economic models do not give significant correlations between economic growth and human capital growth either in a comparative analysis of them in a time period, or in a comparative analysis of indicators of several different countries[24]. It is natural that the problem of theoretical inconsistency negatively affects the models of research and diagnostics of human capital, in particular, when trying to create technologies and procedures for studying human capital on the principles of an interdisciplinary approach. The imperfection of such methods of empirical measurement of human capital is one of the difficulties standing in the way of empirical confirmation or

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[22] Bychenko Yu.G. The sociological concept of human capital. - Saratov: Volga Region Academy of Public Service, 2000, - p. 112.
[23] Gennaioli N., Rafael La Porta. Human Capital and Regional Development // The Quarterly Journal of Economics, 2013. Oxford University Press, vol. 128 (1), p. 105-164.
[24] Pritchett L. Where has all the education gone? World Bank Economic Review. 2001. Vol. 15. p. 3.

refutation of the theoretical results obtained. It is all the more difficult to talk about uniform or well-established ideas about methods that could appropriately reflect the measurement of human capital in practical and applied terms. Theoretical inconsistency leads to a number of problems and difficulties relevant to practical activities, among which, firstly, the difficulty in choosing indicators-indicators of the state of capital, complicating the technical design of models and diagnostic techniques, is clearly visible[25]. Secondly, another contradiction in the construction of applied procedures for the diagnosis of human capital lies in the orientation to the study of factors external to the personality that really have a significant impact on human capital, but these ideas practically do not reflect, in fact, the socio-cultural and socio-psychological characteristics of a modern person included in the social conditions of a particular organization.

As already mentioned, the solutions to the above problems are hidden in theoretical constructions, where the theoretical and methodological foundations of understanding and measuring human capital are investigated: strategies for applied diagnostics of human capital depend on the nature of scientific ideas about the nature of human capital. Perhaps the central point in explaining the essence of human capital is the idea of it as a changing phenomenon. There is every reason to believe that ideas about human capital have changed and are changing in accordance with the socio-economic development of society. Over the past three centuries, the objective content of human capital has evolved, which has led to the evolution of scientific ideas about strategies for its study and diagnosis. It can be said that the dynamics of scientific (classical) approaches and methods of analyzing human capital reflect its understanding not only as a set of knowledge, skills and abilities of a person, which was characteristic of industrial society, but along with this, modern theoretical research reveals the important role of many social factors, in particular, personality values, which are causally related.investigative links with the structures of human capital, values that integrate together the knowledge, skills and abilities of the individual. The direction of development of these knowledge, skills and abilities, combine them with motivation and interests, tastes and preferences, without which the professional competencies of a modern person will be ineffective.

The most adequate in this case may be two methodological approaches to the study of the phenomenon of human capital: socio-historical and integrative. In our opinion, there is no alternative to a research approach that reveals the history, evolution and integration of elements, content and understanding of human capital as a scientific phenomenon. Hypothetically, it can be assumed that based on the analysis of the history and evolution of the understanding of human capital, conclusions can be drawn about the totality of cause-and-effect relationships, conditions and factors affecting the emergence and development of this form of capital, i.e. to investigate this phenomenon as an integration of

[25] Cohen D., de Soto M. Growth and human capital: Good data, good results // Journal of Economic Growth. 2007. Vol. 12. p. 1.

relationships. On the other hand, sociology as an integral science, built on the basis of knowledge of a number of natural, social and humanitarian disciplines, mathematics, demography, economic and social statistics[26], provides scope for analysis and explanation of cause-and-effect relationships, conditions and factors affecting human capital, its systemic, structural and dynamic properties. In particular, the construction of sociological approaches to research and diagnostics of human capital based on an integrative approach involves addressing a variety of elements of internal and external characteristics, including the analysis of values, as one of the possible strategies for its study. In a number of works, such a hypothetical position in domestic and foreign sociology is withered directly and indirectly[27].

According to our view, as the theoretical and methodological foundations of the study of human capital evolve, scientific ideas about this phenomenon destroy its purely economic interpretation, i.e. the meaningful and categorical idea of human capital increasingly acquires a socially conditioned and personality-oriented character. This evolution is conditioned by the natural dynamics of socio-economic development – the transition of society from agrarian to industrial, and then to post-industrial, which leads to the emergence of new forms of sociality, a new role of the individual and his human capital.

In analyzing the evolution of the concept, first of all it is necessary to consider the evolution of scientific ideas about human capital. It is important to note that the theory of human capital, having methodological prerequisites for its study, long before its formation as a scientific category, at the empirical level, has accumulated extensive experience, both in the theoretical and in the applied part, in the quantitative and qualitative assessment of this capital. In particular, this can be seen from the analysis of the historical context of the formation of the theory of human capital.

Traditionally, the emergence of the concept of human capital has been dated since the 1960s. It was during this period of time that the formation and active development of theoretical propositions about this phenomenon took place. The emergence of such a concept is due to the increase in the pace of industrial production, the introduction of modern technologies and the increasing importance of competencies and the level of education of specialists for large-scale industrial production.

The recognized founders of the concept of human capital are economists G. Becker and T. Schultz. In his scientific works, T. Schultz defined the role of human capital as a source of future earnings for all spheres of activity, where the main unit is considered a person. In production, the theory of human capital is divided into two factors: physical capital (means of production) and human capital (acquired knowledge, skills, skills used in production)[28].

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[26] Toshchenko J. T. At the origins of scientific sociological periodicals // Russia is reforming. 2019. No.17. URL: https://cyberleninka.ru/article/n/u-istokov-nauchnoy-sotsiologicheskoy-periodiki (accessed: 04.05.2022).

[27] Panfilova T. V. Human capital in the light of the problem of values // MGIMO Bulletin. 2013. No. 3 (30).

[28] Zapolsky A.D. Development of the human capital of the region in the conditions of digitalization of the economy: Dissertation of the Candidate of Economic Sciences. Kursk, 2019. pp. 16-17.

G. Becker gives the following definition: "Human capital is everyone's stock of knowledge, skills, and motivations. Investments in it can be education, accumulation of professional experience, health protection, geographical mobility, search for information."[29] T. Schultz, in turn, "Human capital is a source of future earnings or future satisfaction, or both."[30] The contribution to the development of the concept of human capital was made by L. Turow, he defines human capital as "an individual's ability to produce goods and services, his productive abilities."[31] In a later period, M. Armstrong, T. Davenport "Human capital – knowledge, skills, skills and abilities of an employee of an organization."

Russian scientists also did not stay away from the study of the essence of human capital. One of the most famous Russian scientists is M. Cretsky. The author offers his own evolutionary concept of human capital, where he defines it as: "a universal form of human life activity, assimilating previous forms and restoring the previously violated unity of producer and consumer."[32]

As it becomes obvious, today the concept of this capital is interpreted in many ways. Thus, in the work of P.V. Lemanova, a systematic analysis of the definition of "human capital" is presented, which shows the opinion of more than 27 authoritative scientists engaged or engaged in the study of this category. Based on the analysis of these definitions, P.V. Lemanova comes to the conclusion that "human capital is part of the total capital and represents the accumulated costs of education, healthcare, and vocational training."[33] As we can see, in the vast majority of cases, the analyzed definitions are of an economic nature, i.e., related to economic theory and rightly, therefore, characterize the economic patterns and trends of human capital.

With a variety of definitions and approaches, it is possible to fix the position of researchers, which consists in recognizing human capital as a given, as an established and emerging phenomenon. Along with this, researchers have proposed approaches in which the problems of human capital are considered evolutionarily. In our opinion, a noteworthy generalized study of the history and evolution of the formation of modern ideas about the essence of human capital is proposed in the work of V. A. Anikina "Human capital: the formation of the concept and basic interpretations" published in the journal Economic Sociology[34]. As the author shows, the beginning of the study and analysis of human capital was laid in economics. The first scientific developments of the theory of human capital[35], as noted earlier,

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[29] Becker, G. Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education. 3rd Edition, University of Chicago Press, Chicago, 2009, p. 389.
[30] Zapolsky A.D. Development of the human capital of the region in the conditions of digitalization of the economy: Dissertation of the Candidate of Economic Sciences. Kursk, 2019. p. 18.
[31] Zapolsky A.D. Development of the human capital of the region in the conditions of digitalization of the economy: Dissertation of the Candidate of Economic Sciences. Kursk, 2019. p. 19.
[32] Lemanova P.V. Social policy in the management of human capital development. Moscow: Publishing House of the Academy of Natural Sciences, 2016. p. 21.
[33] Lemanova P.V. Social policy in the management of human capital development: textbook. – M.: Publishing House of the Academy of Natural Sciences, 2016. pp. 16-24.
[34] Anikin V.A. Human capital: the formation of the concept and the main interpretations // Economic sociology. 2017. No. 4. pp. 120-156.
[35] Koritsky A.V. The origins and main provisions of the theory of human capital // KE. 2007. No. 5. pp. 3-11.

are associated with the ideas of G. Schultz and J. Mintzer. Along with this, V.A. Anikin's research reveals that scientists from the USA, Europe, Japan, and some other countries have been talking about this or that interpretation of human capital since the pre-industrial period. Based on extensive scientific material, the author formulates a conclusion about five stages that differ qualitatively in scientific ideas about human capital.

At the first pre-industrial stage (before the XVIII century), human capital was identified with knowledge aimed at achieving results. Moreover, knowledge possessed only by a narrow circle of people who received it as "sacred knowledge" mainly at universities. Knowledge was an undoubted advantage in entrepreneurship. The first attempts to give a scientific justification to human capital in this period are associated with the ideas of the economist W. Petty, which he outlined in the book "Political Arithmetic"[36]. Petty has the idea that if the material basis of prosperity is the land and nature, then the main creator of wealth is labor in various spheres of material production.

The second stage of the evolution of human capital (Europe of the XIX century - the first half of the XX century) is primarily associated with the idea that human capital is related to knowledge that is implemented in business. First of all, the development of ideas about business qualities is associated with the works of the classics of economics – A. Smith and D. Ricardo. K. Marx, as well as A. Marshall, J. B. Clark and V. Pareto and some others made a significant contribution to the development of the theory of the question.

At the second stage of the evolution of human capital, the important role of knowledge as an incentive in the organization of production is recognized. Mass education and vocational education are emerging, numerous technological and technical institutes and colleges are opening, the main purpose of which is to ensure mass production[37]. Human capital capable of practically organizing a business is recognized as the main condition for competitiveness (researchers of the School of Human Relations - E. Mayo, A. Maslow, D. McGregor, etc.)[38].

The third stage - the late industrial period – is a decade, starting from the 1960s to the 1970s, when there is a "worldview shift" in the awareness of the importance of the role of a business person in production as a special form of capital. First of all, this applies to Europe, the USA, and Japan. It is at this time that most of the fundamental conceptual views on the problem of a business person are formulated, which become the core of the theory of human capital for a long period. First of all, theoretical generalizations are associated with the works of T. Schultz, G. Becker, J. Mintzer –

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[36] Ivanov S. V. Evolution of the study of the economic category "Human capital" // Socio-economic phenomena and processes. 2011. No. 7. URL: https://cyberleninka.ru/article/n/evolyutsiya-issledovaniya-ekonomicheskoy-kategorii-chelovecheskiy-kapital (accessed: 06.04.2020).

[37] Verhaest, Omey 2006. Verhaest D., Omey E. 2006. The Impact of Overeducation and Its Measurement. Social Indicators Research. 77 (3): 419–448. doi:10.1007/s11205-005-4276-6].

[38] Shemyakin E.L. The history of the concept of human capital // Volga Scientific Bulletin. 2015. No.5-2 (45). URL: https://cyberleninka.ru/article/n/istoriya-vozniknoveniya-kontseptsii-chelovecheskogo-kapitala (accessed: 06.04.2020).

representatives of the Chicago School[39]. Describing this stage of development of the theory of human capital, S. V. Ivanov in the article "Evolution of the study of the economic category "Human capital" defines it as neoclassical[40].

The central ideas of T. Schultz in the formation of the theory of human capital were the provisions on the important role of business information that functions within the company and thereby ensures the effectiveness of its development; there is an expanded understanding of the role of investments not only in university education, but the health of employees of the enterprise is recognized as a factor in the development of human capital.

G. Becker, in addition to the important role of knowledge and production skills , singled out the motivation of people 's labor activity as an important factor[41]. Becker predicted the conclusions of his contemporaries that the formation of such motivation and the accumulation of important knowledge and work experience should begin in the early years of children's adulthood. "The return on such a strategy for the development of human capital may be higher than from investments in fixed assets," G. Becker believed.

In the works of J. Mintzer, a conceptual position is formulated regarding vocational training, which subsequently becomes the main factor in income distribution. J. Mintzer considered investments in education to be the main factor in the development of human capital. In his work "Education, Experience and Income" (1974), J. Mintzer described the concept of the overtaking period. The main idea of the concept lies in the prospects of choosing professions that are focused on the future. The choice of such promising professions most fully provides opportunities for the realization of the business qualities of each individual," emphasized Ya. Mintzer.

A significant contribution to the development of the theory of human capital was made by the work of foreign researchers of this period. Among them: L. Turow, who showed the intellectual basis of the human capital and the fundamental role of the integration of the skilled workforce of the organization, which determine the "future of capitalism"; E. Fromm, who revealed the humanistic content of efficiency based on the psychoanalytic principles of the formation and development of human capital; G. Psacharopoulos, who showed the totality of benefits and positive consequences that accompany investments in human capital; Y. Ben-Porata, who formed the concept of nurturing human capital throughout life until the moment when the marginal costs of developing human capital no longer equaled the marginal earning opportunities (the so-called Ben-Porata model); M. Bowen, who revealed the

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[39] Voronina N. D., Popov D. S. The demand for adult education and factors related to participation in it: Russia against the background of OECD countries // Economic Sociology. 2019. №2.

[40] Ivanov S.V. Evolution of the study of the economic category "Human capital" // Socio-economic phenomena and processes. 2011. №7. URL: https://cyberleninka.ru/article/n/evolyutsiya-issledovaniya-ekonomicheskoy-kategorii-chelovecheskiy-kapital.

[41] Becker, Gary S. Human Capital and the Economy // Proceedings of the American Philosophical Society, vol. 136, no. 1, 1992, pp. 85–92.

decisive role of the "family field" in the formation of a child's business qualities; J. Kendrick, who, on the analysis of American society, showed the possibilities of a costly method of analyzing human capital; B. Chiswick, who revealed the influence of a person's position in the labor market depending on the accumulated business competencies, as well as formed the concept of labor market analysis based on the theory of human capital.

Two important features of the basic developments of the theory of human capital should be emphasized: all the authors presented were more or less associated with European countries and almost always with American universities, and among the authors presented by S.V. Ivanov were mainly economists, with the exception of (E. Fromm and M. Bowen). These features could not but affect all subsequent developments of the problem.

As for Russia, the study by V.I. Peftiev and N.V. Dutov presents an important fact confirming that the concept of "human capital" was discussed long before the corresponding discoveries in the USA, Europe and Japan[42]. However, as the study of the history of the formation of scientific data on human capital in Russia shows, these ideas have not found their proper development. Subsequently, a number of Russian scientists, among whom it should be noted O.I. Ivanov, R. Kapelyushnikov, L. Tulchinsky, I. Ilyinsky, M. Kritsky, V. Martsinkevich, S. Strumilina, et al., whose works have made a significant contribution to the adaptation of many ideas of foreign authors about the role of business components in the formation of human capital and the development of human resources of Russians. Their followers today represent not only economics, but also sociology, management, psychology and other branches of knowledge.

The fourth stage of the evolution of human capital dates back to the 1980s and lasts until the 2000s. and it is associated with the changed structure of the intangible factors of the economy and the increasing role of information, access to information, the ability to work with information, the skills of maximum use of computers. The new demands of the time are directly linked in the ideas about the new quality of human capital – the emergence of information capital[43]. According to Volkov Yu.G. information capital includes information products in the form of information stored on tangible media, as well as in information knowledge and in information skills and abilities, means of storing, replicating and distributing information developed on the basis of the above competencies in the search for new necessary information needed for self-development, self-education and self-improvement and meeting other information needs a person. The implementation of the above conditions transforms information

[42] Peftiev V. I., Dutov N. V. Entrepreneurship in pre-revolutionary Russia: the experience of A.V. Chichkin // Yaroslavl Pedagogical Bulletin. 2011. No. 2. p. 305.

[43] Karapetyan R. V., Sizova I. L., Bakaev M. A. Current and expected parameters of digital competence growth in the employed population // Bulletin of the Institute of Sociology. 2020. Volume 11. No. 1. C. 111-134.

into information knowledge, which is a necessary and sufficient condition for the formation of information capital[44].

The fifth stage of the evolution of human capital, since 2000, is characterized by the recognition that the basis of human capital is not cognitive and emotional skills formed already in the first years of a person's life. Conclusions are formulated about the basic role of the family, the preschool period of a person's life, school and university education - all that forms the system not so much of knowledge about the case, but of values, orientations and attitudes of a person to the most diverse aspects of life, all that was predicted by T. Schultz, who spoke about the important role of childhood for the cultivation of human kaptala.

Also, this stage includes the researchers' ideas that human capital consists of a person's personal qualities. For example, A.E. Sultanov believes that "human capital includes a wide range of personal qualities, ideological attitudes, value orientations that can indirectly affect the results of production activities.[45]" A number of other researchers believe that the greatest research potential has a comprehensive methodology for the study of human capital, which could include a component of human capital- values[46]. Naumova N.V. believes that "human capital is a system of values that directly affects the formation of a person's standard of living, knowledge and health."

Thus, it can be concluded that for more than half a century since the beginning of theoretical studies of human capital, ideas about its essence and characteristics have constantly evolved. Modern researchers reveal the nature and features of this evolution in different ways. However, the invariable scientific truth for such studies remains the position about the relationship and dependence of human capital on factors of different order. At the same time, three groups of factors play a special role in the study of the evolution of human capital, which can be classified as personal, organizational, industrial and social. As for personal characteristics as a factor of human capital development in phylogeny[47], in the work of S. V. Ivanova "Evolution of the study of the economic category "Human capital" concludes that "in the course of socio-historical development, first of all, the person himself changes, many of whose characteristics (knowledge, abilities, skills and experience – as the foundations of human capital), not being a commodity, money or capital as such, acquire a variety of historically transient forms begin

[44] Volkov Yu. G., Kurbatov V. I., Popov A.V. "Homo informaticus" - a subject of self-government and self-organization of online online communities // Humanities, socio-economic and social sciences. 2019. №2. URL: https://cyberleninka.ru/article/n/homo-informaticus-subekt-samoupravleniya-i-samoorganizatsii-setevyh-on-layn-soobschest.

[45] Sultanov A.E. Methods of measuring and evaluating human capital. International Scientific Journal «Global Science and Innovations 2021: Central Asia» Nur-Sultan, Kazakhstan, June 2021. P. 84-87.

[46] Deryugin P.P., Kremnev E.V., Kamyshina E.A., Yarmak O.V. Strategies for diagnosing human capital based on value analysis: presentation of empirical results. IV Golikov Readings: Oriental Studies and Regional Studies of the Asia-Pacific region in the context of transdisciplinary Knowledge: proceedings of the International Scientific Conference. Irkutsk, December 7-9, 2020 / IGU – Irkutsk: IGU Publishing House, 2020. – 487 p.

[47] Shavel S. A. Personal qualities and Human capital // Population. 2012. No.3 (57). p. 40.

to successfully "try on these clothes, these new social forms for them.[48]" Recently, even his genetic nature, physical and mental qualities, his strength, beauty and dexterity have been singled out in a special form of physical capital[49]. As you can see, in the modern interpretation, the genetic nature of a person, his strength and even beauty can be considered as capital. There is no doubt that such generalizations differ from the understanding of human capital that was characteristic of earlier studies.

But not only personal characteristics affect human capital. Mainly in the studies of economists, it is emphasized that human capital is undoubtedly dependent on the economic structure of society and the forms of organization of human productive activity (N. N. Koshel)[50]. Investments play a crucial role in the formation of human capital, as emphasized in the studies of economists. Investments in human capital are of strategic importance for the economy, since states and societies that reduce investments in human capital or completely refuse to invest, in a short time find themselves among the laggards in economic development and, as a result, may lose not only economic, but also political independence[51].

In a significant part of the research, the content and characteristics of human capital are considered as interrelated with the characteristics of social development and are "the result of the historical movement of human society to its modern state"[52], that is, human capital can be considered the result of the entire social and economic development of human civilization[53]. The modern understanding of human capital includes such "purely social" characteristics as: health, motivation, culture, abilities.

As it is easy to see, the differences in ideas about the nature of human capital are quite significant, since in this case a phenomenon is being investigated, which on the one hand is the result of the interaction of a number of factors, and on the other hand, the researcher is dealing with a continuously developing phenomenon. It is probably no coincidence, therefore, that the scientific definition of human capital is constantly being enriched and transformed, and its "final" definition consists in recognizing the permanent nature of human capital corresponding to certain stages of socio-economic development of society. Due to the complexity of the object under study, according to MGIMO Professor S.A. Kravchenko the most adequate approach to the research of human capital can be an integrative approach and "integral methodological tools necessary for an innovative view of the content of human capital and

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[48] Ivanov S. V. Evolution of the study of the economic category "Human capital" // Socio-economic phenomena and processes. 2011. No. 7. p. 57.
[49] Ivanov S. V. Evolution of the study of the economic category "Human capital" // Socio-economic phenomena and processes. 2011. No. 7. p. 57.
[50] Koshel N.N. The learning region as a condition for effective management of human resources // Education for sustainable development: on the way to a knowledge society. Mn., 2005. pp. 24-32.
[51] Zhukovskaya I.F. Human capital - the main factor in the development of the modern economy // Economics of education. 2015. No. 1. pp. 64-69.
[52] Cretsky M. M. Human capital. – Leningrad: Leningr Publishing House. unta, 1991, – 117 P.
[53] Fedorov N. Yu. To the sociological interpretation of the concept of "Human capital" // MNIZH. 2014. No. 10-3 (29). pp. 81- 82.

the formation of the contours of the concept of network human capital."[54],[55] The creation of such tools is the task of the future. More details about this concept will be discussed a little later.

For the reasons shown and a number of other reasons, the typologization of definitions of human capital is very multifaceted[56]. In particular, this can be seen by the fact that in Internet search engines, the definition of human capital and its characteristics can be found in millions of articles and publications. Such statistics show a high interest in the problem and at the same time reveals that the problem of human capital remains invariably important for researchers of various scientific fields and emphasizes the ambiguity of the perception of this concept. At the same time, the most stable scientific position of research is the view of human capital "as the sum of innate and acquired abilities, depending on the level of education received, accumulated professional experience, developed creative potential, moral, psychological and physical health, as well as motives for activities that provide the opportunity to generate income.[57]" This fact reflects the change in the direction of research from objective factors of the formation of human capital to the personal-subjective side of this phenomenon. So, for example, O.V. Shulaev, investigating the evolution of the concept of human capital, concludes that if at the initial stage of the development of the concept, the specificity of human capital was determined relative to the firm, industry, profession, i.e. if it was objective in nature and measured by objective indicators of work activity (investments, work experience in the company, industry and professional training), then "in the studies carried out in the last decade, an approach is being formed aimed at studying the transferability of specific types of skills, not limited to professional frameworks, laying the foundations of a dynamic approach to the study of the transferability of skills and content performed works"[58]. This position is typical, among other things, for the research of the peculiarities of human capital in Russian science. For example, p. Kapelyushnikov in a special study shows that the evolution of human capital in modern Russia can be considered as dependent on the socio-psychological characteristics of the individual - knowledge, skills and abilities[59].

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[54] Kravchenko S. A. Formation of network human capital: methodological contours of the concept // MGIMO Bulletin. 2010. No. 6. p. 15.

[55] P. P. Deryugin, R. E. Popov, E. A. Kamyshina, O. S. Bannova. The conversion of the human capital of the head into the socio-structural relations of the corporation (empirical verification) / // Scientific results of sociology 2021: A collection of articles based on the materials of the I International Scientific Online Forum, Belgorod, February 16-18, 2022. – Belgorod: Epicenter Limited Liability Company, 2022. – pp. 61-70.

[56] Mineeva N. N., Neganova V. P. Characteristics of types of human capital // Journal of new economy. 2009. No.4 (26). pp. 29-36.

[57] Tobien M. A. Problems of modern interpretation and measurement of the category "human capital" / M. A. Tobien // Bulletin of Vladimir State University named after Alexander Grigoryevich and Nikolai Grigoryevich Stoletov. Series: Economic Sciences. - 2014. – No. 2. – pp. 106-118.

[58] Shulaeva O. V. Specificity of human capital: evolution of the concept and its significance // Statistics and Economics. 2014. No. 5. p. 119.

[59] Kapelyushnikov R. Human capital of Russia: evolution and structural features // Bulletin of Public Opinion. Data. Analysis. Discussions. 2005. No. 4. pp. 46-55.

It is obvious that the transfer of indicators of the study of human capital from measurements of work experience, professional training, investments, terms of study and many other objective indicators to indicators of a subjective order indicates the general orientation and nature of the evolution of ideas about human capital as a socio-personal characteristic that characterize its condition. At the same time, there are many unresolved issues that will have to be considered by domestic sociological science. In particular, the definition of human capital as "available stock" and "potentials" or, conversely, "income stream", "profits"[60]. In the latter case, human capital requires consideration of the acting personality in the totality of social ties and dependencies, i.e. as a result (ensemble) of the mutual influences of all social relations.[61]

In general, a historical digression into the study of understanding the nature of human capital shows that the idea of the essence of the concept of human capital does not remain unchanged and its main content in different historical times was different. Initially, human capital was understood as sacred elite knowledge, which allowed achieving greater economic effect. Further, human capital is associated with mass forms of professional training of a person capable of creating profits, primarily knowledge, skills and abilities. Therefore, in the future, a natural step is to understand human capital as a result of investing in the development of personnel competencies. At the turn of the century, human capital is defined as capital dependent on a person's ability to perceive and process information flows. Finally, in modern conditions, human capital is associated not only with professional knowledge, skills and abilities, with information, but also with non-cognitive knowledge and emotional experience of a person, with her values, which significantly affect the effectiveness of participation in production. Accordingly, the description of strategies for the diagnosis of human capital presupposes the selection as objects of direct analysis of knowledge, investments and results of activity, abilities to work with information and values, as elements of the structure, the appeal to which will allow the analysis of human capital.

Thus, it can be concluded that during the transition from one stage of development of society to another, there is a transformation of a person's personality, as well as a change in the formation of society. In the period of pre-industrial society, when manual labor was mainly used and agriculture prevailed in the economy, human capital was identified with knowledge. During the period of industrial society, when the main sphere of production was industry, human capital was transformed into identification with skills, education and investments. When a post-industrial society has come, where information becomes the main factor of production, and the leading technology is mental labor (and not manual labor, as in pre-industrial, and machine technology, as in industrial), human capital also experiences changes in its

[60] Ivanov S. V. Evolution of the study of the economic category "Human capital" // Socio-economic phenomena and processes. 2011. №7.
[61] Marx K., Engels F. Works. M., 1955-1981. Vol. 3. P. 3.

structure. At the post-industrial stage, the most important components of human capital are information, personal qualities of a person, his values

Accordingly, due to the evolution of the theoretical and methodological foundations of human capital research, scientific ideas about human capital are increasingly moving away from its traditional economic approach. According to N.Y. Fedorov, among sociologists, V.V. Radaev and Yu.G. Bychenko have been specially engaged in theoretical research of the category of human capital for a long time. Radaev, following economists, defines human capital as "a set of accumulated professional knowledge, skills and abilities acquired in the process of education and advanced training, which can subsequently generate income – in the form of wages, interest or profit." Bychenko adheres to a socio-cultural and interdisciplinary approach, including biological and cultural capital in the structure of human capital, i.e., respectively, "the value level of physical abilities to perform labor operations, the level of public health" and "the totality of intellectual abilities, education, skills, moral qualities, qualification training of individuals who are used or can be they are used in labor activity and legitimize the possession of status and power." These authors, therefore, as well as others, consider man and his capital as an element of the labor and production, social and political process, but not as an end in itself of the development of man himself[62]. In any case, the content of human capital, according to the results of research by sociologists, acquires a socially conditioned and personality-oriented character. This is due to the development of society, the transition of society from industrial to post-industrial.

It is necessary to emphasize the activity of research on the levels of human capital as one of its important characteristics. The levels of human capital are most often considered from the standpoint of S. Fischer's concept, where "individual, organizational (organization and firm), regional and national levels" are distinguished[63].

In addition, some researchers distinguish the following types of human capital: "positive (aka innovative or creative), neutral and negative." Malkov S.Yu. defines negative human capital as that "which is used by the owner to obtain benefits through illegal, immoral or dangerous actions for society.[64]" Yu. A. Korchagin defines negative human capital as "not providing any useful return on investment in the processes of development, growth, in the quality of life of the population.[65]" He also notes that the share of negative human capital in the economy depends on the culture, mentality of the population, as well as on the effectiveness of government agencies and the strategy of the elites[66]. At the

[62] Fedorov N. Yu. To the sociological interpretation of the concept of "Human capital" // MNIZH. 2014. №10-3 (29). 81- 82.
[63] Oshchepkova D. S. On the issue of human capital assessment // Vestn. Volume. State University. Economy. 2016. №2 (34). URL: https://cyberleninka.ru/article/n/k-voprosu-ob-otsenke-chelovecheskogo-kapitala-1.
[64] Malkov S.Yu. Russia in the context of world dynamics: modeling and forecast. Moscow: Moscow edition of the publishing house "Teacher", 2016. – 208 p.
[65] Malkov S.Yu. Russia in the context of world dynamics: modeling and forecast. Moscow: Moscow edition of the publishing house "Teacher", 2016. – 208 p.
[66] Malkov S.Yu. Russia in the context of world dynamics: modeling and forecast. Moscow: Moscow edition of the publishing house "Teacher", 2016. – 208 p.

level of personality, negative human capital consists of skills and abilities with which a person commits illegal actions for the purpose of profit. The problem of accumulation of negative capital is acute in many countries of the world, including Russia.

S. Fischer defines individual human capital as the ability to generate income embodied in a person.

As for the construction of diagnostic methods for the sociodynamics of individual human capital, the measurement of students' human capital will be expressed in obtaining data on the system of knowledge, qualities and competencies of an individual in conjunction with the value structures of the individual. At the same time, the "reference" sample of competencies and value orientations of students is formed based on the social and economic criteria of university activities as an idea of the ideal type. Such a "reference" system of qualities and competencies of students is formed based on an understanding of the requirements for the professional training of graduates in the interests of generating income in the region. Naturally, the organizational level of human capital within universities is the most important subsystem and aims at the formation of appropriate value orientations, attitudes, knowledge, competencies and motivations of students.

Returning to T. Schultz's fundamental reflections on human capital, it is important to note that from the point of view of the classic, "all human resources and abilities are either innate or acquired," that is, not purely economic, but necessarily personal and social[67]. And therefore it is quite fair to recognize that human capital is directly related to the individual not only as a carrier of knowledge, but also with many of his other characteristics, including social values and personal attitudes that form the social codes of society. This statement, in our opinion, is considered a cornerstone position in promising methods of measuring human capital.

Summing up the above, it should be noted that, firstly, the evolution of scientific ideas about the content and characteristics of human capital is associated with the dynamics of social and economic development of society, its social structure and social institutions, with the emergence of new forms of society. Starting from the traditional society, and further in the conditions of industrial and post-industrial society, the concepts and theoretical and methodological foundations of the study of human capital are transformed, expanded and increasingly go beyond purely economic approaches to understanding its essence, content and characteristics. The main trend of scientific explanation of this phenomenon in sociology is increasingly acquiring a socially conditioned character, involving consideration of human capital in combination with a variety of characteristics of the social and socio-psychological order. Secondly, the periodization of scientific ideas about human capital is associated with the changing social structure of society and is built up in a series of successive periods, at each of which this phenomenon

[67] Schulz T. Investment in Human Capital // American Economic Revien, March – № 1. Vol. 51, No. 1 (Mar., 1961), 1-17 pp.

is interpreted more and more extensively, acquiring a number of social characteristics. At the present stage, the most adequate representation of human capital reflects the integrative paradigm, in which the understanding of human capital integrates a variety of diverse characteristics, conditions and factors that determine the multifaceted manifestations of human capital in various fields of human activity, corresponding to the characteristics of post-industrial (information) society.

Further research involves the search for phenomena that are most closely related to human capital and are able to reflect cause-and-effect relationships, conditions and factors affecting the content characteristics of this phenomenon.

1.2. Strategies of students' human capital research: sociological analysis and conceptual positions of the integrative approach

The first attempts at empirical measurement of human capital were made by the British. So, back in the XVII century, the English statistician and economist W. Petty showed the dependence of economic growth on the "multiplication of humanity." Subsequently, empirical methods of measuring human capital were proposed by T. Schultz, G. Becker and J. Mintzer[68]. Currently, researchers are talking about multiple approaches in the assessment of human capital as the most common options for its measurement[69]. At the same time, first of all, attention should be paid to the significant difficulties and contradictions characteristic of the interpretation of the bases of classification of sociological research of human capital in conjunction with methodological approaches and measurement methods.

A literary review of approaches to the diagnosis of human capital allows us to conclude that by now there are many grounds for classifying research strategies and diagnostics of human capital. Assessing the trends in the development of foundations for the classification of the study of human capital, economist O.A. Shlyakova makes a reasonable conclusion that "researchers of human capital concentrate their efforts mainly on the integration of previously created theoretical models and experimental data obtained.[70]" At the same time, when constructing methods of sociological research of human capital, new perspectives are obvious, which take into account the peculiarities of understanding

[68] Verenikin A.O. Human capital: conceptual foundations and features of manifestation//USA. Canada: economy, politics, culture. 2005.No. 3., p. 85 101.
[69] Folloni, G. and Vittadini, G. Human capital measurement: a survey. Journal of Economic Surveys, 2010, vol. 24. p 248-279.
[70] Shlyakova O. A. The relevance of the theory of human capital in modern Russia // Izv. Sarat. un-ta Nov. ser. Ser. Economy. Management. Right. 2010. No. 2. p. 44

human capital in a digital society and in the formed new social environment. The most well–established approaches to the analysis of this definition are as follows:

- activity: understood as the ability to produce items and services[71];

– profitable: defined as the stock of knowledge, skills, and motivations available to an employee that allows them to produce higher-quality economic goods and receive a higher income (T. Schultz, T.N. Gaidai),[72],[73]. The income approach is based on accounting for the income that a particular employee can bring. It was proposed by American economists L. Dublin and A. Lotka, whose method is suitable for assessing the economic value of a person in relation to his family[74].

The income principle assumes an assessment of the income received by employees, which reflect the return on the funds invested in the "production of the employee". The application of the income approach to the assessment of human capital involves, first of all, the capitalization of income received from the use of this type of capital. It is in this case that the accumulation of human capital by the current generation and the potential for its use in economic activity during the functioning of the employee is reflected[75]. The disadvantages of this approach are the difficulty of assessing the diversity of the employee's contribution – the quality of human capital only by quantitative measurements. Also, when consumers have no choice, they are forced to make their choice regardless of the quality of services, but due to the modest supply on the market, which will artificially inflate the level of human capital[76]. Moreover, one of the paradoxes of measuring human capital by the method of capitalizing earnings is that according to the income principle, the human capital of an unemployed or well-off housewife will be close to zero, and the human capital of business owners or senior managers will be repeatedly overestimated, which can also be attributed to the inaccuracy of measurement;

– investment: presented as a stock of health, knowledge, skills, abilities, and motivations formed as a result of investments and accumulated by a person, which are used in social reproduction, contribute to the growth of labor productivity and thereby affect the growth of income of this person (A.I. Dobrynin, S.A. Dyatlov, E.D. Tsyrenova)[77],[78];

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[71] Turow L. The Future of Capitalism. How Today's Economic Forces shape tomorrow's World. – Novosibirsk: Siberian Chronograph, 1999. – C. 432

[72] Schulz T. Investment in Human Capital // American Economic Revien, March – № 1. Vol. 51, No. 1 (Mar., 1961), 1 17 pp.

[73] Gaidai T.N. Cost recovery of human capital and its compliance with the system of universal values // Bulletin of MFUA. 2014. No. 4. URL: https://cyberleninka.ru/article/n/vozmeschenie zatrat chelovecheskogo kapitala i ego sootvetstvie sisteme obschechelovecheskih tsennostey.

[74] Kapelyushnikov, R. I. How much is the human capital of Russia? preprint WP3/2012/06 [Text] / R. I. Kapelyushnikov; Nats. research. unt "Higher School of Economics". – M.: Publishing House of the Higher School of Economics, 2012. – p. 76.

[75] Vasilyeva E.N. Analysis of methodological approaches to measuring human capital. Federalism. 2010. 1 (57). pp. 89-96.

[76] Bogatova A.V. Methodological approaches to the assessment of human capital. Bulletin of ASAU No. 3 (101). 2013. pp. 135-140.

[77] Dobrynin A.I., Dyatlov S.A., Tsyrenova E.D. Human capital in a transitive economy: formation, evaluation, efficiency of use. – St. Petersburg: Nauka, 1999. – 309 P.

[78] Hagstrom R. J. Investing: The Last free art. M.: Olympus Business, 2005, - 288 P

– historical: it is considered as a form of life activity assimilating previous forms and being the result of the historical movement of human society to its modern state (M.M. Kritskiy)[79];

- indicator approach, based on natural indicators of human capital. To measure it, objective data is used – a system of indicators. The indicator approach has been actively used since the mid-19th century by Economists W. Petty and W. Farr. The approach was one of the first to be used in practice to assess human capital in the middle of the last century[80];

In modern conditions, speaking about the indicator approach, the human capital index is often assumed, which is understood as a combined indicator that determines the level of human capital development in different countries. The organizer of this kind of research is the World Bank Group (World bank group). It is assumed that this Index can be used by countries to identify problems in socio-economic development. According to the methodology of the human capital index, it consists of the health of the population, knowledge and skills that people accumulate during their lifetime. The development of the human capital index in the state involves investing in people through quality healthcare, education, skills, jobs and physical health of citizens. The leader as of the 2020 study on the human capital index is Singapore, Russia ranks 42nd[81].

However, the indicator approach has a number of limitations and assumptions. Thus, the universality of the methodology for measuring education or health indicators is not always acceptable. For example, the cost of one year of study may vary significantly in different periods, but education will be evaluated by financial costs. Also, the quality of education may differ significantly depending on the educational institution. The indicator approach equalizes people and uses only averaged estimates, which also raises a number of questions and problems;

- cost calculation (cost approach) is based on cost accounting. "The author of this approach is the economist E. Engel, who first applied it to the assessment of human capital. "Engel estimated the costs of parents for the birth and upbringing of children before the age of majority.[82]" Further, the approach of calculating the costs of human capital formation became widespread among American economists in the second half of the 20th century. So, t. Using the example of the US economy, Schultz proved that the income from investments in human capital is greater than from investments in physical capital. This leads to the conclusion that it is especially important for countries with a low level of realization of human capabilities and low incomes to invest in health, education and science[83].

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[79] Cretsky M. M. Human capital. – Leningrad: Leningr Publishing House. unta, 1991 – 117 P.
[80] Kapelyushnikov, R. I. How much is the human capital of Russia? Nats. research. un-t "Higher School of Economics". – M.: Publishing House of the Higher School of Economics, 2012. – 76 p.
[81] URL: https://www.worldbank.org/en/publication/human capital.
[82] Morozova T.V., Kozyreva G.B., Belaya R.V. Principles of measuring human capital: modern approaches and methods // Discussion. No.8 (82), 2017. pp. 26-33
[83] Morozova T.V., Kozyreva G.B., Belaya R.V. Principles of measuring human capital: modern approaches and methods // Discussion. No.8 (82), 2017. pp. 26-33

T.V. Morozova notes that "the cost calculation approach to the assessment of human capital, taking into account the income received from it, is based on a quantitative measurement of capital, taking into account the income that can be expected from it in the future." Some scientists estimate human capital as the expected future lifetime income of all people[84].

Nevertheless, the calculation of costs has a key drawback: the value of a person as a physical being is measured, but his knowledge and skills are not evaluated, that is, his social, accumulated capital is ignored, accounting for the time spent on education is ignored, the difference in costs as a person grows up.

When implementing an integrated approach, objective and subjective indicators of human capital are analyzed simultaneously. Sometimes the complexity of the approach is expressed in the combination of only subjective and individual indicators. This approach has many advantages, but it is attributed to labor-intensive technologies and is considered for the future. A number of publications emphasize that such research today can be carried out only at the level of qualitative methods based on expert assessments[85].

The analysis done earlier shows that there is a certain contradiction between the modern understanding of the essence of human capital and the methods by which it is measured. It is expressed in the fact that by the present historical period, the core of human capital - knowledge, skills and abilities - are associated with deep personal characteristics, which, first of all, include values, interests, motivation and even non-cognitive and emotional elements. Along with this, in specific methodological procedures, the latter are taken into account only indirectly or not at all. It follows from this that the modern measurement of human capital, in addition to "input" (investment) and "output" (results of activity), necessarily involves an appeal to a set of objective factors and subjective characteristics, in the integration of which human capital is formed, as it is assumed in the theoretical developments of the problem.

In the evolution presented earlier about the changing essence (core) of the understanding of human capital in sociology, its dependence on the nature of changes in the socio-economic conditions of society's development is obvious. In the conditions of a post-industrial society, the understanding of human capital has a number of fundamental features:

Firstly, today the understanding of human capital cannot be reduced only to knowledge, skills and abilities. The current state of the economy confirms that knowledge itself no longer "works", especially if it is knowledge that, in conditions of mass education, is often acquired only formally. G.

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[84] Gu W. Estimates of human capital in Canada: The lifetime income approach. Ottawa: Statistics Canada. 2010.46 p.
[85] Arabyan K.K. Accounting and analysis of intellectual potential in the formation of enterprise value. Abstract of the dissertation. 2007.

Becker also warned that it is insulting to treat a person as a rational machine and this is not included in the plans of human capital research[86].

For modern Russia, this conclusion is relevant in a special way. Analyzing the changes in the understanding of human capital, it becomes obvious that "the traditional interpretation of human capital only as a set of knowledge and skills not only does not correspond to the current situation in the economy, but can also be extremely harmful to society if it is adopted as the basis of state policy on its formation and expansion.[87]" In essence, this conclusion is adequate to the ideas of the understanding sociology of M. Weber, who showed in his work "Protestant Ethics and the Spirit of Capitalism" that the most important differences between traditional and emerging new capitalism are not in the economy itself, but in human resources, more precisely – in the attitude of a person to work – in human capital. M. Weber, as well as P.A. Sorokin, following G. Hegel, considered the value-spiritual component of personality as the real engine of history[88]. It follows from this that when constructing strategies for sociological diagnostics, it is advisable to consider modern human capital as an intensive social factor in the development of society, inextricably linked not only with the person himself as a carrier of knowledge, but also with his intellect, entrepreneurial initiative, mentality, competence system[89], as well as motivation and value-semantic structures of personality[90].

Secondly, in modern conditions, the basis of human capital can be formed on the basis of any other elements of the personal structure, i.e. such characteristics of a person that are able to influence the creation of assets – profit, income, rent, etc., turning into a factor of production, as well as to ensure capitalization, and in a broad sense – to produce and reproduce that- either. At the same time, "any elements" should be considered as the result of any social knowledge and experience of the individual, knowledge gained from early childhood, family and preschool life, schooling and university[91].

Thirdly, as has been noted more than once, ideas about human capital were formed among economists, which leaves its imprint on the methodological foundations and methodological approaches to its diagnosis and analysis. In fact, most strategies for the study of human capital were initially built according to a behavioral scheme: input – output. As we have seen, the first methodological direction in the study of human capital was the desire to evaluate investments in human capital. Initially, such investments were estimated only by the cost of education. Later, they began to be estimated as costs for

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[86] Becker G. Human behavior: an Economic approach. Selected works on economic theory: Trans. from English./Soch. scientific. ed. afterword by R.I. Kapelyushnikov, preface by M.I. Levin. M.: Higher School of Economics, 2003. – 672 P.
[87] Anikin V.A. Human capital: the formation of the concept and the main interpretations // Economic sociology. 2017. No.4, pp. 120-156 URL: https://cyberleninka.ru/article/n/chelovecheskiy-kapital-stanovlenie-kontseptsii-i-osnovnye-traktovki.
[88] Zaretsky A.D. Human values in modern economic relations // Fundamentals of EUP. 2012. No. 1 (1). pp. 139-144. URL: https://cyberleninka.ru/article/n/chelovecheskie values in modern economic relations.
[89] R. E. Popov, P. P. Deryugin. Sociological research of human capital: value measurements // Sociology of religion in Late Modern society. – 2022. – Vol. 11. – pp. 101-106.
[90] Schumpeter J. Capitalism, Socialism and Democracy. Moscow: Ekonomika, 1995. p. 540
[91] Skudnova T. D., Lichman I. D. Axiological component of social activity as a factor of positive transformation of society // Bulletin of the Taganrog Institute named after A.P. Chekhov. 2019. No. 1. p. 304

all areas of personnel work and work with personnel. At the same time, the costs were not simple humanitarian aid, their investment ultimately assumed future monetary income or was measured by the productivity of individuals. Or, as T. Schultz said, profitable expectations are always assumed from investments in education[92]. But in any case, intrapersonal structures, values and interests of the individual, conversion or attempts to "understand" them for a long time were practically not taken into account. The same approaches were continued in the strategies of empirical research of human capital. Summarizing the above, it should be noted that modern ideas about human capital presuppose the development and systematization of its main characteristics as an object of research and diagnostics in the direction of the development of ideas about the information potential and non-cognitive characteristics of the individual, in reference to the values of the individual.

Fourthly, there are difficulties in comparative analysis of the human capital of people, organizations, social groups and communities whose social characteristics differ in their indicators (for example, doctors and teachers, engineers and managers, etc.).

As can be seen, in each of the presented approaches to research and diagnostics of human capital, whether it is an indicator approach, a revenue approach or a cost calculation approach, human capital is considered as an element of the social structure to which the researcher refers. In this case, the strategy depends on what level of human capital the researcher wants to diagnose. Here we can consider an individual, social groups and organizations, regions, the state or society as a whole.

And yet the main contradictions of reflecting the basic properties of human capital, relevant for its understanding as a sociological category, are as follows. Like any other entity, human capital cannot be investigated based solely on its own internal characteristics, studied, according to I. Kant, only as a "thing in itself". Being a multifaceted and multifaceted education, human capital in sociology can be studied only in relation to other phenomena with which it is constantly interdependent. Therefore, its essential characteristics are cognizable only through the mediation of the essential content, through the analysis of intermediate links[93].

The approaches considered reflect the understanding of human capital characteristic of industrial and early stages of post-industrial society, when the "reserve" or "potential" itself could already be realized capital. For example, the use of mechanisms in relation to manual labor. In any case, as can be seen, in the presented approaches, human capital is evaluated and analyzed according to the parameters external to a person of "input" – investment, and "output" – the ability to produce or forms of life activity. On the contrary, "For the third millennium, it is natural for humanity to turn to new spiritual dimensions of life. The information type of economy, which is based on the use of human intellectual abilities, has been replaced by an intuitively creative economy that uses a person's unique abilities to manage their

[92] Schultz T. The value of children // Thesis. 1994. No. 6. pp.43-69.
[93] K. Marx, in the book: Marx K. and Engels F., Op., 2nd ed., vol. 23, p. 316.

emotions," O.N. notes. Kolpakova[94], and then the author shows the connection of cognitive and emotional processes that make up a person's ability to master knowledge: "By controlling their pleasant emotions, a person increases hundreds of times the speed of thinking, the speed of assimilation of new material, the speed of decision-making." This type of knowledge assumes, as a necessary condition, the realization of creativity, which includes, among other things, positive emotions and is characterized by a number of important features:

- the emergence of a new class of people — people who know how to manage their positive emotions;

- the combination of intellectual and emotional abilities of people who appear as creative thinking, creativity, intuition;

- changes in the nature of work. "In the new society, work is an interaction between people.

Nature and artificially created objects are excluded from the labor process, and only people who learn to interact with each other remain. "This is a completely new situation in the history of human society, which has no analogues," the author summarizes[95]. In the current situation, it is assumed that it is possible to justify a special type of human capital – emotional capital. If we turn to the history of the issue, G. Becker and G. Schultz also spoke about the important role of emotions in the formation of human capital. But, as history has shown, these ideas of theirs have been realized only recently.

Such a statement of the question is all the more relevant in the modern world, in a post–industrial society, where the formation of a reflexive socio-natural reality - modern society and the knowledge about it itself, acquire a non-linear character. The nonlinear development of society and knowledge about it become an objective factor in the characterization of modern knowledge as the foundation of human capital. According to authoritative Russian researchers S. A. Kravchenko and A. I. Podberezkina, the nonlinear world presupposes the formation, respectively, of nonlinear knowledge, "based on the transition from the traditional identification of rigid correlations between facts and phenomena to theoretical and methodological tools that can take into account the numerous uncertainties that have come into our lives, which manifest themselves in the form of social gaps, cultural traumas, unintentional consequences of human innovation[96]".

In fact, in such conditions, there is a continuous transition from unconditional trust to the received knowledge, reflexive – conditional trust, i.e. to trust with a low level, when "in addition to scientific, social rationality is taken into account; critical verification of any theory is assumed; the criterion of its

[94] Kolpakova O. N. Management of human and emotional capital // Innovations. 2010. No. 3. p. 108.
[95] Kolpakova O. N. Management of human and emotional capital // Innovations. 2010. No. 3. p. 108.
[96] Kravchenko S. A., Podberezkin A. I. Trust in scientific knowledge in the conditions of new threats to the national security of the Russian Federation // Vestnik MGIMO. 2018. No.2 (59). p. 43-44.

humanistic component is introduced into the validity of knowledge.[97]" Thus, knowledge, in which "in addition to scientific" now takes into account "social rationality", as the basis of all human capital, turns out to be constantly changing and therefore its rather shaky foundation.

The role of reflexive trust is increasing, which is "constant monitoring by actors of changes occurring in socio-natural realities, respectively, in knowledge about them, critical acceptance of rediscovery through the prism of both scientific and social rationality. It includes awareness of the need for a humanistic component in scientific knowledge.[98]" Comprehension of knowledge in the modern world, assessment and reflexive trust-distrust of knowledge increase the role of cognitive activity in the development of knowledge, skills and abilities in the independent acquisition of relevant knowledge. Actually, therefore, the place of the acquired knowledge in the structure of human capital today begins to occupy not so much knowledge in itself, as an assessment of its relevance, orientation and social orientation, the focus of knowledge on public interest and the interest of the person himself, which manifests itself as the ability to independently obtain this knowledge, "to extract knowledge independently".

The positions expressed develop a new understanding of man and human capital in sociology. Sociology has its own model of man, which "is a product of typifications and idealizations[99]" peculiar to sociology. The main thing for sociology is that a person as a person is inevitably included in the system of society, in all the diversity of social relations. Through "social attitude", "social fact", "social action", a person becomes part of the social system and possesses not only human capital, but a whole set of other capitals. For example, p. Bourdieu describes in the most detail the social, cultural and symbolic capitals. Over the past 50-60 years, various forms of capital have been described and given multiple characteristics in science, in particular, physiological, political, and administrative capitals have been described in quite detail. The research of emotional capital has begun, which, in the conditions of the emerging intuitively creative economy, the activity of a highly emotional person acquires an actual sound[100].

As it was shown in the previous paragraph, the understanding of human capital is constantly changing and is filled with new meanings. The most important factor of such transformations are the peculiarities of the development of society, more precisely, the peculiarities of the development of social production. It is obvious from history that in the future the understanding of human capital will be transformed and certain contours of these changes can be outlined today.

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[97] Kravchenko S. A., Podberezkin A. I. Trust in scientific knowledge in the conditions of new threats to the national security of the Russian Federation // Vestnik MGIMO. 2018. No.2 (59). p. 43-44.
[98] Kravchenko S. A., Podberezkin A. I. Trust in scientific knowledge in the conditions of new threats to the national security of the Russian Federation // Vestnik MGIMO. 2018. No.2 (59). p. 54.
[99] Filatov V. P. Human models in social sciences // Epistemology & Philosophy of Science. 2012. No. 1. p. 125.
[100] Kolpakova O. N. Management of human and emotional capital // Innovations. 2010. No. 3. p. 105. p. 67.

One of the most important conceptual platforms for discussing the future of human capital is expressed by S.A. Kravchenko in his work "Formation of network human capital: methodological outlines of the concept"[101]. On the basis of the integral methodological tools, once proposed by P. A. Sorokin, the author analyzes and describes the prospect of the formation of human capital in new social conditions, in the conditions of the networkingization of Russian society. First of all, this is a question of a problem that has been difficult to solve in Russia in recent decades – the choice of ways and means of implementing any good intentions, in which the production of humanism and its penetration into social institutions, culture and management are integrated. The author specifically emphasizes that the most important element of the social structure, where the humanization of human capital is required, is human relations. It is in the direction of their humanization, the development of morality and spirituality between people that the ideas of human capital development are connected. In a networked society, humanization acquires a global character, since the unification of peoples is inevitable, and it takes place in the realities of networked modernity. At the same time, the author clarifies, modern human capital is filled with a special global-local content, since humanization must be built not only as a global trend, but also on the basis of regional mentality and national characteristics of people. With regard to the management of this process, two important features are emphasized: the importance of combining humanization and rationalization in management and the balance between management and self-organization, the ability of managers to motivate self-determination.

In the light of the presented ideas, the angle of view on the problem of human capital from the standpoint of sociology consists in a number of fundamental provisions that allow such an analysis to be carried out. These basic provisions are relevant for the systematization of ideas about human capital as an object of sociological analysis. First of all, such a study can be reduced to two sections of analysis: intrapersonal, characterizing the direction of the formation of elements of the inner world of a person who tends to micro-sociological approaches, and external, activity characteristics that ensure success in society, more compatible with macro-sociological approaches.

The basic provisions of the systematic sociological analysis of human capital are:

- the importance of considering human capital as a socially conditioned phenomenon arising from the realities of a substantial social need of a special social unit;

- multiple relationships of the head – corporation – external environment of the corporation;

- the expediency of presenting human capital as a set of socially personal elements, primarily social attitudes – values and value orientations that guide its specific knowledge, skills, abilities, as well as abilities, hierarchized, interconnected and ensuring the achievement of the final result, its orientation to production;

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[101] Kravchenko S. A. Formation of network human capital: methodological contours of the concept // MGIMO Bulletin. 2010. No. 6. pp. 15-25.

- consideration of the human capital of an individual as a special attitude to obtaining a specific result of social interaction in the form of profit, without which building relationships loses the meaning of capitalization, loses its value.

As a sociological category, human capital within the framework of S.A. Kravchenko's conceptual position is defined as follows: "In the most general form, based on the methodology of the outstanding Russian-American sociologist P.A. Sorokina, by human capital we mean the integral unity of the quantity and quality of human resources that endow people with the ability to be rational thinkers, superconscious creators of truth in large systems of science, technology, economics, politics, law, as well as beauty, involving the creation of masterpieces of culture and art, and goodness, understood as "accumulation of unselfish love for man and humanity[102]".

In this definition, the social component of human capital is obvious, which is aimed at the realization of this resource in the external environment and is expressed in the "ability": firstly, to rationalize one's activities - to extract a positive result of activity, secondly, to create masterpieces of culture and art, and, thirdly, to manifest as love for humanity – to form human relationships. How and where does this ability come from? As a result of the study of the problem of abilities carried out by M.M. Kalashnikov, the author shows that they (abilities) are socially predetermined[103]. In particular, he refers to the position of A.N. Leontiev, who reveals that the abilities inherent in a person as a social being are not formed automatically in the morphological structure of a person, but develop and form as a result of mastering the experience of previous generations. "The process of mastering is carried out during the development of the subject's real relationship to the world. These relations do not depend on the subject, not on his consciousness, but are determined by such historical, social conditions in which he lives, and how his life develops in these conditions.[104]"

B.G. Ananyev spoke even more definitely about the social origins of abilities: "Ability is a manifestation of the creative development of the mind, and not a simple accumulation of knowledge, therefore, a manifestation of the creative application of this knowledge, the author's position of the person himself in relation to the knowledge that he learns independently and consciously. Thus, it is assumed that the ability is not a simple accumulation of knowledge ...[105]" The author emphasizes the idea that the development of abilities is associated with the development of the whole personality, its character, etc. Ananyev traces the closest connection between abilities and character ("abilities are included in character") and says that the development of abilities and character is a single, albeit

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[102] Kravchenko S. A. Formation of network human capital: methodological contours of the concept // MGIMO Bulletin. 2010. No. 6. p. 15.
[103] Kalashnikov M.M. On the question of the essence of the concept of abilities in pedagogy and psychology // Bulletin of BSU. 2014. No. 1. pp. 32-38.
[104] Leontiev A.N. Biological and social in the development of the human psyche / Questions of psychology. 1960. No. 6. pp.23-38.
[105] Ananyev B. G. On the correlation of abilities and giftedness // Problems of abilities. M., 1962.

somewhat contradictory process: "That's why real talent," writes B.G. Ananyev, "presupposes a developed and large character, a certain will, clarity of life purpose and the vitality of the plan."

Another major authority, K.K. Platonov in the concept of abilities comes from their connection with the structure of personality. He believes that the personality structure consists of four substructures. The first substructure includes orientation, attitudes and moral personality traits. In the second - knowledge, skills, skills and habits. Briefly, it can be called an experience. The third combines the individual characteristics of individual mental processes or mental functions, understood as a form of reflection of emotion, sensation, thinking, perception, feeling, will and memory. The fourth substructure includes the properties of temperament or the morphological foundations of the higher nervous activity of a person. The main thing, as K.K. Platonov emphasizes, is that the essence of the personality structure and its abilities lies not so much in the elements and substructures, as in their interrelation, where the relationships and moral traits of the personality are assigned a decisive role[106].

In our opinion, the shown characteristics of the social conditionality of abilities as a condition for the realization of human capital, that is, a manifestation of the "author's position of the person himself in relation to knowledge" (B.G. Ananyev) (this is indicated by the presented characteristics of abilities - "the real relationship of the subject to the world", "these relationships do not depend on the subject, not on his consciousness, but are determined by such historical, social conditions in which he lives", "how his life develops in these conditions", "creative application of these knowledge", "abilities are included in the character", "a developed and large character, a certain will, clarity of life purpose and vitality of the plan" and others), show the essential dependence and connection of human capital with the world of value-motivational structures of personality.

In other words, the operationalization of the concept of human capital in the interests of sociological research can be represented as a set of knowledge, skills and abilities of an individual that are in causal relationships with its values and orientations, and ensure the satisfaction of social needs. Such causal relationships are based on orientation to social values and recognition of their priority, as well as an understanding of the needs and interests of society, involving the acquisition of such knowledge, skills and abilities that allow you to identify and implement valuable, important and significant objects, both in the internal and external environment in the process of interacting with them.

Some researchers note the relevance of the formation of a sociological approach to the diagnosis of human capital through the appeal to values. This, in particular, is indicated by the research of Zgonik, Anikin[107]. The relevance of the appeal to values is emphasized precisely by the fact that such an approach

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[106] Platonov K.K. Psychological structure of personality / Personality in socialization. M., 1968. pp. 70-73.
[107] Anikin V.A. Human capital: the formation of the concept and the main interpretations // Economic sociology. 2017. No. 4., pp. 120-156.

makes it possible to systematically study human capital based on its internal components and assess their relationship with socio-economic conditions and factors affecting its characteristics.

Values play an important, if not fundamental role in the life of university students. Within the framework of universities, many social, psychological, economic, legal, managerial, technological and, importantly, human, moral and other factors are intertwined and integrated. As a result of these mutual influences, something new arises as a "uniquely social" that has no analogues or duplicates – the corporate values of the university, which then program the future activities of graduates for many years.

The interpretation of the essence of corporate values is associated with a number of relevant scientific approaches that allow operationalizing this concept, which in turn makes it possible to study values, manage them, and form them. Today, values are understood as "universals of meaning" in V. Frankl's research, which constitute the "matrix" of any culture, including the culture of universities. However, it should always be remembered that the very concept of value comes from the word "price" and has deep economic roots. Initially, the "price" expressed the material value of something and did not depend on the individual consciousness of a person. For example, gold, money, objects and means of labor and everyday life, all these are material values, the value of which does not depend on the simple desire or will of some individual.

With the formation of human society, the concept of value was transferred to the phenomena of the spiritual order. This is how moral values, political values, aesthetic values, legal values, etc. – spiritual values, including management values, appeared. The values of various social organizations, including university corporations, have a separate status.

Thus, values are divided into material and spiritual. Every university has such values, both material and spiritual. It should be noted that the university can declare its value, it will not necessarily become a real value for each of its students or employees. In this case, we can talk about a nominal or formal system of proclaimed values. Corporate values become a reality only when the employees of the corporation have their own positive attitude towards them, when people begin to share and defend the values of the corporation.

That is why some methods of empirical research of corporate values use a number of criteria, the study of which makes it possible to determine the reality of the existence of corporate values. Corporate value can be recognized as real if such value has the following characteristics: 1. A significant amount of social space covered by a positive attitude towards it (the number of personnel defining this corporate value as their own); 2. A long time period of the existence of value as a regulator of employee behavior (a basic set of stable motivations of staff behavior, which are taken for granted, by default); 3. Financial investment – the costs required to maintain this corporate value (there are no values without costs); 4. The volume of information flows that ensure the reality of the existence of corporate value (values are

discussed and defended in dispute, they are surrounded by myths and legends, they are interpreted and passed down from generation to generation).

Value is always the benchmark. That is why T. Parsons understands values as a set of criteria or standards that allow someone to evaluate some phenomena or events as important or not important, significant or not significant. In another way, it can be said that those phenomena or events that a person considers important for himself can be determined as valuable (or not), and this determination of importance is carried out on the basis of a set of criteria of reference points that manifest themselves in the situation of choosing one of a number of alternatives.

Values as the basis for choosing meaningful alternatives can manifest themselves in many ways. In any case, values should be distinguished as the values of the goal, the values of the means and the values of the results.

Most often, the idea is emphasized that values are ideals, symbols of these ideals, or something desirable (K.Klakhon), what should be pursued, what should be achieved – the final goals. Thus, M. Rokich speaks about values and goals and emphasizes that the achievement of goals becomes the value basis of the person himself, and without goals, the value world of a person or any organization becomes ossified and inadequate, which inevitably affects maladaptation in the external environment. Goals can be considered as the external side of values.

Finally, values can be characterized by the results and products of labor. The accumulated assets of corporations, profits, materials, everything that is the result of the corporation's activities, and in the case of university research, the accumulated assets act to increase the level of human capital of students.

Thus, the corporate values of the university should be understood as the material and spiritual goals, means and results of educational activities that have developed in the experience of activity, and determine (influence) the choice of significant and important (valuable) alternatives for development, behavior and communication (strategies, decisions, organizational culture, etc.), ensuring the integration of the university's internal environment and its adaptation in the external environment.

Corporate values exist objectively. In contrast to the value orientations of students' personalities, which are a subjective reflection of corporate values in their minds. Value orientations – ideal constructions of what is due and desired - are facts of human consciousness. These are beliefs, attitudes, orientations, principles and norms that have been formed in the course of a person's entire life.

Conducting methodological studies of strategies for the study of human capital allows us to say that the basic principles of the formation of methods for the diagnosis of human capital, in our opinion, involve the unification of two directions of technology formation. "On the one hand, finding connections

and correlations between various indicators of human capital. On the other hand, it is the identification of cause-and-effect relationships between indicators and factors that form human capital.[108]"

The most promising direction of the development of such methods of empirical research is supposed to be carried out on the basis of an appeal to values as a phenomenon reflecting numerous facets of human capital, including using the methods of a network campaign.

1.3. World-class scientific and educational centers as drivers of students' human capital formation

The formation of the human capital of students in a post-industrial society involves the creation of special conditions conducive to the most successful integration of knowledge and experience of professional activity[109]. In this regard, world-class scientific and educational centers have important potentials of an innovative ecosystem, where relevant social interaction is provided, contributing to the formation of human capital. Among the important advantages of such universities are: state guarantees of their activities; the use of regional advantages of the economy; the involvement of the scientific community in project developments and programs; the direct participation of students studying at universities and the involvement of their educational process in solving real problems of regional development[110].

The need to create such centers is dictated by the peculiarities of working with students at the present stage of development of Russian society. The situation that has developed in modern Russia could not but affect the values of students and, in general, the formation of the human capital of young people. The economic crisis, fierce competition in achieving certain benefits, the pandemic, contributed to the promotion of new values, new ways of adapting to reality. For the development of the human capital of society, it is of great importance to study the transformation of the values of young people and,

[108] Deryugin P.P., Yarmak O.V., Strashko E.V., Kamyshina E.A. Human capital in empirical research: the perspective of network techniques. Information – communication – Society. No. 1. 2020. pp. 49-53.
[109] Zakharova V.V. Scientific and educational center as a tool for the development of neo-industrial specialization of the regions of Russia // Creative Economy. – 2020. – Volume 14. – No. 5. – pp. 763-774.
[110] Deryugin, P. P. World-class scientific and educational centers as a factor in the formation of human capital in Russian regions / P. P. Deryugin, O. V. Yarmak, E. V. Strashko // Materials of the X International Sociological Grushin Conference "Living in Russia. To live in peace. Sociology of Everyday Life", Moscow, May 20 – 14, 2020. – Moscow: All–Russian Center for the Study of Public Opinion, 2020. - pp. 218-222.

in particular, students, because the ideas of the future of Russia that are being formed today in the near future have become one of the essential factors in choosing the ways of its development[111].

The value system of students, as one of the most susceptible groups of young people, develops under the influence of the transforming social institutions of Russian society, in the conditions of socio-economic crisis and value-normative vacuum of the state, when the previous values and norms are no clearer indicators of proper behavior and lose their significance. This point of view is especially important in relation to the conditions of today's Russian reality.

All the above facts testify to the relevance of the study of the sociodynamics of the human capital of students in modern Russia in the conditions of world-class scientific and educational centers.

Russian experience in creating scientific and educational centers

The history of the formation of scientific and educational centers has a relatively large experience. Attempts to unite such spheres of society as education and science, as well as the economy were made more than two hundred years ago. The intensity of institutionalization of these attempts increased and decreased in different periods of time.

In general, the literature review shows that during the formation and activity of the SEC, four periods can be distinguished when this work was carried out with a certain originality.

To this period belong the formations of the SEC, which began to form in the 19th century under the reign of Peter. The authors of the article "Scientific and Educational Centers" Potachev S.A. and Potemkin M.N. note that for the first time the integration of science and education in Russia goes to the unification of the Academic Gymnasium, Academy of Sciences and Academic University[112]. This association was approved by the order of Peter the Great on January 28, 1724. It is this historical event that can be considered the foundation of these SECs. Nevertheless, there was no large-scale dissemination and institutionalization after a while.

The following period, from the 1930s to the 1990s, factories were formed at higher technical educational institutions. The plants in question were formed in the 1930s at the Kharkov Electromechanical, Leningrad Boiler Turbine and Moscow Tool Plants.

More thorough attempts to form the SEC were just made in the 1930s. So, in 1938, an article was published about an innovative method of personnel training. It was proposed to attach students to new institutes and laboratories in order to strengthen their practical and theoretical skills[113].

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[111] Veretennikova N. V. The evolution of Russian education and the formation of human capital in agriculture //Vestn. Volume. State University. 2008. №309. URL: https://cyberleninka.ru/article/n/evolyutsiya--i-formirovanie-chelovecheskogo-kapitala-v-apk.

[112] Deryugin, P. P., Lebedintseva, L. A., Yarmak, O. V., Yarmak, V. E., Kamyshina, E. A., Shilyaeva, A., Kurapov, S., & Strashko, E. V. (2020). Human capital in the focus of modern sociological discourse. Mediapapir. p. 10.

[113] Potachev S. A., Potemkin M. N. Scientific and educational centers // Universum: Bulletin of the Herzen University. 2011. No. 11. p. 69.

The war suspended the process of institutionalization of the SEC. But already in 1951, a new type of university was created — MIPT, in 1952 — branches in the closed cities of Minatom, and in 1953 — MEPhI. The creation of the Novosibirsk Academic Campus (1957) — the most important scientific and educational center of Russia - was another step in the development of the SEC. In the 1950s, the government formed the VTUZ factories - higher technical educational institutions formed at large industrial enterprises. VTUZ were organized at the following plants: Leningrad Metal, Krasnoyarsk Machine-building, Rostov Plant of agricultural Engineering and others[114]. With this kind of integration of the educational and production process, the ratio of training and direct work was one to one. It was the technical colleges at the factories that had a great influence on the development of the scientific and engineering school of Russia. Despite the development, the historical events of the 1980s – 1990s suspended this process.

The next period of SEC formation in their modern form dates back to the target program "State support for the integration of higher education and fundamental science for 1997-2000"[115] approved by the government. It was then that the centers (educational and scientific complexes) responsible for the interaction of research institutes and educational institutions began to be created. The idea was to form SECs based on higher educational institutions[116]. For example, in accordance with the implementation of this program, two centers were created on the basis of Herzen University – the Educational and Scientific Center for Computer Studies of Language and Speech and the Center for New Vocabulary Technologies. The center was also created on the basis of the Biological Research Institute of St. Petersburg State University[117].

The formation of SECs was also carried out on the basis of research institutions. In particular, SECs operated on the basis of the Mathematical Institute of the Russian Academy of Sciences, SECs for Nanotechnology at Moscow State University, as well as a number of others.

Kocheshkova L.O. in the work "Experience and prospects of integration of science and education (in the format of a scientific and educational center)" also notes that in Russia the importance of combining the sphere of science and education was declared as one of the strategic objectives of the country in the early 1990s, and practically it has been supported by the government since 1996, when the Presidential Target Program was launched, noted earlier.

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[114] Lukyanenko M. V., Polezhaev O. A., Churlyaeva N. P. Prospects of university training of engineers and their development in corporate systems of continuing education; SibGAU. Krasnoyarsk, 2012. pp. 18-20.
[115] Resolution of the Government of the Russian Federation No. 1062 of September 9, 1996 "On the Federal Target Program "State Support for the Integration of Higher Education and Fundamental Science for 1997-2000".
[116] Potachev S. A., Potemkin M. N. Scientific and educational centers // Universum: Bulletin of the Herzen University. 2011. No. 11. p. 69.
[117] Potachev S. A., Potemkin M. N. Scientific and educational centers // Universum: Bulletin of the Herzen University. 2011. No. 11. p. 69.

Kocheshkova L.O. gives her own typologization of the forms of integration of science and education. She proposes to distinguish three forms: contractual associations, partial integration and full integration of science and education. Contractual associations include associations, consortia, associations of research institutes and one of the faculties of an educational institution of higher professional education. The author refers to the partial integration of educational units at the research institute, branch laboratories and institutes at universities. The full integration of science and education includes scientific and educational centers, research universities.

As a result, L.O. Kocheshkova's review demonstrates attempts since the beginning of the creation of the Russian Federation to approach the integration of science, education and the real sector of the economy. The examples given indicate the successful unification and complementarity of science and education in scientific and educational centers established on the basis of higher professional educational institutions. However, in these examples there is no clear connection with enterprises[118].

In the course of the literary review, it was revealed that the widely used term "scientific and educational center", although adequate to a more modern understanding of the meaning of the integration of science and education, is nevertheless interpreted by the scientific community in many ways intuitively. A certain "clarity" in the interpretation of the "standard" structure for SEC was introduced by the wording of the Passport of the federal target program "Scientific and scientific-pedagogical personnel of innovative Russia for 2009-2013"[119]. The program gives the following definition of SEC: "In the Program, a scientific and educational center is understood as a structural subdivision (part of a structural subdivision or a set of structural subdivisions) of a scientific, scientific and production organization or a higher educational institution conducting research in a general scientific direction, training highly qualified personnel on the basis of the regulations on the scientific and educational center approved by the head of the organization."

The last period of SEC formation is based in the modern history of Russia and dates back to 2018, when the Decree of the President of the Russian Federation began the creation of world-class scientific and educational centers that have a different essential characteristic, goals, tasks and functions.

The proposed periodization of the formation of SEC in Russia shows that with the development of society, the directions and trends in the formation of SEC have changed significantly. From the time of Peter the Great to the present, the structure of the SEC, its ideological intent, as well as goals have undergone changes depending on scientific progress and the political situation in the country. Historical changes in the formation of SECs are presented in Table 1.

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[118] Kocheshkova L.O. "Experience and prospects of integration of science and education (in the format of a scientific and educational center). Problems of theory development. No. 6 (74). 2014. from 7-22.

[119] Decree of the Government of the Russian Federation of 28.07.2008 N 568 (ed. of 29.07.2013) "On the federal target program "Scientific and scientific-pedagogical personnel of innovative Russia" for 2009 - 2013".

At the first stage, attempts were made in the Russian Empire to combine education and science, where an Academic Gymnasium and the Academy of Sciences were integrated to improve labor efficiency. For the second stage, when the VTUZ factories were formed, a characteristic feature was the bias towards the integration of the economic and industrial sphere and education, also with the aim of increasing the efficiency of labor and production. The third stage of the SEC development again makes a bias towards the unification of the scientific and educational spheres. On the basis of large universities, such as MSU, St. Petersburg State University and others, separate structural scientific units are being formed. The modern stage will be marked by the creation of world-class scientific and educational centers, the main idea of which is the integration of economics, science and education.

Table 1. Historical periods of SEC development in Russia.

Period	**Date of the period**	Subject of integration	Names of integration entities (examples)
I	Since 1724	Education and science	Academic Gymnasium, Academy of Sciences and Academic University
II	From the 1930s to the 1980s	Education and production	Creation of VTUZ plants at the Leningrad Metal, Krasnoyarsk Machine-building, Rostov Agricultural Machinery Plant
III	From 1996 to 2018	Education and science	Educational and Scientific Center for Computer Studies of Language and Speech, Center for New Vocabulary Technologies. The center is based on the Biological Research Institute of St. Petersburg State University
IV	Since 2018	Education, science, the real sector of the economy	World-class scientific and educational center "Innovative solutions in agriculture" (total 15 SEC)

World experience in the creation of scientific and educational centers.

There are a large number of models of integration of science and education, as well as production capacities in the world in order to intensify the development of industry and human capital. Examples exist in the USA, Canada, Europe, China, Japan and other leading modern states. Nevertheless, each approach is characterized by its own specifics related to the historical development of a particular society, as well as the existing political and economic regime there, the initial technological level.

Medushevsky N.A. in the article "The policy of creating scientific and educational centers in the Russian Federation and the European experience of integrating scientific and educational activities" notes that the closest example of creating scientific and educational centers relative to Russia is the European Union, which includes diverse and differently developed in scientific and technological terms territories whose joint interaction, due to the youth of the Union, has not yet settled[120].

At the same time, there are documents that plan the comprehensive scientific, educational and technological development of the European Union, despite the diversity in order to integrate and system development. Therefore, in the author's opinion, when in Russian practice we are talking about world-class SECs, we mean first of all the experience of the European Union.

It is noted that in recent years, the European approach to research infrastructures has made significant progress thanks to the implementation of the roadmap of the European Strategic Forum on Research Infrastructures (ESFRI)[121], which unites and opens national research centers and develops electronic infrastructures underlying the digital European research space. Networks of research infrastructures across Europe strengthen the human capital base, providing world-class training for a new generation of researchers and engineers and facilitating interdisciplinary collaboration.

As the Europe 2020 strategy is implemented in the next decade, research infrastructure will play an important role in stimulating innovation, solving important social problems and stimulating openness and cooperation. Thus, the representatives of the forum represent the implementation of their work strategy. It is assumed that all member States of the European Union will work together on the research infrastructure to overcome the existing limitations. Their main goal is to create an open, competitive, equal development opportunities, scientific infrastructure that provides access to advanced technologies and world-class education.

Some authors note that the SEC is not a new, but still insufficiently studied social institution. In their opinion, its emergence for the first time occurred in the United States of America, where the age of such organizations is tens of years.

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[120] Medushevsky N.A. The policy of creating scientific and educational centers in the Russian Federation and the European experience of integrating scientific and educational activities. Theories and problems of political sciences. 2019, Vol. 8. P. 3-11

[121] European Strategy Forum on Research Infrastructures (ESFRI) roadmap URL: https://ec.europa.eu/info/research-andinnovation/strategy/european-research-infrastructures/esfri_en.

In the USA they are called Research & Education Centers (REC). An example is one of the oldest REC - Highlander Research and Education Center, which was founded in the 1930s and specializes in training highly qualified personnel; Safe Transportation Research and Education Center, created on the basis of the University of Berkeley, whose main task is to solve problems of road and transport safety; National Great Rivers Research & Education Center, based on research in the field of river hydrology and ecology, as well as many other REC[122].

Currently, there are more than 400 research parks in the United States. Kocheshkova L.O. offers the following classification REC[123]:

- (Industrial research park) industrial research parks – created by land owners or regional management structures to attract large corporations that need an economically attractive territory to host their research units. These parks, as a rule, are equipped territories designed to accommodate research and industrial laboratories. Inter-firm relations and relations with universities or state laboratories are carried out by firms at their own discretion (the Pureland Industrial Complex in Logan Township, New Jersey; Cherry Hill Business Park in New Lenox, Illinois, Cabot Business Park in Mansfield, Massachusetts, etc.)[124].

- (University-related research park) university research parks–created by universities or local authorities. The primary goal of these parks is to create a source of income for the university, to establish the park as a regional source of development, and to implement a mechanism for commercialization of university technologies through subsidiaries. (MIT University Park in Cambridge, Massachusetts Stanford Research Park in Palo Alto, California)[125].

- (Disturbed research park) distributive research parks – not having a physical location REC. In this case, the city acts as a science park. Small and large universities, high-tech companies, and technical colleges, business services are geographically distributed throughout the region. ("Silicon Valley", "Triangle Park" in North Carolina; "Highway-128"[126].

REC – can be defined as an organization that has direct interaction between research centers, universities, the purpose of which is to create high-tech enterprises, the organization of innovative industries. RECs have a specific territory and a management team engaged in business development of companies[127].

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[122] Popov R.E. Institutionalization of world-class scientific and educational centers within the framework of digitalization of society: Russian and world experience. Digital society is a new format of social reality: structure, processes and development trends. Materials of the All-Russian Scientific Conference, 2020, pp. 426-428.
[123] Association of University Research Parks URL: www.aurp.net.
[124] Kocheshkova L.O. Experience and prospects of integration of science and education (in the format of a scientific and educational center). Problems of theory development. No. 6 (74). 2014. pp. 7-22.
[125] Ibid., p. 16.
[126] Ibid., p. 17.
[127] Semenova I.V., Lachininsky S.S. Scientific and technological parks in the system of regional development of the USA. Bulletin of the Chuvash University. 2010 No. 2. pp. 440-446.

One of the key features of REC's activities is to increase the efficiency of economic development of the relevant region in which the research park is located or the development of the economy in the macroeconomic sense.

The peculiarity of REC is that each of them has its own unique structure, because each of the parks independently chooses which institutions or companies to cooperate with. These can be both universities and state laboratories, non-profit enterprises, firms of various sectors of the economy.

Thus, the experience of the European Strategic Forum on Research Infrastructures (ESFRI), which has been operating since 2002, was presented. The Forum unites 28 European countries that strive to unite science and education, as well as to make the achievements of science open and accessible to all countries of Europe and the world community. In agreement with ESFRI, a road court is being created in each participating country, on the basis of which scientific and educational centers are being formed in strategic areas of science development. The experience of the USA, a country that is considered one of the founders of the idea of integrating science, education and the economy, was considered. It has been implementing the activities of research parks for the second century, which are aimed at developing the economy of the region and the country as a whole.

The scientific centers of the People's Republic of China differ in their specific features of working with students. A thorough analysis of this activity is proposed in the study of N. B. Pomozova[128]. The scientific centers of China can be classified as follows: the leading 6 institutes of academic science that continue to work since the last century and 4 centers created in the 2000s, i.e. with China's transition to an increasingly active foreign policy:

- according to the criterion of subordination, 4 are state, including the party - Chinese Research Institute of Modern International Relations[129], the academic - the Academy of Social Sciences of China and the university - Shanghai Institute of International Studies.

- according to the criterion of research topics, there are 3 research centers focused only on international issues (the Chinese Research Institute of Modern International Relations, the Center for China and Globalization[130], the Shanghai Institute of International Studies[131]), 3 research centers that study, in addition to international relations, issues of economic policy and public administration ("Yunirul", "Pangu", "Chun-yang").

- from the list of "think tanks" included in the prestigious Go Global Think Tank Review rating.

- according to the time of creation, among the 5 "think tanks" (Chinese Research Institute of Modern International Relations, Center for China and Globalization, Shanghai Institute of International

[128] Pomozova N. B. Chinese analytical centers: from practical rationality to social institutional reflection / N. B. Pomozova // Discourse. – 2021. – Vol. 7. – No. 5. – pp. 71-85.
[129] China Institutes of Contemporary International Relations. URL: http://www.cicir.ac.cn/NEW/en-us/index.html.
[130] Center for China and Globalization. URL: http://en.ccg.org.cn.
[131] Shanghai Institutes for International Studies. URL: http://www.siis.org.cn.

Studies, Chunyang Institute of Financial Research; Pangu Institute) are focused exclusively on the international agenda, and 2 more (Chinese Academy of Social Sciences[132] and the Center for Research and Development at the State Council People's Republic of China[133]) are more focused on China's domestic policy, but actively study international experience. 4 of them (including the Taiwan Chung-hua Institute) are non-governmental, independent organizations. Unirul is funded by US funds. Think tanks covering the international political agenda pay the greatest attention to the United States and Sino-American relations.

It is noteworthy that the Taiwan Chung-hua Institute of Economic Research was included in the prestigious American rating as a Chinese MC.

In addition to the rapid growth of the network of analytical centers since the early 2000s, another impetus to this process was given in 2004. This is due to the reaction of the international community and, above all, Europe to the new initiative of China's "peaceful rise" and Beijing's social reflection on this reaction. The expression of which was both the expansion of the network and the change in the subject of its research. It turned out that, firstly, rationality, as the Chinese understood it, differs from that which the Europeans adhered to - in a "peaceful elevation" with a rationally justified gain from the cooperation of all parties involved, they saw mainly "elevation"[134]. And, secondly, the Chinese leadership and experts reflected on the clash not only with politicians, but also with the EU bureaucracy, which predetermined the relevant research, not only socio-political, but also philosophical depth (Foucault, et al.). Since the "Renaissance", rationalism in Europe has consistently strengthened its position, up to the almost solemn proclamation by M. Weber of the rationalization of society as a historical trend. Moreover, the statements are not "material", but "formal" rationality, which the social actor follows, counting, taking into account, calculating everything not for some specific, specific purpose, but implementing accounting as a universal, universal principle of attitude to reality. In the most general methodological terms, Weber defined the rational "in the sense of a logical or teleological "sequence" of any intellectual-theoretical or practical-ethical position."[135] Although V.V. Shcherbina, E.P. Popova believe that he used his "idea of rationality as a kind of guideline, as an "ideal type" with which real behavior of people could be correlated[136]". N.N. Zarubina draws attention to the possibility in this regard to distinguish different types of rationalization: "practical as everyday expediency of actions; theoretical as the construction of increasingly abstract concepts and holistic pictures of the

[132] Chinese Academy of Social Sciences. URL: http://casseng.cssn.cn.
[133] Development Research Center of the State Council of the People's Republic of China. URL: http://en.drc.gov.cn.
[134] Deryugin P.P., Bannova O.S., Kamyshina E.A., Popov R.E., Sidorova A.N. Formation of human capital in the digital educational environment: Russia and China - social aspects. INFORMATION–COMMUNICATION–SOCIETY. Volume 1, 2021, pp. 147-154.
[135] Weber M. Selected works. – M.: Progress, 1990. p.308.
[136] Shcherbina V.V., Popova E.P. The problem of rationalization of managerial activity in a business organization // Personality. Culture. Society. 2015. Volume XVII. Issue 1-2 (No. 85-86). p. 137.

world; material as the subordination of life behavior to realization[137]". As for China, whose analytical centers are considered in this article, from Weber's works we can conclude about his understanding of the Confucian tradition as practical rationality[138].

The success of the movement in this direction was formalized at the party congress by the President of the People's Republic of China himself, who in his report at the XIX Congress of the CPC in October 2017 noted that "it is necessary to accelerate the development of philosophy and social sciences with Chinese specifics, as well as to create new analytical centers with Chinese specifics,[139]" thus securing the place of the system such institutions, as well as its importance for the formation of current and future policies. In compliance with this new directive, the assessment of the activities of analytical centers with Chinese specifics has been included in official reports, in particular on the work of the government since March 2018[140]. From the standpoint of political sociology, these Chinese "think tanks" represent an increasingly important channel of two–way communication between society and political institutions, representing a transition in terms of practical rationality to social institutional reflection - "constant observation of people, social groups, institutions, clarifying values, ideas and correlating them with their own consciousness in order to possibly change their positions and behavior", characteristic of modern societies in conditions of accelerating and becoming more complex socio-cultural dynamics[141].

The dynamics of the network of Chinese analytical centers since the 2000s and the topics of their research characterize the formation of the modern Chinese state apparatus as a social reflexive institution, ready and capable of change due to understanding oneself and the situation in which one has to act. Under the influence of Chinese researchers who have gained the trust of political leaders, these leaders, first of all, Xi Jinping, instead of a confrontational vector towards the West, especially in the conditions of a modern emerging, "fluid" society in conditions of increasing socio-cultural dynamics and risk, chose an understanding and practical rational (M. Weber) methods of action, which required large investments from the system of "think tanks" and great efforts of their employees. As a result, an understanding of the main perspective was formulated – comprehensive cooperation with Europe and the corresponding reorientation of Chinese foreign policy from the two "superpowers" to Europe and the countries lying on the "new Silk Road" to it, the validity of which is confirmed, among other things, by the deployment of confrontation with China initiated by the United States. In connection with such

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[137] Zarubina N.N. Max Weber's theory of rationalization as a methodology for understanding modern socio-cultural processes // Sociological Research. 2020. No. 6, p. 6.
[138] Weber M. Economic Ethics of World Religions: Experiments of Comparative Sociology of Religion. Confucianism and Taoism. St. Petersburg: Vladimir Dal, 2017. – 446 p.
[139] The text of Xi Jinping's report at the XIX Congress of the Communist Party of China. URL: http://russian.news.cn/2017-11/03/c_136726299.htm
[140] The text of Li Keqiang's report on the work of the government.
URL: http://ru.china-embassy.org/rus/ztbd/2h/t1584035.htm.
[141] Litvak N.V. Modern diplomatic service as a reflexive institution // Polis. Political studies. 2018. No. 2. pp. 163-172.

productive activity of "think tanks", the Italian researcher S. Menegazzi notes that despite the fact that in the West it is generally believed that only in democratic societies such structures are able to influence political decision-making, the development of a system of "think tanks" in China under the fourth and fifth generation of leaders clearly demonstrates their importance in political processes. It is there that ideas are formulated and discussed, which later form the basis of China's foreign policy and diplomacy[142]. Interaction with Europe, as the main foreign policy goal, led to a social reflection of problems in building comprehensive cooperation with it, and this reflection, in turn, led to an appeal to European rationalism in order to both understand Europe and try to establish communication with it using a discourse that it understands.

The world-class scientific and educational centers of the Russian Federation - a modern stage.

On May 7, 2018, the Decree of the President of the Russian Federation "On national goals and strategic objectives of the development of the Russian Federation for the period up to 2024" was issued. In this Decree, the Government of the Russian Federation is instructed to ensure the creation of at least 15 world-class scientific and educational centers (SEC) by 2022 when developing a national project in the field of science. It is these centers that are the object of research of this dissertation[143].

When creating a national project in the field of science, the Government of the Russian Federation had to proceed from the fact that by 2024 it was necessary to ensure the fulfillment of the following tasks:

the presence of the Russian Federation among the five leading countries of the world engaged in research and development in areas determined by the priorities of scientific and technological development;

ensuring the attractiveness of work in the Russian Federation for Russian and foreign leading scientists and young promising researchers;

outstripping the increase in domestic research and development costs from all sources and in comparison with the growth of the country 's gross domestic product[144].

Currently, 15 SEC have been created. The first of them were: SEC "Innovative solutions in agriculture"; SEC "Kuzbass"; SEC "Technoplatform 2035"; Perm SEC "Rational Subsoil Use"; West Siberian interregional SEC and others.

SEC is an association of federal state educational organizations of higher education and scientific organizations supported by a subject of the Russian Federation without the formation of a legal entity

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[142] Menegazzi, S. Rethinking Think Tanks in Contemporary China. Springer. 2018. 206 p.
[143] Decree of the President of the Russian Federation on May 7, 2018 "On national goals and strategic objectives of the development of the Russian Federation for the period up to 2024".
[144] Decree of the President of the Russian Federation No. 204 dated May 7, 2018 "On National goals and strategic objectives of the development of the Russian Federation for the period up to 2024". p. 12.

with organizations operating in the real sector of the economy and operating in accordance with the program of the center's activities[145]. SEC is aimed at breakthrough research of a fundamental and exploratory nature, as well as applied developments for civil purposes aimed at solving interdisciplinary tasks recognized by the international scientific and technical community[146].

The initiator of the creation of the SEC is a subject of the Russian Federation, which, together with the federal state educational organization of higher education and a scientific organization, develops the program of the center's activities and submits it to a grant competition. Technological projects are being implemented on the territory of this subject of the Russian Federation and key participants of the center are located.

SEC is managed by the "supervisory board of the center", which is a collegial advisory body of the center's management, formed by the decision of the highest officials of the subjects of the Russian Federation, in whose territories the participants of the center operate in order to carry out general management of the center's activities and determine the program of its activities. The composition of the supervisory Board of the center is formed from among representatives of federal executive authorities and state authorities of the subjects of the Russian Federation operating in the territory of the subject of the Russian Federation in which the center was established, organizations of the real sector of the economy, federal state educational organizations of higher education and scientific organizations. The supervisory Board of the center is managed by the highest official of the subject of the Russian Federation – the initiator of the creation of the center.

Further in the structure and next in the hierarchy of management of the SEC is the "managing council of the center" – a collegial management body of the center, formed by the supervisory board of the center from among the representatives of all participants of the center for organizational management and coordination of its activities for the implementation of the program of the center.

The participants of the center are legal entities participating in the implementation of the center's activity program (educational, scientific organizations, business representatives).

The organizations participating in the SEC should provide training for solving major scientific and technological tasks according to the priorities of scientific and technological development of the Russian Federation, including taking into account regional specifics. An important element of personnel training will be the centers of competence development of managers of scientific, scientific and technological projects and laboratories created in each of the SEC.

In accordance with the Passport of the Federal Project "Development of integration processes in the field of science, higher education, industry", the basis of the activities of the SEC is the

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[145] Methodological recommendations on the formation of programs for the activities of world-class scientific and educational centers, approved by the Deputy Minister of Science and Higher Education of the Russian Federation on 23.09.2020.

[146] Passport of the national project "Science", approved by the Presidium of the Council under the President of the Russian Federation for Strategic Development and National Projects on 12/24/2018.

implementation of a portfolio of technological projects focused on world-class research and development, obtaining new competitive technologies and products, their commercialization[147].

The key document defining the implementation of the goals and objectives of the SEC is the "program of the center's activities". This program includes a set of measures aimed at achieving the goals of providing world-class research and development, obtaining new competitive technologies and products and their commercialization, training personnel to solve major scientific and technological problems[148].

Based on the considered components of the SEC, its structure can be schematically represented (Figure 1).

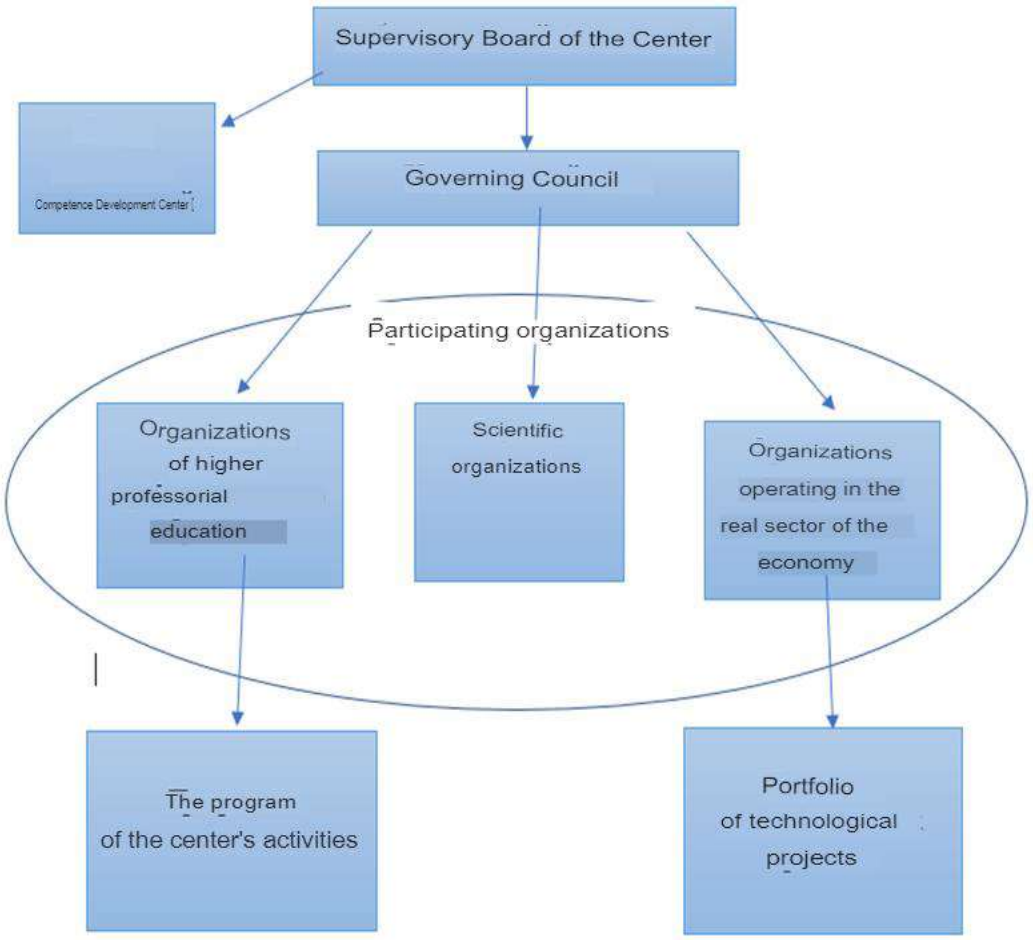

Figure 1. Structure of world-class scientific and educational centers

The considered experience of the formation of organizations of identical SECs in Europe and the USA and the creation of SECs allows us to draw the following conclusions.

[147] Passport of the Federal project "Development of integration processes in the field of science, higher education, industry". URL: https://xn--m1acy.xn--p1ai/storage/app/public/3103/S4%2BFP_Integraciya.pdf.
[148] Strashko E. V., Yarmak, O. V. Deryugin P. P., etc. Factor analysis of investment attractiveness and human capital of regions with world-class scientific and educational centers /. // Russian Journal of Management. – 2021. – Vol. 9. – No. 1. – pp. 171-175.

SEC and REC have differences at least in the legal aspect. RECs can be both commercial organizations and non-profit or joint-stock companies.

SEC is also an association without the formation of a legal entity. Despite the fact that the missions of these structures are similar: ensuring the interaction of science, education and business, there is a key difference in their goals. SEC is most focused on the development of scientific and practical activities with the subsequent commercialization of scientific achievements. REC, in turn, primarily function with the aim of developing the region's economy.

An important difference is that research parks have a certain territory of their own, the area of which is leased to companies that are part of the park. Also, research parks set themselves the task of forming new companies with the help of business incubators in the park, which is absent in the SEC.

The specificity of ESFRI is that it is a more global structure that has a supranational character. Its activities are carried out within the framework of the European Union and it includes 28 European countries. Each participating country has a delegate – a representative of the State that is developing the national roadmap. And already within the framework of the roadmap for strategic directions of development, scientific and educational centers are being united into consortia.

Another difference between ESFRI and REC and SEC is characterized by the fact that only one organization, for example, a university, can participate in a scientific and educational center. It is also possible to combine several universities or several scientific organizations. Scientific organizations, higher educational institutions and organizations operating in the real sector of the economy must be present in the SEC structure, there is no such restriction in ESFRI.

It is worth noting that the activities of all organizations and SEC, REC, and ESFRI are identical and are aimed at current modern problems in science. These include digitalization, developments in medicine, physics, chemistry, industry and the social sphere.

The decisive, and perhaps the only resource for overcoming a series of crises in the Russian Federation lies in the activation of the human capital of Russians. Therefore, it is difficult to overestimate the role of a person, his creativity, talents and talents in the formation of an effective economy of the country.

The scientific problem of diagnosing the awareness of the importance of the human capital in the orientations of students lies in the fact that human capital is multidimensional, and there are a number of methodological problems in the theory of human capital. In particular, the diagnosis of human capital as an object of research and the factors that influence its formation are considered separately in the vast majority of studies. In the structure of human capital itself, indicators of different social nature are analyzed. There are several levels of human capital diagnostics – personal, group or organizational, regional or national, in the study of which, in any case, human capital is understood as the sum (or arithmetic mean) of the surveyed data of individual respondents. This approach to data generalization

contradicts theoretical positions where social phenomena (group or regional) cannot be understood as a simple sum of human capital of individuals.

Generalization of scientific positions on the problem of human capital diagnostics allows us to talk about several methodological approaches, and hence about several methodological diagnostic strategies. Thus, the investment approach assumes as a direct object of study the analysis of data on the quantity and quality of investments in human capital. An objective or factorial approach is similar in nature of diagnosis, involving such a research procedure when a set of objective socio-economic factors is studied on the basis of statistical data. On the contrary, within the framework of the subjective concept of diagnostics of human capital, the main indicators of its condition are determined by the innate or acquired characteristics of people. The individual approach as the main indicators of human capital provides for the study of needs, motivations, personality psychotypes, less often – values that affect the effectiveness of human activity. In the sequence of another approach, the diagnosis of human capital is carried out based on the results of the analysis of the results of people's activities. Such a principled position is characteristic of a result-based or effective approach.

As a promising direction for the diagnosis of human capital, ideas are expressed about a comprehensive approach to the study of objective and subjective indicators. However, the actual implementation of such a methodology, where the person himself, the objects of his influence, the external environment, investments and labor results are being investigated within a single procedure, is currently difficult to implement and is rather a prospect for future research. The first step towards building a holistic methodology for the diagnosis of human capital can be the study of a single object of research – the values of people, which covers the whole set of relationships and elements that make up human capital.

Thus, the study of students' human capital should be based on the diagnosis of corporate values of university students. The corporate values of students should be understood as the material and spiritual results, means and goals of the corporation's activities that have developed in the experience of its activities, and determine (influence) the choice of significant and important (valuable) alternatives for development, behavior and communication (strategies, decisions, organizational culture, etc.), ensuring the integration of the internal environment of the corporation and its adaptation in the external environment.

The most relevant approach to conducting empirical research, in which the diagnosis of the values of university students as the basis of human capital is implemented, is the network approach.

It involves combining two areas of research. On the one hand, finding connections and correlations between various indicators of human capital. On the other hand, it is the identification of causal relationships between indicators and factors that form human capital.

Chapter 2. Empirical studies of the sociodynamics of human capital of students studying in world-class scientific and educational centers

The second chapter is devoted to the empirical part of the research of this dissertation. Conducting an empirical study is conditioned by the purpose and objectives of the study, in particular: analysis of the main trends in the formation of human capital of students studying at universities that are part of world-class scientific and educational centers. To achieve this goal, the following tasks were implemented:

-to carry out a sociological analysis of the activities of world-class scientific and educational centers.

- to carry out empirical testing of conceptual provisions, as well as to analyze the sociodynamics of changes in the human capital of students studying at universities that are part of world-class scientific and educational centers.

The choice of research strategies and methods is also conditioned by the conclusions obtained in the first chapter of this study within the framework of a sociological analysis of the theoretical and methodological foundations of the concept of human capital.

Operationalization of the concept of "human capital" - it can be represented as a set of knowledge, skills and abilities of a person who are in causal relationships with a variety of personality structures, including its value attitudes and orientations, providing the direction and dynamics of meeting social needs. Personality values can be considered as indicators of network analysis, revealing both the immediate characteristics of human capital and the multiple connections that develop around it.

Moreover, the formation of human capital in a post-industrial society involves the creation of special conditions conducive to the most successful integration of knowledge and experience. In this regard, world-class scientific and educational centers have important potentials of an innovative ecosystem, where relevant social interaction is provided, contributing to the formation of human capital.

Taking into account all the facts presented, an integrated approach was used as an empirical research strategy. As it was established earlier, the study of human capital involves the integration of many internal and external characteristics, conditions and factors, for the study of which an integrated approach is the most relevant. This approach allows the most accurate and detailed study of such a multifaceted factor as human capital.

A schematically integrated approach is presented in Figure 2.

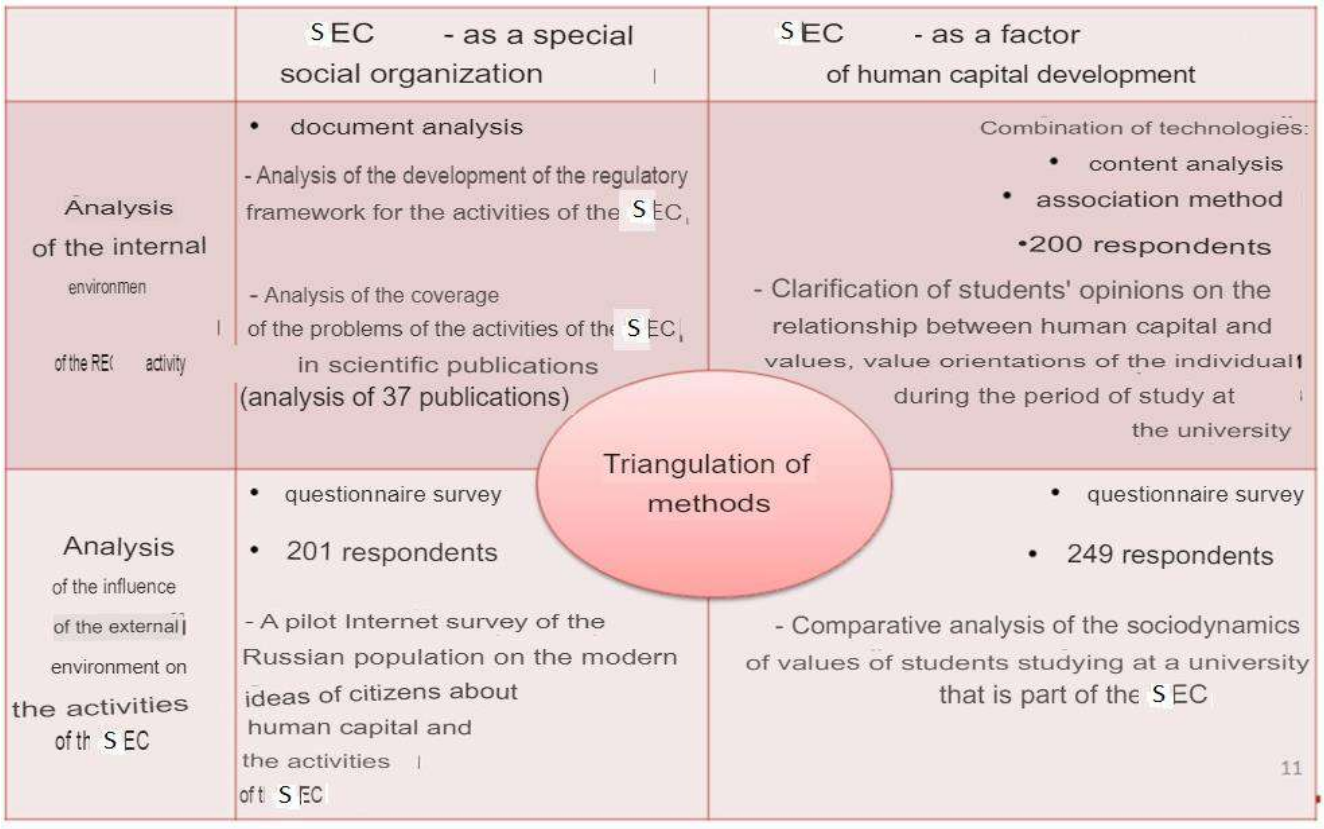

Figure 2. The scheme of an integrated approach in an empirical study.

The empirical study included an analysis of both internal and external factors. In particular, the internal environment of the world-class scientific and educational centers was considered, as well as the analysis of the influence of the external environment of society on their activities was carried out.

Based on the sociological theoretical concept, SEC were considered on the one hand as a special social organization, and on the other as a factor in the development of human capital.

Empirical data was collected on the basis of triangulation methods. Methods such as document analysis, questionnaire survey, a combination of content analysis technologies and the association method were used.

The implementation of an integrated approach included four parts of an empirical study:

- An empirical study was conducted, which includes a combination of content analysis technologies and the method of associations in the interests of conducting sociological research. The technology of the methodology involved addressing respondents with the task of expressing their opinion (idea) about the relationship between the acquired knowledge, skills and abilities as basic elements of human capital, on the one hand, with the values and value orientations of the individual during the period of study at the university, on the other. The respondents were students studying at universities that are part of the Belgorod and Perm SEC.

- A comparative analysis of the sociodynamics of business qualities was carried out during the period of study at the university using a network approach. The purpose of this part of the empirical research was to form a methodology of sociological diagnostics aimed at identifying, fixing and network modeling of the sociodynamics of business qualities in the structure of human capital as students study at the university. The respondents were students studying at universities that are part of the Belgorod and Perm SEC.

- The analysis of the development of the regulatory framework for the activities of world-class scientific and educational centers, the analysis of the coverage of the problems of the activities of the SEC in scientific publications;

- A pilot Internet survey of the Russian population was conducted on the modern ideas of citizens about human capital and the activities of the SEC.

2.1. Values and human capital: results of an empirical study of programming students in the context of V.P. Tugarinov's ideas

Professor of St. Petersburg State University, Doctor of Philosophy V.P. Tugarinov substantiated the conceptual idea of the meaning and characteristics of values and formulated it as a sequential chain – the "famous triad" (Khmyrova-Pruel I. B.) - as a unity: cognition – evaluation – practice. "Man not only knows and contemplates, but evaluates and acts,[149]" he wrote. The researcher of the work of the outstanding scientist I.B. Khmyrov-Pruel notes that the priority of V.P. Tugarinov in domestic developments of the concept of values is obvious and indisputable[150]. His followers A.O. Boronoev, G.P. Vyzhletsov, M.S. Kagan, A.A. Pen and many others have repeatedly emphasized the outstanding contribution of V.P. Tugarinov to the study of the problematic of values. In modern conditions, the theoretical baggage of this knowledge is recognized as an actual heritage.

The central point of V.P. Tugarinov's theory is the recognition of the emergence of a value relationship as an inevitable moment of cognition, whether it is the development of a scientific idea or the comprehension of empirical facts. On the contrary, in the light of modern interpretations of cognitive activity, one can find approaches in which the development of information or the acquisition of knowledge can be understood as an impartial, non-evaluative moment, i.e. the development of any

[149] Tugarinov V.P. Selected philosophical works. — L.: LSU, 1988. p. 256.
[150] Khmyrova-Pruel I. B. V. P. Tugarinov's concept of values and value problems in Russian sociology (60-90-ies of the twentieth century): dissertation of Candidate of Sociological Sciences: 22.00.01.- St. Petersburg, 2002.- 177 p.

scientific concept, theory is considered as a "pure" process of "obtaining information" or using an "educational service". This is not about the ideological background of the issue, although the scientific analysis of values as the core of public consciousness always poses a certain danger to official ideology. Least of all, the authors suggest paying attention to ideological constructions or conclusions[151]. The fact is that the development of knowledge objectively, inevitably prompts an evaluative moment – the formation of values, and there is no getting away from it.

Another relevant aspect for this study is the position of V.P. Tugarinov's theory of values concerning the social context within which the normative-value relationship of cognition and values is formed. According to the classic, "benevolence to society, based on gratitude for the benefits that it gives us," inevitably implies education in this spirit, which is "the education of a well-meaning philistine." V.P. Tugarinov believed that the meaning of life can consist only in life itself, in the service of this life. However, "serving" only one's personal life, only one's personal interests, in isolation from public ones is very illusory[152].

In unity with society, V.P. Tugarinov refers to the understanding of the person himself as a value. "In contrast to the previous definitions of values, V.P. Tugarinov also mentioned a separate personality: for the personality is part of the social whole. Life values cannot be fully immersed in society. It must be borne in mind that: firstly, there are unique features of the physical and mental makeup of each individual; secondly, the individual must solve many issues of his life by himself; thirdly, a person is able to inherit from the past and perceive from others prejudices, remnants that give rise to various false values. Sometimes, when a person considers pseudo-values, they seem to be genuine values. In some cases, a person remains immune to the values that society sometimes imposes on her. Tactical life values of an individual often turn out to be in striking contradiction with the values of society.

The special practical relevance of the research is dictated by the intensification of public attention to the training of IT specialists, their values and human capital, which arouse some interest and suggest a scientific explanation.

The methodological foundations of the research are formed as a synthesis of ideas around the essential characteristics of values expressed by V.P. Tugarinov, the provisions of G. Becker's theory of human capital and the methodological guidelines of V.A. Yadov's strategies for sociological research of values, in particular, the latter's understanding of values as personal attitudes to certain values of the material and spiritual culture of society[153].

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[151] Lapin N.I. The problem of values in the studies of V. A. Yadov and his colleagues // Economic Sociology. 2009. No. 3. p. 84.

[152] Khmyrova-Pruel I. B. V. P. Tugarinov's concept of values and value problems in Russian sociology (60 - 90s of the twentieth century): dissertation... Candidate of Sociological Sciences: 22.00.01.- St. Petersburg, 2002.- 177 p.

[153] Zdravomyslov A. G., Yadov V. A. Attitude to work and value orientations of personality. In the book: Sociology in the USSR. Moscow: Mysl. Vol. 2. 1965.

The conceptual and methodological provisions of the study can be formulated in the following provisions. The central principle of the research is based on the understanding of the relationship between epistemology and values according to V.P. Tugarinov, which reveal the idea that in the process of achieving any goals and interests, a person inevitably forms a certain system of values, whether it is professional practice, preparation for it or social, economic and other activities, obtaining technical or socio-humanitarian knowledge. According to the author, people have countless real values, in all areas of reality, they are revealed as a person masters them for himself, to achieve his goals and interests.

A number of relevant consequences follow from these basic provisions:

- epistemology and social cognition are naturally connected with the principles of axiology, which allows us to characterize the totality of cause-and-effect relationships of the formation of values as dependent on cognitive activity: a person not only learns and contemplates, but evaluates and acts[154]:

- the achievement of goals in various fields of activity presuppose the presence of various types of values (according to V.P. Tugarinov – political, moral, aesthetic, philosophical, legal, etc.): the division of values into material, socio-political and spiritual, being based on the corresponding division of the main branches of social activity, which does not exclude the division of values into cash (existential), targeted and normative[155]. The special role of spiritual values, which should be understood as the values of science, morality and art[156];

- the formation of values takes place within the framework of social and activity conditions and factors, the influence of which may affect the nature of the development of values in different ways: society cannot exist without a value - based approach[157]. Marx's theory of value is an economic expression of the theory of values[158];

- the correlation of cognitive and value approaches in sociology is an actual research direction, which involves the study of strategies-technologies for the development of new values and the relationship of these strategies with personality. Interest refers to the direction of a person's thoughts and feelings to objects that satisfy or are able to satisfy his need[159];

- the result of mastering new ways of cognitive activity (thinking) translates the revision of existing and the relevance of the emergence of new values. In particular, new values change the personality itself and its position in society: the realized goal ceases to be the goal[160].

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[154] Tugarinov V.P. Selected philosophical works. — L.: LSU, 1988 p.256.
[155] Tugarinov V.P. Selected philosophical works. — L.: LSU, 1988. p. 283.
[156] Tugarinov V.P. Selected philosophical works. — L.: LSU, 1988. p. 281.
[157] Tugarinov V.P. Selected philosophical works. — L.: LSU, 1988. p. 256.
[158] Tugarinov V.P. Selected philosophical works. — L.: LSU, 1988. p. 257.
[159] Tugarinov V.P. Selected philosophical works. — L.: LSU, 1988. pp. 265-266.
[160] Tugarinov V.P. Selected philosophical works. — L.: LSU, 1988. p. 268.

The purpose of this part of the empirical research is to identify, study and sociological analysis of the mutual influence of knowledge acquisition as drivers of the formation of human capital and the basis for the formation of a system of values of students during their studies at the university.

Research methodology. It can be characterized as a combination of content analysis technologies and the method of associations in the interests of conducting sociological research. The technology of the methodology involved addressing respondents with the task of expressing their opinion (idea) about the relationship between the acquired knowledge, skills and abilities as basic elements of human capital, on the one hand, with the values and value orientations of the individual during the period of study at the university, on the other[161]. Specifically, the question was formulated as follows: "Does obtaining higher education (i.e. obtaining knowledge, skills, abilities, competencies – human capital) affect the transformation of personal values – moral, political, aesthetic and others"? Give 1-2 examples. For unified approaches to understanding the categories of analysis, the respondents were previously presented with definitions of human capital (according to G. Becker) and definition of values (according to V.A. Yadov). The survey was conducted in writing. Further, the received texts were analyzed according to a system of indicators characterizing the sociodynamics of the connections between the acquired knowledge, skills and abilities with a system of values and orientations.

The survey was conducted in 2022 among students (n=224) in St. Petersburg.

Hypotheses of empirical research. Firstly, the students' responses are supposed to fix connections - mostly positive and significant. Along with this, other ideas about the nature of such a connection are possible (situational, neutral, negative, etc.). Secondly, students' values are grouped by certain types, for example, moral, political, legal, etc., among which a significant part will relate to professional ones. The values of the market order and the values of the digital society will be important for students. Thirdly, a number of socio-pedagogical conditions and methodological approaches to the organization of university activities are relevant for the formation of values. Students' ideas will reflect to a greater extent the conditions and factors affecting values, to a lesser extent they will be focused on methodological approaches that reveal the practice of the organization and methodology of the university. Fourth, it is assumed that the nature of knowledge acquisition can develop into special (subconscious) relationships of students – strategies that reveal their attitude to the formation of values. Fifth, the cause-and-effect relationships of knowledge acquisition and value formation will be expressed in the reassessment of former values and the formation of new ones. In turn, this will affect the peculiarities of students' self-awareness and the expectation of objective changes resulting from such awareness.

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[161] Popov R.E., Baruzdin I.A., Salakhutdinov A.A., Deryugin P.P. World-class scientific and educational centers as drivers of the formation of Russian human capital: sociological analysis of the problem field (to the 300th anniversary of St. Petersburg State University). Discourse. 2022;8(3):41-55.

The results of the content analysis of students' associations regarding the connection of knowledge, skills and abilities as the main elements of human capital and values were built in a consistent logic as a consideration of a number of technologies for analyzing the data obtained and confirming empirical hypotheses.

The first result. In the students' views, the relationship between the knowledge, skills, abilities and the value system obtained at the university can be characterized mainly as a direct positive one[162]. Statistical data on the characteristics of these relationships are shown in Table No. 2 and in diagram No. 1.

Not all respondents were able to assess the nature of the connection between knowledge and values, 211 out of 224 respondents were able to formulate their point of view. Thus, for the overwhelming number of 71.6% students, the fact of the influence of the acquired knowledge on the transformation of the value system during the period of study at the university is obvious. The direction of changing values under the influence of acquired knowledge is also clear: "acquired knowledge shifts values to deeper meanings."

Table No. 2. The influence of knowledge skills and abilities on the formation of values.

The nature of the relationship	**Degree of influence**	**Descriptive characteristics of links – associations, examples**	**Number of respondents (%)**
Positive	Significant impact	*The unconditional, significant, directly, cardinally, undoubtedly, really, strongly, absolutely, very, important, cannot but be reflected*	37 (17%)
	Generally having an impact	*An important role, contributes. "Yes, it does. Due to the knowledge of the world through the knowledge gained in higher education, a person may be inclined in favor of certain values that have a connection with the acquired competencies".*	108 (51%)
	Weak influence	*I believe that gaining new knowledge can (but not always) affect a person's values. He will receive new knowledge, information on some topics, can see a situation from a different angle, get acquainted with someone else's point of view."*	4 (1,8%)
	Depending on the type of education	*Humanitarian/ technical/ economic. "If a person receives a higher education related to moral norms, then there is a chance of changing his views."*	4 (1,8%)

[162] Deryugin P.P., Ziyaeva M.M., Gluhikh V.A., Popov R.E. Values of education in the representations of students-graduates of OT-specialties (results of pilot research) // Society: sociology, psychology, pedagogy. 2023. No. 9. pp. 22-29.

Continuation of table No. 2.

Situational	Possibly influencing	*It can be different, to a certain extent, in some cases it affects, situationally, indirectly, unlikely, possible influence, important, but not decisive role*	43 (21,6%)
Neutral	Not affecting	*"I believe that the basic moral and aesthetic values do not change in a person after starting school, that is, they are formed in early childhood. If in the course of life a person begins to act contrary to these basic values, this will certainly lead to discomfort, dissatisfaction with life. My mother and I discussed this topic, and she says that no matter how I have changed in my behavior over the years, it is clear that my values do not change. She says the same about all other people."* *"but I don't think that getting a higher education can have a huge impact on the transformation of values. If a person has a firm position, then he adheres to it."*	11 (5%)
Negative	Influencing negatively	*Disdainful attitude towards other people who have not received higher education, resourcefulness – deception at the expense of knowledge, arrogance, disrespectful attitude towards others, arrogance, conflict* *We can also learn how to "create visibility", again because of the amount of work.*	4 (1,8%)

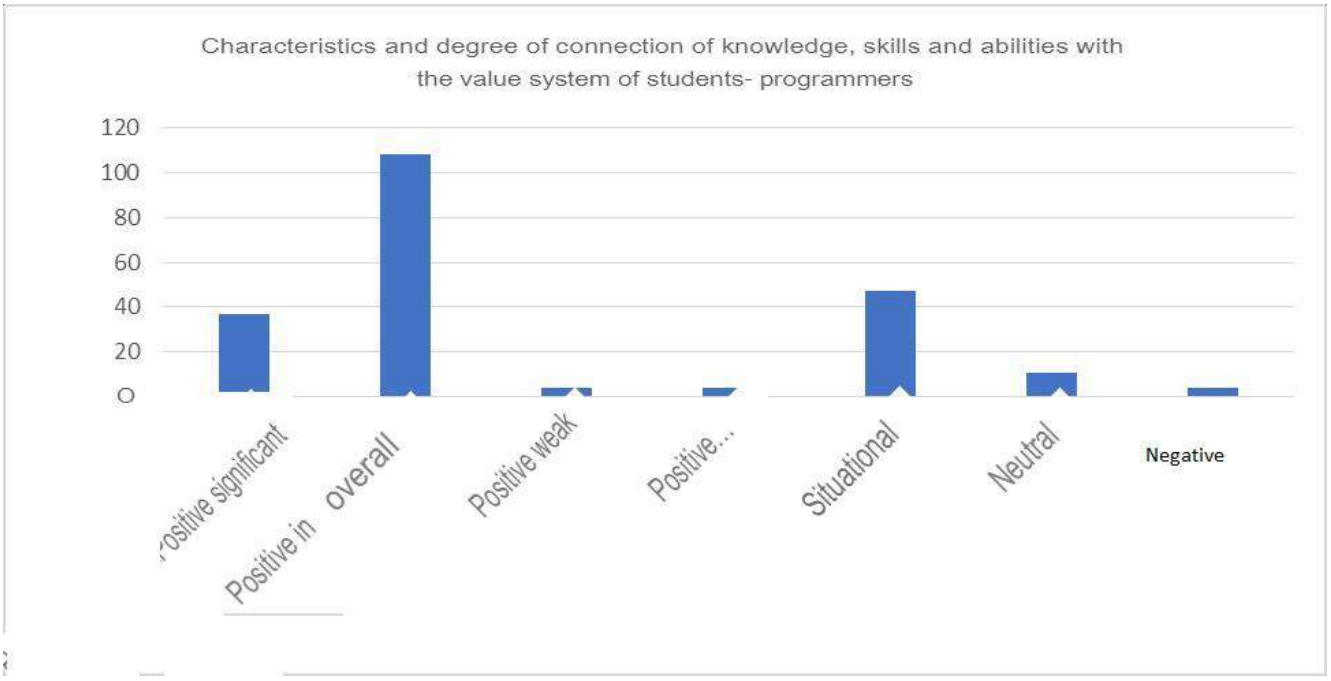

Diagram No. 1. The influence of knowledge skills and abilities on the formation of values.

For 21.6% of students, this influence is assessed rather as situational: "Higher education is a diverse thing that can develop absolutely opposite qualities in a person, and often only strengthens a person who has formed for admission. As an example, I will give my parents — both graduates of engineering specialties of St. Petersburg universities: Mom — Mining, Dad — VTUZ. But the set of moral values is absolutely different — if mom reads books, goes to theaters, studies further, dad's favorite activity is to watch "Gangster Petersburg" and so on after work. I think higher education has an important, but not decisive role in the formation of human values."

As a non–influencing factor - 5%. "I believe that it does not affect, since getting an education only develops a person in a certain direction, gives him the necessary knowledge to realize any goals. One cannot, for example, say that studying mathematics and programming will help me rethink the moral norms of society. However, there are exceptions."

Less than 2% of respondents showed that the acquired knowledge rather negatively affected the formation of their value system: "Getting a higher education has a certain influence on the formation of personal values on the same level as any experience a person receives throughout his life. The influence on moral values is rather negative because under the influence of a large amount of stress and workload, students often refuse to honestly perform the tasks of the courses." It should be emphasized that harmful influences can also be significant. As V.P. emphasized. Tugarinov, significance or significance are not only values, but also harm[163].

Thus, the central trend in the opinion of students was the recognition of the essential connection of the acquired knowledge, skills and abilities at the university with the system of their values, which confirms the hypothesis of the relationship between human capital and personal values.

The second result. Students-programmers mainly fix the role and importance of knowledge gained in the study of subjects of the socio-humanitarian cycle, which, in their opinion, play the role of a leading principle in the formation of a system of values[164]. Special subjects, professional knowledge and their influence on the value system are perceived by students as less significant. The generalized data on the results of the content analysis of the essay texts are presented in Table No. 3.

The presented types of values were mentioned in the works of 212 respondents. As the analysis shows, the knowledge gained at the university had the most significant impact on the transformation of students' political and moral values. Significantly acquired knowledge has an impact on aesthetic, philosophical and ideological, social and humanitarian values. In general, 89% of respondents showed that the knowledge gained at the university is reflected in the formation of those types of values that can

[163] Tugarinov V.P. Selected philosophical works. — L.: LSU, 1988. p. 261.
[164] Deryugin P.P., Bannova O.S., Kamyshina E.A., Popov R.E., Sidorova A.N. Social and professional awareness of the coming digitalization by students of engineering and technical specialties (pilot research experience and first results). Discourse. Volume 7, number 1, 2021, pp. 43-56.

rather be attributed to the socio-humanitarian. 9.1% believe that education changes attitudes towards scientific activity, intellectual development, and education in general. The problem of the formation of professional values deserves special discussion, the change of which was expressed by 8.9%. A number of students noted that professional values can be easily mastered "within six months of work in the specialty."

Table No. 3. Generalized data on the results of content analysis of essay texts.

Types of values	**Descriptive characteristics of links – associations, points of view**	**Number of respondents, %**
Moral	*Restraint, restraint, formalization of relations, freedom, dignity, respect, mutual understanding, responsibility, decency, pride, generational connection;* *"The university does not change these values";* *"I will answer - definitely yes, being enlightened in various fields of science, a person changes not only his views on life, but also moral values."*	41 (19,3%)
Political	*Democracy, political literacy, political position, rallies, ideals of the system, condemnation of racism – 3, patriotism* *"Political values can change in the course of life, but also up to a certain point, since political attitudes in my opinion are easier to change than moral and aesthetic ones. I can also give an example from my own life, since my attitude to power and political views have also changed";* *"For example, a person who receives certain knowledge in the field of history and law can change his political position."*	58 (27,3%)
Aesthetic	*"For example, if you study fine art, you will better understand the concepts of art, your vision of works, the values of art will be expanded. Your aesthetics will be improved."*	24 (11,3%)
Professional	*"The values of the individual are changing in our time. One of the bloggers, thanks to his studies at LETI, realized that for him personally, a great way to earn money is to create videos on YouTube, although he previously despised it";* *"For example, we students get the skill of working with a lot of information. We can realize the value of this skill and apply it in order to deal with a large number of problems, to delve into their essence. This is a positive manifestation, the honesty of doing the work."*	19 (8,9%)
Socio-humanitarian and cultural	*"In my opinion, higher education can affect a person's values. The student receives more information and forms a certain system of knowledge that affects the development of personality and the formation of a deeper perception of the world. Higher education, for example, brings up culture in a person";* *"By my own example, I observe how the study of sociology affects my views, understanding of the current world situation, society. I started reading a book by a modern sociologist with a very interesting view of life, which was advised by a teacher in practice, which I would hardly have started doing if I had not been interested in university classes earlier";*	23 (9,91%)

Continuation of table No. 3.

Legal	*"Higher education changes a person in many ways, as I believe. The need to study something (and the need is created due to the obligation to take exams and tests) develops in a person the habit of not sitting idle. Move forward. In addition, in our country, every student receives a comprehensive higher education. Even an engineer studies philosophy, history, law and many other humanitarian subjects, which cannot but affect his values."*	5 (2,3%)
Philosophical and ideological	*"Another thing is when the disciplines of philosophy, history, ethics and others are considered, where a conditional student comes to university with a relatively narrow mindset that has developed during adulthood, and then suddenly he is given a mountain of different theories about the formation of the world and society, different views on the world. Of course, there is a chance that he will write down some ideas for himself, he will like them and change his values."*	21 (9,9%)
Psychological	*"For example, a student can take a course in psychology and begin to better understand the motives and actions of others, which can change his attitude towards them. But I think that relocation to a new environment has a much greater impact, where a person has a different environment, which also has a huge impact. For example, during higher education, a student moves into a dormitory, where his new neighbors can instill in him values different from his old ones"; "If he studies humanities, for example: political scientist, psychologist, etc., then education certainly transforms our values."*	4 (1,9%)
Economic	*"I believe that obtaining higher education (obtaining knowledge, skills) affects the transformation of personal values. With the acquisition of new knowledge in a certain area, a person revises or supplements his already established values taking into account the new information received. For example, more educated people pay more attention to their spending and try not to spend money on meaningless purchases."*	3 (1,4%)
Scientific, educational and intellectual	*"If you study science, you will better understand how the world works. From there you can apply a lot of good things from an economic, political and ethical point of view (from the social activities of animals). It will help you get better"; "During my studies at the university, I discovered a great desire to develop my knowledge and the learning process has become very important for me in life."*	14 (9,1%)

The third result. Among the factors that most contribute to the acquisition of knowledge that affect the formation of values, students highlight social conditions and special events, as well as organizational and methodological approaches in the university's activities, a significant role is played by the information, knowledge and experience studied. The final results of the analysis are presented in Figure 3.

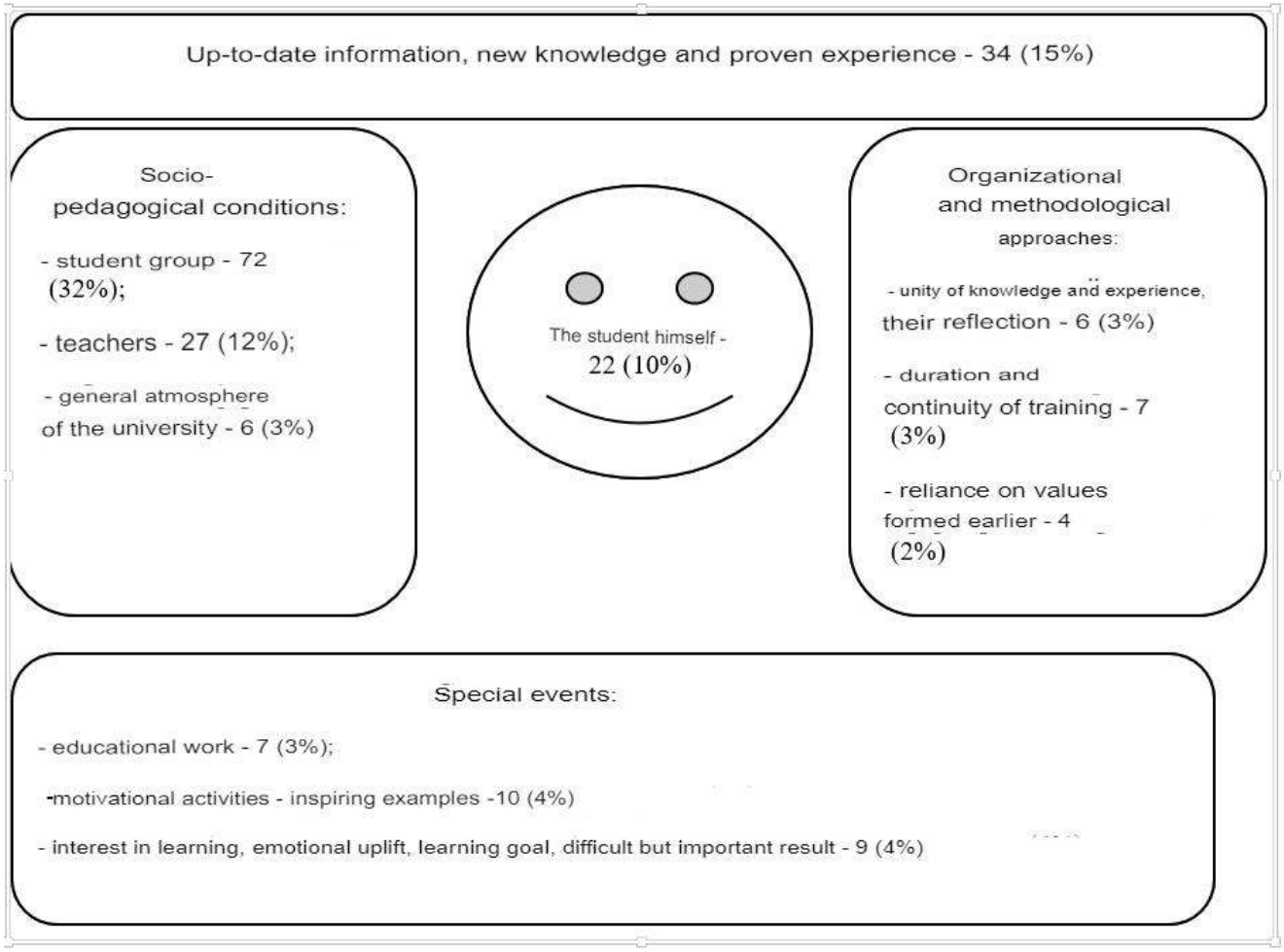

Figure No. 3. Conditions and factors influencing the increasing role of knowledge as a trigger for the formation of a value system.

First of all, among the conditions and factors contributing to the formation of a value system, from the point of view of students (32%), it should be noted the influence of the direct contact environment (group, dormitory, team, etc.): "I think that in the process of obtaining a VO, changes in values are possible. Even if we do not take into account the natural process (with age, people usually change everything). Each environment, environment, and group form the values that a person "imbues" with. The environment has a strong influence on the individual, so often a person adopts the mood of the majority, especially if this is his only environment." "It seems to me that getting higher can influence the change, transformation of personal values. The main factor, in my opinion, is familiarity with a new circle of people and other points of view on certain things." "Yes, it does, because when a person receives a higher education, he is in a society (in this case, students) and with constant communication with him, he forms certain values that can either coincide with the group or not. Such an important importance of the direct contact environment, its attractiveness and importance in the formation of values is due to the

"difference in the value systems of life" (V.N. Shubkin)[165], which in itself stimulates the activation of social interaction.

From the point of view of students, the formation of values is significantly influenced by up-to-date information, new knowledge and proven experience. As some of them point out: "An equally important value of higher education is the formation of a diverse worldview. Obtaining a large amount of correctly selected and compiled information has a fruitful effect on the development of a person, forming a circle of her interests and areas of knowledge, which in turn is a prerequisite for the formation of a deeper and integral scientific worldview."

Among the conditions and factors that form such knowledge, which can significantly affect the value system of students, the role of a teacher, samples of professional behavior is important: "I believe that higher education can affect only if the teacher turned out to be an excellent speaker and was able to convey some ideas to students"; "I personally have the university did not cause strong changes in personal values. Here, it is also of some importance not only what the student learns from university education, but WHO teaches him and HOW. There are no impartial teachers, and they will definitely affect the values of a student if he listened to them even with the corner of his ear."

An example, a model of successful socialization and professional adaptation is important for students, which is also a condition for the formation of a value system: "I think getting a higher education affects the transformation of personal values. Getting a higher education in any field, a person will somehow expand his horizons, get acquainted with outstanding figures, see examples of people who have reached heights. Examples: 1) by studying the discipline, a person learns the achievements of some figure and is inspired by him. Subsequently, he lights up with similar ideas and begins to develop in this area. 2) getting a higher education most often contributes to changing a person's social circle, that is, people who are interested in the same topics appear in his environment. This contributes to the desire to develop together, and learning new things is always easier and more enjoyable with like-minded people."

Respondents emphasized the relevance of special situations, the impact of which on the formation of values should not be belittled.: "I believe that getting a higher education does not have a direct impact on a person's acquisition of any values. Life situations and dilemmas that a person faces have the greatest impact." First of all, it turned out that value orientations and generalized social attitudes are mutually consistent, but poorly consistent with situational social attitudes. In principle, this conclusion is consistent with the results of studies conducted by N.I. Lapin[166].

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[165] Shubkin V. N. 1970. Experience of sociological research of employment and choice of professions. In the collection: Sociological experiments. M.: We Shubkin V. N. 1970. Experience of sociological research of employment and choice of professions. In the collection: Sociological experiments. M.: Thought. p.160.l. p.160.

[166] Lapin N. I. The problem of values in the studies of V. A. Yadov and his colleagues // Economic Sociology. 2009. No.3. URL: https://cyberleninka.ru/article/n/problema-tsennostey-v-issledovaniyah-v-a-yadova-i-ego-kolleg (date of reference: 01.05.2022). p.90.

Result 4. Based on the results of the analysis, we can talk about a number of strategies for the relationship of knowledge and values, which are understood as the attitudes and principles of teaching at the university. Such strategies are formed at the intersection of dichotomous axes in the following directions: conscious/unconscious and voluntary/involuntary change (transformation) of the value system. The description of such associations is presented in Table No. 4 and in diagram No. 2.

The data obtained suggest that there are a number of strategies for mastering new values in the process of studying at the university. These strategies are formed as a different attitude of students to the development of the acquired knowledge, they are formed at the intersection of the axes: conscious / voluntary (rational reflection); conscious / forced or involuntary (imposed reflection); unconscious / voluntary (irrational reflection); unconscious / involuntary (irrational - critical reflection). This should also include a situational strategy, i.e. a strategy that has not yet developed.

Here are some examples of such statements.

Rational reflection:

"I believe that getting a higher education affects the transformation of personal values. A person who goes to university wants to get knowledge if no one forced him and this is his personal choice. In the subjects, the student can learn something new for himself. He can immerse himself in some subject very much, because he liked it and based on this, the knowledge gained can open new things to the world to him."

"Of course, the basic values are formed at an early age, at school. However, higher education also influences the transformation of personal values. For example, a person receiving a higher education may be very interested in science, new discoveries, work at the department, in laboratories, and these values will be more expensive for him than material ones due to low earnings or social ones, since there is little time for personal life. Each case is different, but in this example I note that the previously prevailing values fade into the background."

Table No. 4. Tags describing value transformation strategies.

Mastering new values	**Descriptive characteristics of links – associations**	**Number of respondents, %**
conscious	*Revision of values, reformation, acceptance, adaptation of one's values, adherence to the proposed system of values - 2*	**7**
unconscious	*Makes (think) – 2, imposing values in the learning process, filtering values*	**4**
freewill	*Passion (education), expansion of the value network, imperceptible transformation, independent search for suitable values, acquisition of values*	**6**

Continuation of table No. 4.

forced	*Mastering values through overcoming discomfort, difficulties, acceptance of conflicting values, involuntary agreement with values*	**4**
Situational-spontaneous	*It happens in different ways - 4, depends on the situation – 6, depends on the mood, multivariate, affects a lot of external processes*	**36**

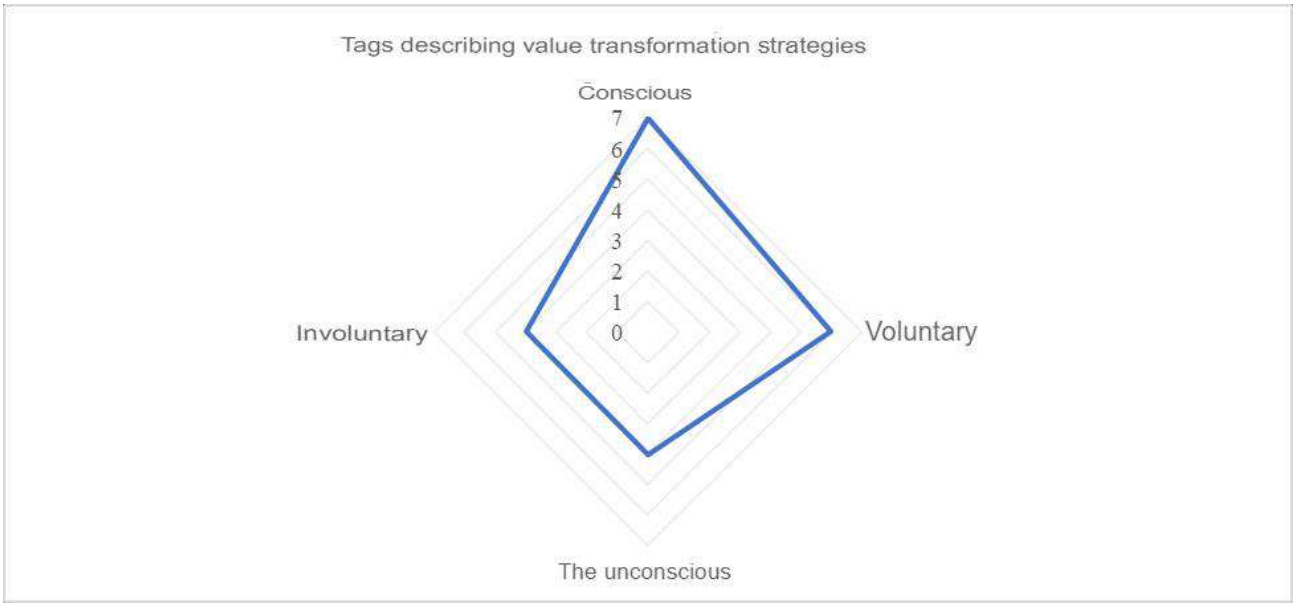

Diagram No. 2. Tags describing value transformation strategies.

"If a person honestly devotes himself to education, he develops certain values (diligence, work, respect for elders, ethical attitude towards other people, understanding that everything depends only on us; that people need to be helped and this help will come back to you doubly)."

"In my opinion, getting a higher education plays a big role in the transformation of personal values only when the direction chosen for study really appeals to a person."

Forced reflection. It is appropriate to recall here that not all values are as something conscious and positively perceived: not all values are pleasant[167]:

"I believe that getting a higher education affects a person's values, maybe not directly, especially in technical areas, but a teacher can often not only tell his subject, but also make students think about something and reconsider their life attitudes. But it also depends on the student himself, so in the process of studying at the university, someone will reconsider their views, and someone will remain the same as he was."

"In my opinion, higher education lays the foundation for professional deformation, the strength of which will be expressed in the time spent in the field. Higher education is obtained at a conscious age,

[167] Tugarinov V.P. Selected philosophical works. — L.: LSU, 1988. p. 261.

when all the values of a person have already been formed (based on human psychology), however, they can be distorted due to professional deformation."

"I believe that the presence of higher education affects the transformation of personal values, since certain cultural values are imposed on a person in the process of learning. Education influences the choice of profession, but sometimes people do not go to work in a profession after graduation, this does not negate the fact that the function of the filtering device does not change by education."

"In addition, I can't help but mention the learning process itself: in the classroom (and in self-study), questions are constantly raised that you have to think about, whether it's philosophy, sociology or ethics."

"Plus, education itself forms a person's critical thinking, his own opinion on policy issues, makes him think about issues that he would not have taken on himself."

Irrational reflection:

"A student got into some university where teachers broadcast a certain opinion about politics - and the political values of this student will change (but they may or may not change the same way)."

"If you take us techies as an example, then knowledge of computer science or the basics of programming, in my opinion, in no way affected my values. Another question is if, for example, in the process of obtaining higher education, the emphasis is on some humanitarian specialties, such as philosophy. Some kind of transformation is already possible here, because such activity is almost directly connected with a person, with his history, with his consciousness and his being as such."

"I think that specifically higher education can transform a person's values, but it may not change a person in any way. Values, it seems to me, change from specific knowledge and life situations. I don't think that learning a programming language can change life guidelines. But studying history or philosophy can give a person the opportunity to look at the world from a different angle, which can change his values."

Irrational - critical reflection:

"I think that everything depends purely on the individual experience of a person. If there is a strong influence in the family, a person's environment, then getting a higher education (especially if there are no subjects in it that affect it in one way or another) is unlikely to have a good effect on a person's values. However, if certain work is carried out with students at the university, then the probability that values, whatever they may be, will change (for the better) increases. Without specially conducted work with the student, the values are not only unlikely to change, but quite possibly will change for the worse."

"As an example, I can cite my good friend who came to the university with a red certificate and the desire to honestly take subjects and teach them. But, having got into a not very good company, she changed her priorities and views on education in general. If a person does not study and passes

everything with the help of any other factors, then he forms values such as lying to help himself; getting out, neglecting someone else's work."

Situational strategy:

"Of course, each person decides for himself whether to take the opportunity to change himself, his values and his life in general."

"It depends on the person, but there are such cases. For example, obtaining knowledge from a subject area may or may not affect a person at all. Or there are cases when the transformation of moral values can occur due to teachers (their presentation of the material)."

"I believe that getting a higher education has a strong influence on a person. But only the person himself will be able to determine whether this influence will have a positive effect on him."

Result 5. The process of studying at the university – obtaining new knowledge - significantly transforms the thinking of students, which ultimately affects the revision of previous values and the emergence of new ones, as well as the growth of subjective self-esteem and their new place in society. These results are presented in Figure No. 4.

As you can see, the most significant changes in the opinion of students during the study period are subject to their thinking: *"Yes, it does, because all spheres of society are interconnected and therefore in-depth knowledge in one area allows you to look at another area from a different point of view, which in the end can lead to the transformation of human values. For example, the study of micro- and nanoelectronics somehow makes a person think about the question "Why can some produce and others not?", which eventually leads to a more detailed study of this issue from the point of view of all spheres of society (which is facilitated by higher education) and transform their values and attitudes towards others, more general questions".*

"I believe that obtaining higher education (obtaining knowledge, skills, abilities, people, students for the sake of a diploma are not considered) affects the transformation of personal values, because in the process of learning, a person receives new knowledge and skills, which directly affects his thinking, and therefore, values change and transform in the process. For example, a student studying in areas related to politics is likely to transform his own political values by the end of his studies, because he will consider this topic from the acquired knowledge, the same can be said about creative areas of study, etc."

The main features that develop in the process of these changes are the ability to think and reason in a new way, the development of analytical thinking abilities and the ability to compare information. An important feature of thinking, students note an increase in criticality as an incentive to the formation of new values: *"One of the most important things that can be obtained together with higher education is critical thinking. In this case, it can affect the transformation of personal values, because a person will be able to sensibly rethink some of his values."*

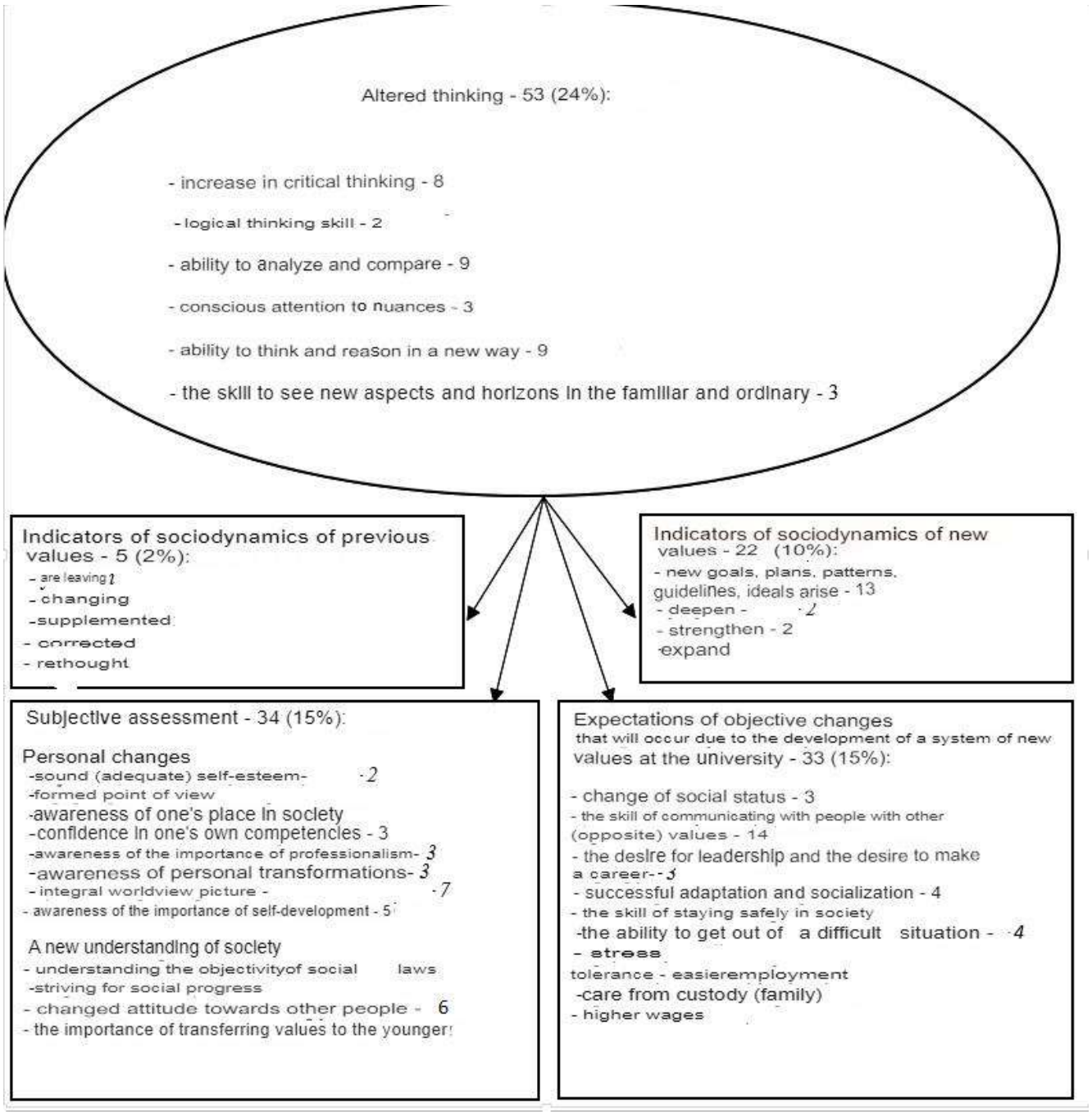

Figure No. 4. Graphical representation of result No. 5.

And yet, the central characteristics of students' thinking, the most important for the process of forming values, should be recognized as the "expansion of the horizon of thinking", i.e., firstly, the emergence of a social scale of evaluating events and facts, secondly, the ability to form their own view of problems and thirdly, the development of the skill of choosing priorities. In essence, the latter is the fixation of the emergence of a mechanism for the formation of values – the choice of important, significant and valuable, the distribution of events and facts according to the degree of value – this is the value.

The results of reflection and rethinking transform the attitude to the old values, which are "corrected", "supplemented", "changed", - "go away".

New values are being formed more actively: new "goals", "plans", "patterns", "ideals", "landmarks" are emerging. New values are "deepening", "expanding", "strengthening".

Students record a number of important subjective and personal changes under the influence of learning: *"A person, realizing that he is interested in this, begins to devote more time to this: he begins to invest time in himself and increase his value. When a person knows what he is worth, he knows that it is impossible to "sell" himself cheaper. Thus, a person's views on values such as morality change. Aesthetics: He begins to see something special in the business that he likes. Also, the transformation is strongly influenced by the environment, that is, classmates and teachers."*

First of all, this concerns the emergence of a "whole worldview picture of the world", as well as "awareness of the importance of self-development", "awareness of one's new place in society", "confidence in competencies and professionalism". Such new characteristics of personal self–assessment as "understanding of the objectivity of social laws" and "social progress", especially "changed attitude to other people", are essential.

The changed values imply, from the point of view of students, actual "changes in social status" that are important for their professional activities. First of all, it is the "skill of communication with other (opposite) values": *"Getting a higher education affects more the development of discipline and communication skills and experience (visiting couples, how interesting and necessary it is, building communication with colleagues and teachers, solving some issues)."*

This should also include the expectation of more "successful adaptation and socialization", "the ability to get out of difficult situations" and "stress tolerance". It is assumed that the new values will allow achieving "easier employment" and "building a career", "leaving custody (family)" and "higher wages".

The main conclusions. According to one of the respondents, the acquired knowledge, skills and abilities at the university, as well as the values formed, are a "single system". In essence, this position confirms that human capital and personal values can be figuratively represented as a kind of trigger, i.e. they can be characterized by the ability to be in one of two stable states and alternate under the influence of external signals – received information, to implement cause-and-effect relationships. In this sense, information is the most important and influential source that encourages the formation of a unified system of human capital - values: *"I think it does. Getting new knowledge, information, a person can begin to look at the world in a different way. He begins to think differently, explains the surrounding events to himself not so much at the expense of the opinions of others, but already applies the information that he owns. The attitude towards yourself may also change. Accordingly, the values."*

"Receiving leading information in any field gives a person the opportunity to develop mentally and spiritually, which, of course, affects values: they change, deepen. Intellectual development of a person when he is studying at a university, getting a higher education, since during these 4, 5 or 6 years a person gets a huge layer of information that he processes and assimilates, overcomes difficulties, which cannot but affect his personal qualities, studying at the university hardens a person."

The connections between the acquired knowledge and the emerging values can be presented as shown in Figure No. 5.

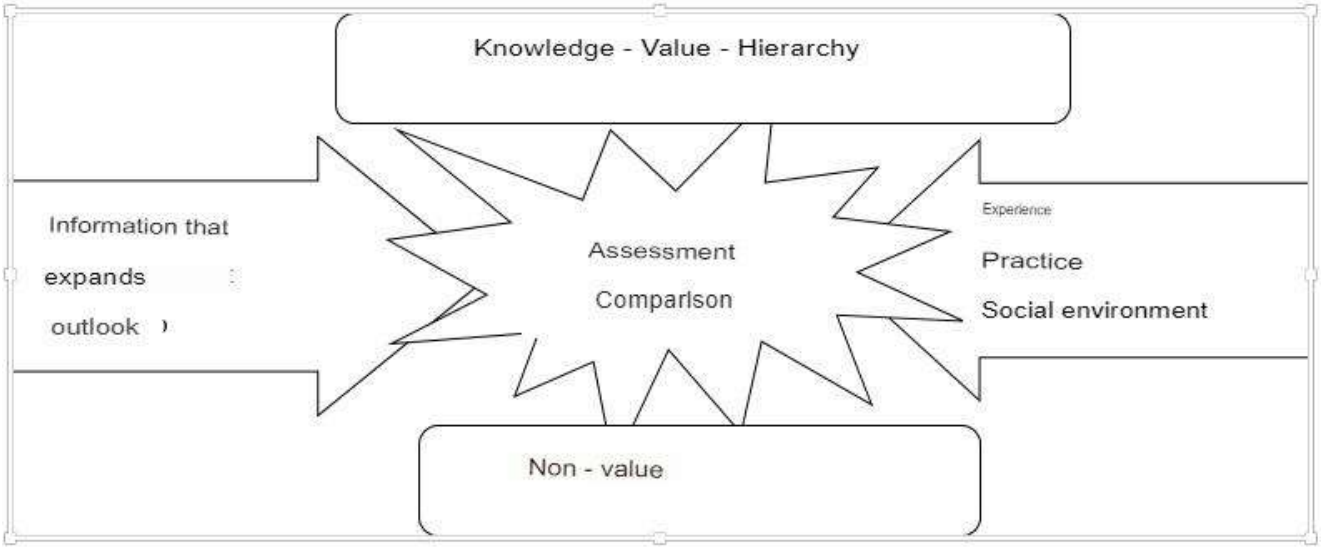

Figure No. 5. A model of the relationship between information, knowledge and values.

The incoming information is compared and evaluated in terms of compliance with the accumulated experience and received social practice, compared with the assessments and opinions of the immediate environment. In the case of experimental and social confirmation of the adequacy of information, it becomes important, significant, valuable – a value. The main indicator of value lies in its ability to influence the hierarchy of events, facts, phenomena. Describing the process of value formation, O. G. Drobnitsky notes that "this is a phenomenal expression of the extreme complexity, diversity and mutual interweaving of the socio-historical needs reflected in every norm."

The hypotheses of this part of the empirical study have been proven to varying degrees of argumentation.

1. The hypothesis that students consider the relationship of knowledge, skills and abilities - as the main elements of human capital – with values as a significant and positive correlation has received almost complete confirmation.

2. The students' value system is grouped by types related to various spheres of public consciousness and practical activity. Students quite clearly distinguish a number of such values, which

differ in indicators and evaluation criteria. As V.P. Tugarinov noted, "Truth acts as such a criterion for science, good for morality, and beauty for art. These are the concepts in which the essence, meaning and purpose of each of these forms of social consciousness are expressed.[168]"

In connection with the verification of this hypothesis, it seems necessary to further research and discuss a number of problematic situations. Firstly, professional values are perceived by students much more passively than the values of the socio-humanitarian order. In our opinion, this situation is explained by a certain gap in the understanding of the meaning and content of students' training in special disciplines, when the problems of value formation are mainly topics considered in the course of social and humanitarian disciplines. The only exceptions are some subjects, for example, professional ethics and interpersonal communication, which students talk about as important for understanding their profession. In this sense, it remains relevant to include in the courses of social and humanitarian disciplines blocks of information that contribute to students' awareness of the specifics of their future profession. Further, 4-year bachelor's degree training does not allow you to fully realize and master the values of professional activity, since special disciplines are mastered only at senior courses, and according to the students themselves, the formation of values is a "long process". In the present case, the period of mastering special disciplines has been shortened.

A relatively insignificant part of students assess scientific and educational activities as an important and significant prospect, recall that about 8% of respondents stated the importance of these values. Even less relevant for students were the values of the market economy – at the level of statistical error.

3. The hypothesis about students' awareness of factors and conditions important for the formation of a system of actual values has been confirmed: students are more aware of how actual conditions and factors affecting values are less focused on methodological approaches that reveal the practice of the organization and methodology of the university. Nevertheless, 19.9% of students noted carrying out special work on the formation of a system of values as significant and important: the expediency of educational work and motivational activities; the importance of emotional uplift and conscious achievement of learning goals; the relevance of the duration and continuity of the educational process. A number of respondents stressed the need to ensure reflection and awareness of the unity of relevant (new) information, new knowledge, proven best practices of professional activity as the basis for the formation of a system of values.

4. The results of the study confirmed the existence of a number of strategies that show a different assessment of the relationship – reflection - between knowledge and values, more precisely, conscious or unconscious, voluntary or forced development and acceptance of values, as well as situational and

[168] Tugarinov V.P. Selected philosophical works. — L.: LSU, 1988. p. 282.

spontaneous attitude to the development of knowledge, skills and abilities. The analysis of the materials shows that the principles of situational-spontaneous strategy are most common. In the present case, we can talk about the importance of carrying out special measures to train students to plan their self-development, giving this work a conscious and purposeful character.

5. The hypothesis about the transformation and revision of previous values under the influence of the learning process has received some confirmation. To one degree or another, more than 70% of respondents stated about such transformations. The acquisition of new knowledge acts as an incentive for the development of a new understanding of previous values and activates the development of new values. Rather, we can talk about new values-goals (according to M. Rokich). Knowledge stimulates personal changes and awareness of one's place in society. New values form new expectations and changes in the status of graduates.

The conducted research shows the relevance of the modern reading of V.P. Tugarinov's conceptual ideas regarding the connections of cognition with values and further with productive activity. In the conducted research, such connections are identified and characterized in a number of directions and content elements. It becomes obvious: any cognitive activity stimulates and develops the value system of students. In the current socio-political situation, inattention to the information saturation of the educational process, without analyzing the context of this information and the methodological security of mastering new knowledge, the formation of a modern specialist will not reflect the actual social significance of values, the formation of human capital will not adequately reflect the needs and interests of the information society.

2.2. World-class scientific and educational centers as drivers of human capital formation: sociological analysis of the problem field

The doctrinal goals of Russia 's national projects define the development of science and the improvement of education as the decisive conditions for their achievement[169]. In the current difficult socio-political and economic situation, a breakthrough in scientific and educational activities is

[169] Voronov S. I., Vorobyeva T. N. State policy and legislative framework in the field of activity of the scientific and production platform "rational nature management" of the world-class scientific and educational center "innovative solutions in the agro-industrial complex" // Achievements of science and technology of the agro-industrial complex. 2020. Vol. 34, No. 9. pp. 19-24.

becoming increasingly important, including it becomes important for ensuring the security and independence of Russian society and countering various threats[170].

In an effort to achieve the set goals for the medium and long term, Russia has created a system of scientific (NC MU) and world-class scientific and educational centers (SEC), which are assigned a decisive role not only in developing a scientific platform for the development of regions, but also in the interests of forming a new type of researchers – young talented scientists capable of to make a scientific breakthrough in a highly competitive scientific environment. In this regard, SEC are rightly regarded as drivers of socio-economic development and the inclusion of Russians in effective scientific and industrial activities. In terms of production, such centers have a primary role as "accelerators of innovation". In the social sense, SEC aims at forming and stimulating the development of modern human capital of the regions in the broadest sense of this concept and ensuring a synergetic effect relevant for economic breakthrough and achievement of strategic social objectives of the country's development[171].

Substantial funds are allocated for the development of the SEC system. The budgets of these centers are funded, which consists of grant activities, the regional budget and extra-budgetary funds (table 5).

Table No. 5. Planned structure of financing of SEC in the Russian Federation until 2024.

SEC	**Grants, million rubles.**	**RB, million rubles.**	**Extra-budgetary funds, million rubles.**	**Total, million rubles.**
Kuzbass	552,0	1 966,0	9 569,0	12 087,0
West Siberian	383,0	30 561,0	10 736,0	41 680,0
"Rational Subsoil Use"	420,0	1 050,0	19 530,0	21 000,0
"Technoplatform 2035"	552,0	2 085,0	10 281,0	12 918,0
"Innovative solutions in the agro-industrial complex"	–	–	–	15 000,0
"Engineering of the future"	576,0	260,4	5 252,6	6 089,0
"Advanced production technologies and materials"	634,0	812,0	12 724,0	14 170,0
"Russian Arctic"	1 6937,5	1 267,0	109 246,0	12 7450,5
"Tulatech"	1 056,0 512,0	139,0	10 100,0	11 295,0
"Eurasian"	15 440,3 511,8	10 334,8	14 402,1	40 186,7

[170] Korosteleva L. Yu. Universities of world-class scientific and educational centers and their importance in the performance indicators and development of regions // Sociological science and social practice. 2021. Vol. 9, No. 4. C. 250-263.
[171] Formation of an innovative educational system at the National Research University "BelSU" as a basis for training world-class personnel on the basis of the REC "innovative solutions in agriculture" / O. N. Polukhin, A.V. Mamatov, I. V. Spichak, N. V. Kiri // Achievements of science and technology of the agro-industrial complex. 2020. Vol. 34, No. 9. pp. 9-13.

As studies by Anisimova V. Yu. and Gaffarly E. P. show, the main share in the financing of the centers is made up of the regional budget and extra-budgetary funds.

The main expenses of the regional budget are directed to fundamental, applied research that meets the criteria and requirements of the regional market, the purchase of educational and scientific equipment; support and development of manufacturing enterprises that are members of the SEC, in particular, updating their instrumentation, material and technical base; advanced training and additional professional training and other areas[172].

In addition to significant financial costs, the activities of the SEC are supported by scientific developments that contribute to the development of human capital. In particular, in 2018, the Center for Interdisciplinary Research of Human Potential was established, which is a consortium of four organizations: the National Research University Higher School of Economics, the Russian Academy of National Economy and Public Administration under the President of the Russian Federation, the Moscow State Institute of International Relations (University) Ministry of Foreign Affairs of the Russian Federation and the Institute of Ethnology and Anthropology named after N. N. Miklukho-Maklaya RAN. Numerous tasks of the center are concentrated around the problems of human capital development and the development of fundamental and applied strategies for its improvement.

Along with this, the activities of the SEC, as a new type of social organizations aimed at the development of the human capital of the regions, involves the study of a number of scientific and applied problematic issues, as well as testing hypotheses relevant to the development of the theory and practice of sociology of organizations. Such problems and hypotheses include:

– firstly, the analysis of the inclusion of human capital issues in the regulatory framework of the existing SEC. Here it is important to identify and systematize the data characterizing the orientation and orientation of the strategies of the centers in the interests of the development of the human capital of the regions;

– secondly, the study of the activities of the SEC as institutions for the formation of human capital based on the appeal to the value-motivational structures of human capital, orienting young people to active, interested and creative participation in the socio-economic activities of the regions, i.e. identifying how relevant and implemented modern ideas about the nature of human capital;

– thirdly, the study of the process of institutionalization of SEC, the stages and qualitative characteristics of their formation as social organizations included in the social structure of Russian society, in particular, the correspondence of the nature of the internal environment to the influences and characteristics of the external environment;

[172] Anisimova V. Yu., Gafarly E. P. Analysis of financing and the role of world-class scientific and educational centers in the Russian Federation // Vestn. Samar. un-ta. Economics and management. 2021. Vol. 12, No. 2. pp. 7-18. p. 12.

– fourth, the study of the focus of educational activities of universities of the SEC on the formation of orientations and values of students relevant to the current socio-economic situation (entrepreneurship, competitiveness, etc.) and the analysis of the conformity of the values formed to the market environment.

The purpose of the study is a sociological analysis of the activities of SEC and the identification of their potentials as drivers of the formation of the human capital of the regions on the basis of appeal to values and motivations, support for creative and talented youth.

Methodology and sources. As the research of Kuptsova I. V. and Laktaeva N. E. shows, the concept of SEC is based on the idea of creating a unique eco-environment that promotes the unhindered conduct of scientific and innovative activities[173].

In this regard, the methodological foundations of the study are based on the principles of analyzing the activities of SEC as innovative ecosystems aimed at the formation of human capital.

The concept of "innovation ecosystem" in relation to the SEC should be considered as a multifaceted phenomenon. The main feature of such a system is the co-evolution of its participants throughout their interaction. In the studies of Akberdina V. V. and Vasilenko E. V., the main elements that ensure the viability of ecosystems are shown. These include: the central entity around which the innovation ecosystem is built – it can be a firm, a digital platform; various economic agents who are or are not members of the innovation ecosystem; links between the members of the innovation ecosystem; additional resources received by the participants of the innovation ecosystem; common goal of the participants of the innovation ecosystem; jointly created values; interdependence of ecosystem members; embeddedness of members in the ecosystem; strategy of the innovation ecosystem; ecosystem boundaries; ecosystem dynamism; benefits from the ecosystem[174].

In the interests of a sociological analysis of the activities of the SEC, it is necessary to emphasize the relevance of its elements, where social components play a decisive role. In particular, this applies to the ideas about the common goal of the participants of the innovation ecosystem – the defining element for the entire system, it is called the ecosystem value proposition[175]; jointly created values - the innovation ecosystem allows its participants to jointly create values that they could not create alone[176].

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[173] Kuptsova I. V., Laktaeva N.E. Scientific and educational centers as a driver of the development of the innovative economy of Russia // State and municipal administration. Scientific notes. 2020. No. 2. pp. 70-76. DOI: 10.22394/2079-1690-2020-1-2-70-76.

[174] Akberdina V. V., Vasilenko E. V. Innovation ecosystem: a theoretical review of the subject area // Journal of Economic Theory. 2021. vol. 18, No. 3. pp. 462-473. pp. 465-467

[175] Walrave, B., Talmar, M., Podoynitsyna, K. S., Romme, A. G. L., Verbong, G. P. J. (2018). A Multi-level Perspective on Innovation Ecosystems for Path-breaking Innovation. Technological Forecasting & Social Change, P. 136, 103–113. Konietzko J., Bocken N., Hultink E.J. Circular ecosystem innovation: An initial set of principles // Journal of Cleaner Production. 2020. Vol. 253.

[176] Konietzko J., Bocken N., Hultink E.J. Circular ecosystem innovation: An initial set of principles // Journal of Cleaner Production. 2020. Vol. 253.

The interdependence of ecosystem members - the result of the activities of key ecosystem members influences and determines the success or failure of its value proposition and each ecosystem member individually[177]. The embeddedness of members in the ecosystem means that a particular member has the opportunity to receive personal benefits from the value created with the participation of other members of the ecosystem[178]. For small organizations, participation in the ecosystem is a chance to be competitive on the world stage[179]. The shown elements of innovative ecosystems play a crucial role for the interests of this study.

A special role in the system is assigned to the "digital ecosystem" and the "regional innovation ecosystem". The main factors that influence the effective development of innovative ecosystems are: innovation factor (constant transformation of technologies and resources into new products with lower costs, adaptation to a changing environment and the creation of new niches[180]; strategic factor (process development, work with partners and potential followers, the creation of an innovation strategy that takes into account the inherent risks of the ecosystem[181]; infrastructure factor (the state of cluster development, cooperation between universities and industry, the presence of a culture of innovation[182]; the human factor (the presence of talented people; concentration of researchers, entrepreneurs and various institutions; the presence of a culture of entrepreneurship, access to capital and a favorable environment from the point of view of regulatory regulation[183]. In general, the ideal SEC ecosystem will be one that will allow a qualified customer to find a qualified contractor, as well as vice versa[184].

Another part of the methodological guidelines of the study directly relates to the ideas of human capital as a phenomenon that must be affected and built on a value-motivational basis. The basic provisions on the nature and essence of values, their nature and the sociodynamics of formation are considered from the standpoint of the understanding sociology of M. Weber and G. Simmel. An important role in the modern understanding of values was played by the ideas of the activity-activist approach of V.A. Yadov and P. Shtomki, explaining the value-motivational factors of the activity of the

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[177] Walraven, V., Talmar, M., Podoynitsyna, K. S., Rome, A. G. L., Verbong, G. P. J. (2018). A Multi-level Perspective on InnovationEcosystems for Path-breaking Innovation. Technological Forecasting & Social Change, 136, 103–113. Konietzko J., Baker N., Hunting E.J. Circular ecosystem innovation: An initial set of principles // Journal of Cleaner Production. 2020. Vol. 253. URL: https://www.sciencedirect.com/science/article/abs/pii/S0959652619348127 (accessed: 12/22/2021)

[178] Walrave, B., Talmar, M., Podoynitsyna, K. S., Romme, A. G. L., Verbong, G. P. J. (2018). A Multi-level Perspective on Innovation Ecosystems for Path-breaking Innovation. Technological Forecasting & Social Change, 136, 103–113.

[179] Akberdina V. V., Vasilenko E. V. Innovation ecosystem: a theoretical review of the subject area // Journal of Economic Theory. 2021. vol. 18, No. 3. pp. 462-473. pp. 466

[180] Iansiti M., Levien R. Strategy as Ecology // Harvard Business Review. 2004. Vol. 82(3). P. 68–78. PMID: 15029791.

[181] Adner R. Match your Innovation Strategy to Your Innovation Ecosystem // Harvard Business Review. 2006. Vol. 84(4). P. 98–107.

[182] Mercan B., Göktaş D. Components of Innovation Ecosystems: A Cross-Country Study // International Research Journal of Finance and Economics. 2011. Vol.76. P. 102–112.

[183] Akberdina V. V., Vasilenko E. V. Innovation ecosystem: a theoretical review of the subject area // Journal of Economic Theory. 2021. vol. 18, No. 3. pp. 462-473. p. 468.

[184] Kuptsova I. V., Laktaeva N.E. Scientific and educational centers as a driver of the development of the innovative economy of Russia // State and municipal administration. Scientific notes. 2020. No. 2. pp. 70-76. pp. 75

active part of the population in achieving socially significant goals and results as subjects of innovation and modernization activity. To a large extent, the provisions that, since the late 1980s, the content of human capital is largely determined by intangible factors and information - information capital – have been used to study the nature of the human capital of modern man. In the modern world, human capital is formed in connection with non-cognitive and emotional skills, an important role is assigned to the childhood period of life, family, preschool, school and university education.

In the aggregate of the presented methodological guidelines of the study, SEC are considered as social organizations aimed at the formation of human capital, organizing their activities on the actual principles of building education and training of specialists.

The hypothesis of this empirical part of the study: in scientific publications on the problems of the activities of scientific and educational centers of the world, there is no research focus on the study of human capital, including value-motivational structures of personality.

The activities of the SEC become the object of analysis by specialists of both state administrative bodies and researchers of various scientific schools and areas in which various facets of the activities of these social organizations are studied. Summarizing the research focus of this issue, it should be emphasized that there are a number of vectors of such research: firstly, an analysis of the development of the regulatory framework for their activities; secondly, an analysis of the coverage of the problems of the activities of SEC in scientific publications; thirdly, empirical studies of the impact of the training system on students at the universities of the SEC; fourth, assessment and analysis of the problem field of the formation of the social institution in question.

The first result. At the regulatory and legal level, in the target orientations and activities of SECs, as well as in the ideas about the mission of the centers, the problems of human capital formation are mainly associated with educational activities and training – the acquisition of professional knowledge, skills and abilities. The data of this analysis are obtained as a result of studying publications that cover topics related to the activities of the SEC[185].

In general, we can say that the most relevant areas of activity of world-class scientific and educational centers by now can be defined as four orientations of this work. These areas are related to: 1) improving the education and training system; 2) involving SEC researchers in solving economic problems of specific regions; 3) developing innovative activities and developing new technologies; 4) ensuring the network interaction of science with scientific universities and scientific organizations in Russia and abroad[186].

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[185] Popov R.E., Baruzdin I.A., Salakhutdinov A.A., Deryugin P.P. World-class scientific and educational centers as drivers of the formation of Russian human capital: sociological analysis of the problem field (to the 300th anniversary of St. Petersburg State University). Discourse. 2022;8(3), pp. 41-55.

[186] Sorokin, A. N., Yakovleva E. I., Filchenkova I. F and others. Competencies of the scientific and educational center: definition, list and structure / // Vestn. Minsk. un-ta. 2021. Vol. 9, No. 1. pp. 30-38.

As for the interests of the transformation of the system of educational activities of universities operating as part of the SEC, the most urgent tasks here are the search for new approaches to professional training, the inclusion in educational activities of heads of organizations and entrepreneurs, project managers, attracting foreign specialists to participate in the training of students and researchers.

The inclusion of SEC in solving the tasks of specific regions implies, first of all, efforts to achieve the advanced development of the regions on the basis of modern technological structure, the use of resources and potentials of the regions, taking into account the specifics of the development of spatial complexes.

The development of innovations and ensuring a technological breakthrough in the SEC is considered in conjunction with the accelerated digitalization of the activities of enterprises and firms in the regions, as well as the commercialization of all types of activities in the interests of achieving competitiveness in market conditions of economic activity[187].

Regarding the development of network interaction of the SEC with leading domestic and foreign universities and scientific organizations, it should be said about the recognition of the importance of cooperation efforts of scientists and researchers around the interests and goals of enterprises and industrial organizations of the regions, as well as the search for new forms of network activity.

The mission of the SEC. As the analysis of the regulatory documents of the SEC shows, the main provisions of the declared missions of the centers established and operating in the territory of the Russian Federation are:

1. Providing leadership in scientific developments of various types of economic activity and social life, taking into account regional specifics (oil production, agriculture, machine and robot building, etc. – depending on the orientation of the regions).

2. Ensuring competitiveness in the main areas of regional development.

3. Ensuring the growth of the market share and commercialization of the activities of enterprises and organizations in the socio-economic structure of regions capable of providing leadership in world markets in the claimed development sectors.

4. Formation of an ecosystem that provides a technological breakthrough based on research and scientific developments.

5. The widest range of scientific and educational technologies for the development of talents, potentials and activity of personnel and youth[188].

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[187] Deryugin P.P., Sidorova A.N., Bannova O.S., Popov R.E. "Own world" of values of students of IT specialties". Collection of materials of the International Conference on Natural Sciences and Humanities. Saint Petersburg State University, 2021, pp. 889-890.

[188] Kamenskikh M. A. Investigation of the essence and features of world-class scientific and educational centers // The economic revival of Russia. 2020. No. 4 (66). C. 135-141. p. 138.

Thus, in the regulatory documents of the SEC, a general system of routes and strategies for their development has been formed, allowing achieving the main goals - ensuring a scientific and socio-economic breakthrough of Russia according to the parameters and tasks outlined in the national projects of the Russian Federation. At the same time, the formation of human capital, the social, informational (media) and pedagogical component of this work is presented only indirectly, and the formation of human capital is assumed mainly in the process of obtaining professional knowledge, skills and abilities. As for the value-motivational incentives for the development of the human capital of the regions, much less attention is paid to these areas of work.

The second result. In scientific research directly devoted to the analysis of the process of institutionalization of the SEC, the value-motivational problems of the formation of the human capital of the regions are given a secondary role. No scientific studies devoted directly to this problem have been identified.

The analysis of scientific publications was carried out on the Cyberleninka platform, where 37 articles directly related to the topic under study were identified at the request of the search engine. The results of the study are shown in Table 6.

Table No. 6. Topics of publications in journals on the Cyberleninka platform, directly covering the activities of world-class scientific and educational centers.

Topics of publications	Number of publications
Characteristics of SEC as specific social organizations, features of their infrastructure and legal bases of activity, including activities in special conditions	9
Financial activity of SEC	1
International activities and international relations of SEC	3
Development of directions, strategies and guidelines for the activities of SEC, indicators and diagnostics of the achieved level of activity	6
Achievement of the innovative nature of the activity of the SEC	9
Analysis of scientific traditions, scientific potential of the activities of the SEC as sufficient to achieve the set goals	2
The advanced nature of education and training of bachelors, undergraduates and postgraduates, staff training at universities of the SEC, the readiness of the teaching staff to work in a competitive environment	7

The analysis of the research topics shows that at present the centers are going through the stage of their formation and the actual solution of the problems of intrastructural formation are the most relevant for them. It is obvious that scientific research and analysis of the activities of world-class scientific and educational centers are mainly associated with the study of strategies for achieving the innovative nature of production activities and the specifics of the formation of infrastructure elements of the centers. An important area of research is the development of directions, strategies and guidelines for the activities of SEC, as well as the search for adequate indicators and technologies for diagnosing the level of their development. Most of the identified relevant publications are devoted to this issue – 24 out of 37.

As for the problems of the development of the human capital of the regions, such materials are practically not studied in the direct formulation of questions, or it is done "along the way", in particular, when considering the problems of ensuring the advanced nature of education and training of bachelors, undergraduates and postgraduates, in general, personnel training at universities of SEC, sometimes when analyzing the readiness of the teaching staff to work in a competitive environment. There are fewer such studies, only 7 publications out of 37. Regarding the formation and influence on the value-motivational foundations of human capital of trainees in training centers, no special studies have been identified.

The third result. As according to the previous analysis, expert interviews showed that the main problems of the SEC are the problems of internal self–organization and establishing interaction between the main participants of the centers – universities - production structures and state administrative bodies. In this triad of social ties, experts stressed the difficulties of building interactions between universities and production structures involved in the educational process. The indicated conclusion is formulated based on the results of generalizations of expert interviews conducted with managers and management of SEC (a total of 12 respondents representing 12 regional SEC, which were collected during the exhibition at an international conference held in August 2021 in Novosibirsk).

In addition to the problems shown, during the interview, statements were made that the activities of the SEC lack structuring, clear and precise work orientations (in particular, this is typical in understanding world standards and levels of activity), feedback from participants in the production and educational process. The goals of the activities of the participants of the SEC are poorly aligned (university – production – administration). Serious investments are required in the infrastructure of universities focused on digital technologies, including the acquisition of super-powerful computer services and technologies capable of achieving world standards of information processing[189].

[189] Kurakova N. G., Cherchenko O. V. Approaches to the definition of key functions and target indicators of regional scientific and educational centers // Economics of science. 2020. Vol. 6, No. 4. pp. 212-224.

The problem of teaching staff, teachers involved in digital technologies and capable of organizing the educational process and teaching on digital platforms at the level of the highest world standards is discussed separately. This applies to the teaching of any disciplines, including social sciences and humanities. The importance of the ability to work with talented specialists and personnel, the readiness of the teaching staff to significantly change the system of training students was emphasized. Some of the interview participants emphasized the urgency of preserving intellectual property and the insufficient legal basis for the protection of research, and hence the reluctance of scientists to share their ideas, in particular, to be published in foreign journals. The importance of achieving unity of study-development-practice and scaling of these educational technologies was emphasized.

It can be argued that the managers and managers of SEC are deeply involved in the problems of the centers' activities. At the same time, summarizing the results of the interview about the problematic field of activity of the SEC, it can be stated that the problems of the value-motivational component of students' human capital are classified as less significant.

The fourth result. Weak orientation of the educational process to the development of the value of business qualities and entrepreneurship of students, underestimation of the importance of independence, talent development, initiation of search and creativity of students.

In this case, we mean the results of an empirical sociological study specially conducted at one of the universities included in the SEC. The results, methods and technologies of this study are described in more detail in the publications[190].

First of all, the results and conclusions of the study fix the weak dynamics of the development of student values relevant to the practical activities of graduates – values of the business order, such as purposefulness, rational approach to solving problems, competitiveness, entrepreneurship, etc., which are important guidelines for obtaining higher education in the SEC in a market situation.

Secondly, it was revealed that the focus of the educational process on mass education of "all" and "by the same standards", as a kind of "alignment" according to the same standards of training, affects the loss of interest in higher education among those students who have experience of work and entrepreneurship in the conditions of the modern market, already having a developed the value-motivational basis of participation in production and commerce.

Thirdly, there was a less significant increase in motivation for the profession among young men against the background of sociodynamics (increase) of motivation for the profession among girls. In particular, such differences are characteristic of the development of the digital space, where initially the motivation of young students turned out to be much higher, but the realization of this interest in the

[190] Deryugin P. P., Lebedintseva L. A., Yarmak O. V., etc. Sociodynamics of the value of business qualities in the structure of human capital during the period of study at the university: strategy of sociological diagnostics / Sociology of Science and Technology. 2020. vol. 11, No. 4. pp. 139-160.

educational process faced organizational, technical, psychological and pedagogical problems that affected the decrease in the level of this interest. There are a number of other problematic trends in the formation of students' human capital, the solution of which involves additional efforts and resources.

The conducted research allows us to draw a number of relevant conclusions:

– world-class scientific and educational centers established in 15 regions of Russia, forming as a specific social institution, are at the stage of their formation, aimed at ensuring a scientific breakthrough in a number of areas of economic activity. As for the activation of the human capital of the regions, this will require additional efforts and potentials, the development and implementation of modern methodologies and technologies of educational activities and information work, in particular, with students;

– according to the direction of scientific and applied research, SEC are focused on a set of goals that reflect Russia's strategic interests in the modern world. At the same time, the development of human capital and, in particular, the motivational and value structures of young people and students remain in the space of weak social and informational influence;

– the formation and development of SEC is associated with a number of problems and difficulties in mastering the world practice of such centers. Among such problems, the most relevant are: firstly, orientation mainly on one's own strength and limited use of the experience of other countries[191]. In the present situation, this provision becomes particularly relevant. Secondly, the focus is mainly on Western standards of conducting scientific activities, professional training, educational and informational work with students, weak communication with universities and research centers of the East, in particular, with such centers in China, where the experience of working on the formation of values and motivation of young people deserves some attention.

In general, as the study showed, the value-motivational aspects of the formation of human capital of the participants of scientific and educational centers constitute a significant issue that needs to be addressed. The existing gap between value-motivational structures and their exclusion from the system of analysis of human capital is scientifically untenable, and in a practical sense has a negative effect in real activity. Overcoming such a gap can be considered an urgent and promising scientific problem that requires further research.

[191] Kuptsova I. V., Laktaeva N. E. Prospects for the implementation of foreign experience in the formation of ecosystems of world-class scientific and educational centers // State and municipal administration. Scientific notes. 2021. No. 2. pp. 18-27.

2.3. Empirical study of the sociodynamics of the value of business qualities during the period of study at the university: a network approach

The purpose of the empirical part was to form a methodology of sociological diagnostics aimed at identifying, fixing and network modeling of the sociodynamics of business qualities in the structure of human capital as students study at the university[192].

Diagnostics of the sociodynamics of the value of business qualities of university students was based on a set of principles of the understanding sociology of M. Weber and G. Simmel, as well as the activity-activist approach of V.A. Yadov[193]. The conceptual provisions of diagnostics were expressed in the following postulates. From the point of view of M. Weber, the explanation of the nature of social phenomena lies in the plane of understanding people's behavior as "semantic connections between" the internal experiences of the subject and interactions with other subjects. According to Weber, in fact, here, in the interweaving between I and We, is the subject of sociology. Values are the central point of inner experiences and the trigger that orients all personality activity. G. Simmel, continuing the line of M. Weber, emphasized that any facts that have received emotional coloring and have passed through personal experience can become values for an individual, which now orient any meaningful choice. In this case, it was supposed to reveal how valuable business qualities become for students as they study at different courses at the university. Finally, the principles of the analysis of the activity-activist approach of P. Shtompki and V.A. Yadova allow us to institutionally characterize students as a subject of innovation and modernization activity, which is active in the business sphere.

The synthesis of the conceptual principles of these theories largely corresponded to the research topic, understood[194] as an analysis of the sociodynamics of the value of students' business qualities and the development of their motivation to be active in a market environment. The object of the study is students of one of the universities that are part of the SEC. The subject of the study is the sociodynamics of the values of students' business qualities during the period of study at the university.

The hypothetical assumptions of the study were as follows:

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[192] The empirical research was carried out as part of an initiative project under the guidance of a supervisor and with the participation of an applicant. Some of the materials have been published in a number of articles, see Deryugin P.P., Lebedintseva L.A., Yarmak O.V., Chikharev I.A., Yarmak V.E. Sociodynamics of the value of business qualities in the structure of human capital during the period of study at the university: the strategy of sociological diagnostics // Sociology of Science and Technology. 2020. №4.

[193] P. P. Deryugin, O. S. Bannova, R. E. Popov. Methodological foundations for measuring values from specialists // Sociology of Religion in Late Modern society. – 2022. – Vol. 11. – pp. 35-39.

[194] Shmatko N. A. Practical and constructed social groups: an activity-activist approach // Russia reforming. 2001. No. 1. URL: https://cyberleninka.ru/article/n/prakticheskie-i-konstruiruemye-sotsialnye-gruppy-deyatelnostno-aktivistskiy-podhod (accessed: 05/26/2020).

Firstly, the sociodynamics of the growth of the network characteristics of the value of business qualities will indicate a positive impact of the educational process at the university on the preparation of students as future participants in the market economy, the business environment.

Secondly, the sociodynamics of the values of the business order will be formed during the period of study among students representing various social groups with varying degrees of dynamism. The process of forming business qualities will depend on the initial social characteristics of students (place of birth, work experience, gender, etc.), and above all, on the degree of involvement in the market environment in earlier periods of life.

Thirdly, a comparison of the values of students and respondents representing a random sample of residents of the region will confirm that studying at the university contributes to the more active development of business qualities.

Confirmation of these provisions of the hypothesis as a whole will show that business qualities, as the core of human capital, are a special value subsystem that subsequently ensures the growth of income, profits, rent formation, etc. – that is, the capitalization of human knowledge, skills and abilities, which is undoubtedly one of the important goals of activity in a market environment.

The methodology for diagnosing the sociodynamics of the value of business qualities during the period of study at the university was carried out using a specially created procedure. The need was due to the objectives of the study, which assumed an appeal to the study of business qualities in the general system of personality qualities. Secondly, the goal was additionally set to create a universal methodology that could be applied to respondents of various specialties and training profiles. Thirdly, in traditional diagnostic procedures, the block of business qualities, their value in comparison with other groups of qualities, has not been identified on the basis of network modeling.

The formation of the methodology was carried out on the basis of the basic idea that business qualities make up characteristics that relate differently to other personality qualities. A preliminary analysis of the literature has shown the expediency of correlating business qualities with many other qualities that affect the state of human capital. However, we regard this approach as promising. Along with this, authoritative researchers emphasize the importance of consistent coexistence of business qualities with the qualities of collectivism, communicative qualities, as well as qualities that define a "good person", which can be regarded as the main condition for increasing human capital. Thus, a system of three dichotomous axes was built: business – communication[195].

According to the analysis of the literature on management and management, purposefulness, pragmatism, prosperity, prudence, leadership and authority were attributed to the qualities that show an

[195] Nezhinskaya T.A., Glazyrina E.Yu. Characteristics of components, indicators and diagnostic criteria for the formation of special professional competencies // Bulletin of the Kemerovo State University of Culture and Arts. 2018. No. 42. pp. 103-109.

attitude to business – business qualities. The significance of these qualities stems from the very nature of the main functions of management. In particular, the importance of including these qualities in the questionnaire was confirmed by the results of modern research (2017) conducted, in particular, in Perm by L.N. Kurbatova, T.A. Belozerova. According to the results of this study, it turned out that "specialists have less developed such business qualities that are necessary in the management of an organization.[196]"

Another group of qualities characterized the communication abilities and skills of students, since each graduate, as the leader of even a small group, "strives to create an effective working group. And communication is an important tool here[197]".

The third group of qualities assumed an assessment of the values of collectivism. Collectivism as important human qualities were considered within the framework of corporate culture by G. Hofstede, such qualities constitute a block of personality characteristics in the diagnostic procedure of Sh. Schwartz and M. Rokich. E. A. Livach speaks about the problematic nature of diagnosing collectivist qualities in the modern student environment[198]. Such qualities included: team spirit, altruism, helping others, benevolence, respect for people, caring for others.

The fourth group of qualities characterized a good person. "Good" in the Spencerian sense, i.e. such a person who does not violate the freedom of another person with his freedom[199]. In addition to freedom, modesty, tolerance, openness, truthfulness, and adequacy are included in the group of these qualities. In a certain sense, these qualities express contradictory poorly combined characteristics of a "good person", for example, openness – modesty, freedom - tolerance. However, such inconsistency in the opinion of J.V. Chetvertakov is explained as "a natural phenomenon in the character of Russians, manifested "in the bizarre coexistence and confrontation of the rational and irrational.[200]"

During the survey, Respondents were offered 24 qualities as important and significant (valuable), which represented 4 groups of qualities that characterized business, communication, collectivist and "good person" qualities:

"Dear colleagues!

We ask you to take part in a sociological study. The meaning of the study is to describe the qualities of the people who surround us. The study is conducted anonymously, without specifying names, surnames, etc., in this case it is absolutely not necessary.

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[196] Kurbatova L.N., Belozerova T.A. Opinion of heads of enterprises on professional and business qualities of graduates // Bulletin of PNRPU. Socio-economic sciences. 2017. No. 4. pp. 107-108.

[197] Vagapova N.A., Andrianova A.A., Kuzmicheva E.A. Communicative qualities of personality as a factor of conflict-free interaction // Bulletin of Kazan State Energy University. 2009. No. 3. pp. 47-51.

[198] Livach E.A. Collectivism and individualism in the system of values of students and cadets // Bulletin of St. Petersburg State University. Series 12. Sociology. 2010. No. 4. pp. 316-324.

[199] Vorontsov A.V. History of Sociology: textbook and workshop for academic undergraduate studies. Moscow: Yurayt Publishing House, 2019. 366

[200] Chetvertakova Zh.V. Regularities of the formation of national character // Analitika kulturologii. 2011. No. 19. pp. 222-229.

The study assumes three procedures.

1. Mentally imagine a real person who can act as a positive standard for you or is closest to such a standard. It is possible that he currently works or lives somewhere else, it does not matter. It is important that he really exists and his image can serve as a model for you to follow. To do this, in the column "+ Standard" (role model, positive standard), evaluate the qualities of this person on the following point scale:

5– the quality is very pronounced;

4 – the quality is quite pronounced (obviously);

3 – the quality is weak;

2– the quality is very weak;

1 – the quality is practically not manifested;

0 – there is no quality.

2. Do the same procedure with respect to the person you would not like to be like (column "– Standard");

3. In the column "I myself", evaluate your qualities according to the proposed indicators."

These qualities were evaluated relative to oneself, relative to positive and negative standards. In the present case, respondents assessed the importance of the qualities they themselves possess, the value of the qualities possessed by a positive standard – a real person who could be a role model for the respondent - valuable, as well as a negative standard, i.e. a person whose qualities the respondents assessed as anti-values (T. Parsons).

The study was carried out through an online questionnaire, which the respondent could only complete once. The time spent on the answers took no more than 15 minutes.

The general idea of the methodology is shown in Figure No. 6. Specifically, business qualities characterized will, determination, pragmatism, prosperity, prudence, leadership.

Processing of materials was carried out with the help of a specially created software product (developer – K.D. Danilov). The advantages of the developed software product are: a) the coherence of the procedures for collecting and processing the information received regarding a specific object; b) almost instantaneous receipt of statistical data after completing the survey on the value of business qualities; c) imagery - graphical modeling of value networks in the indicator system.

The initial social characteristics of the respondents were gender, age, place of birth and place of residence, management experience, education, specialty in which the respondent works or studies, social status: student, employee of the organization, business owner, pensioner, type of company, for working respondents. The software product allowed modeling a wide variety of network connections based on the characteristics shown.

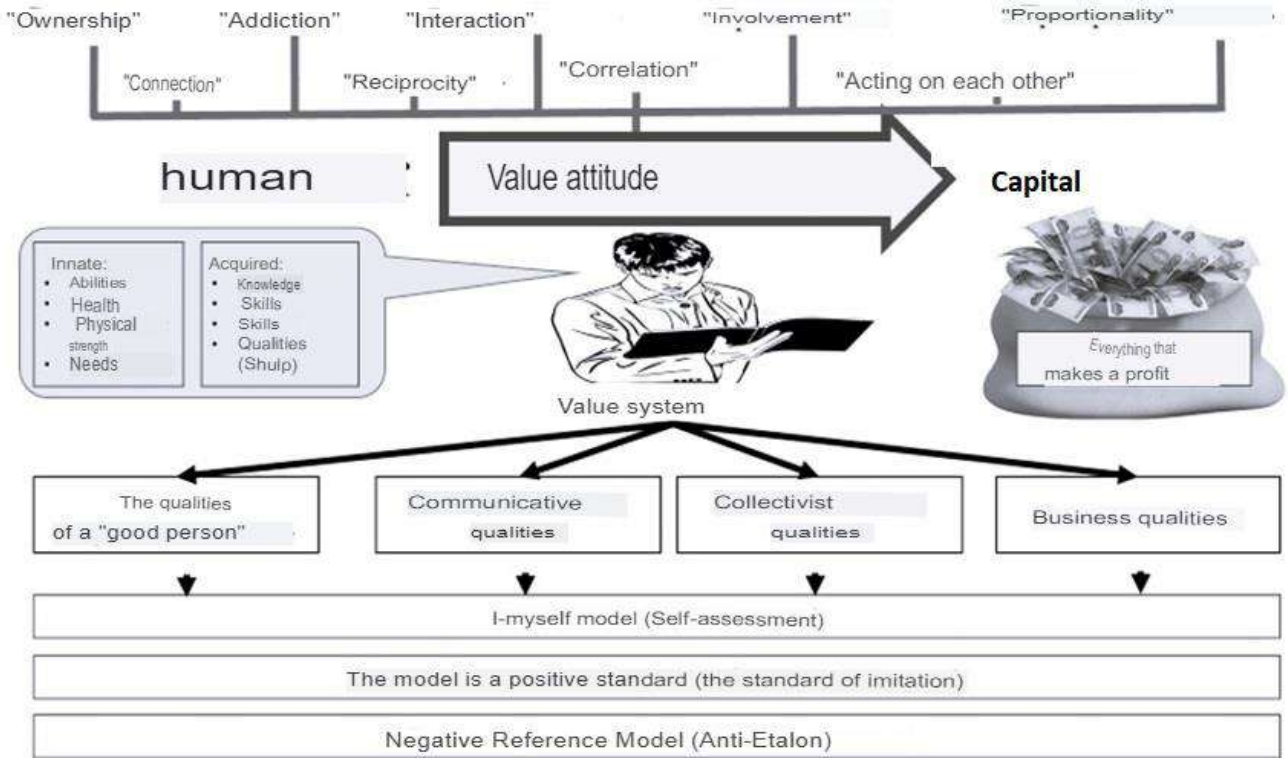


Figure No. 6. A person realizes himself "into capital" through a value attitude.

In the interests of conducting a comparative analysis of the sociodynamics of business qualities, respondents identified students who studied at a university and young people who do not study at universities. The selection is random. The sample included students of the 1st and 4th courses - 249 people, as well as residents of the region - 647 people who made up two age groups. One group of respondents consisted of young people aged 17 to 19 years, which roughly corresponded to the age of first-year students who were also 17-19 years old. The other part were respondents aged from 21 to 23 years, which mainly corresponded to the age of the 4th year students of the university (22-23 years). The sample population among 1st-year students was 27%, among 4th-year students – 23%.

This technique is described in more detail in the works of the authors[201]. The mathematical apparatus of this technique allows for correlation analysis (comparison) of the data of each respondent with each other respondent, according to a variety of parameters characterizing, thanks to which an array of information was formed, measured by millions of units of information, and is actually comparable to the volumes of big data.

Results.

1. Empirical data indicate an increase in the value of all groups of the studied qualities during the training period, which is reflected in the network characteristics of values. Attention is drawn to the

[201] Deryugin P.P., Rasskazov S.V., Lebedintseva L.A., Sivokon M.V. Two methodological approaches to the diagnosis of values in modern corporations. The Fourth Industrial Revolution: realities and modern challenges. X anniversary St. Petersburg sociological readings collection of materials of the International Scientific Conference. 2018. pp. 158-161.

change in the profile of students' values upon admission to the university and upon graduation from the university. Diagram No. 3 shows these profiles, which reflect generalized quantitative characteristics of changes in value networks.

In the first years of study, students noted the qualities of collectivist behavior as the most important value characteristics. However, the socio-dynamics of changes in these qualities was the smallest, and by the time of release, according to their network parameters (weight), collectivist qualities begin to be evaluated differently, somewhat lower, as following communicative qualities. For example, such a quality as "team spirit" loses its former meaning, and moves down three positions in the hierarchy of values.

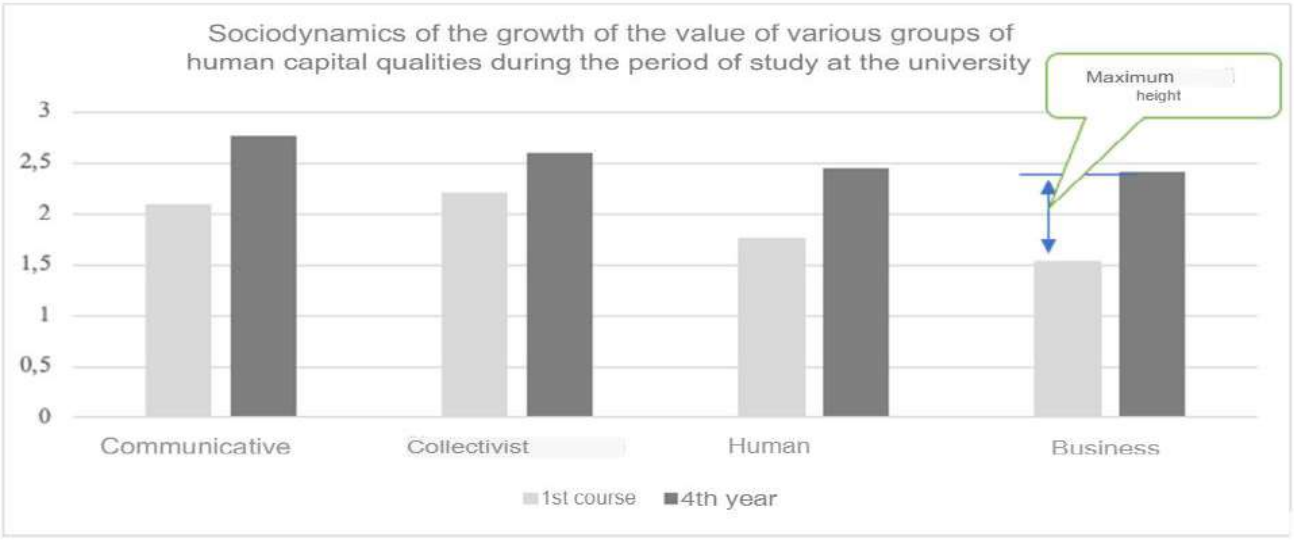


Diagram No. 3. Changing the profile of students' values upon admission to the university and upon graduation from the university.

The dynamics of business qualities are most actively manifested, their importance is growing. The structure of these qualities is also changing. The quality of purposefulness becomes essential, around which a network of other business qualities, such as success, prudence and leadership, develops. These qualities are connected by strong positive connections (Figure 7). In the present case, the gradation of the bond strength on the Cheddock scale is adopted: from 0 to 0.3 – very weak; from 0.3 to 0.5 – weak; from 0.5 to 0.7 – medium; from 0.7 to 0.9 high; from 0.9 to 1.0 – very high. The strength of the network connection is shown by the thickness of the line, the thicker the line, the higher the degree of connection. Dotted lines characterize conflicting relationships, negative correlation.

Obviously, the change in the value system during the period of study at the university, the formation of strong links between the values of the business order, allows us to assert about the ongoing qualitative changes (growth) of the business component of the human capital of students.

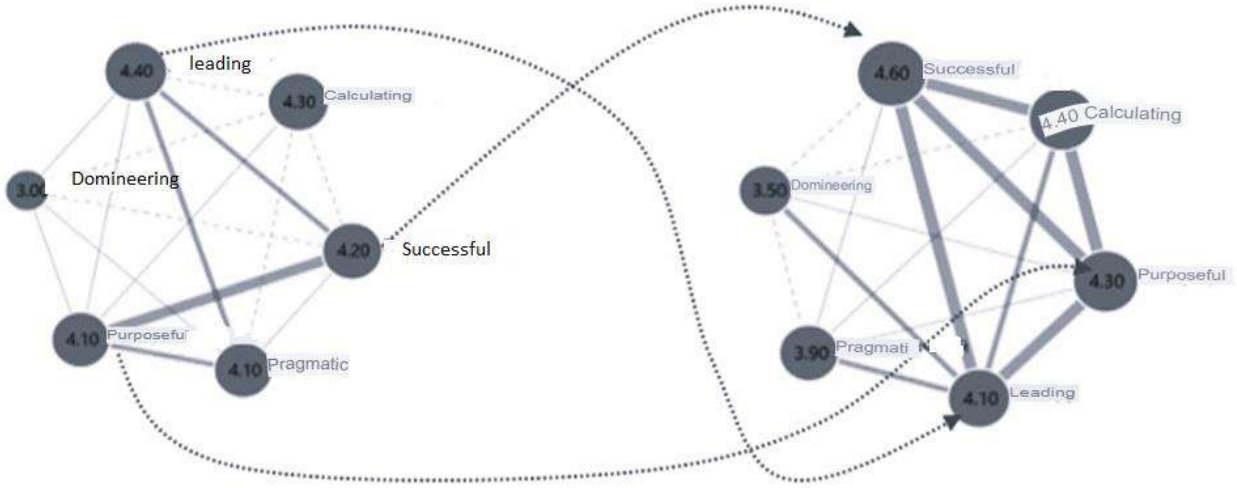


Figure No. 7. Sociodynamics of business qualities in the 1st and 4th courses.

2. The results of an empirical study record many differences in the sociodynamics of values among students representing different social strata and groups of the region. Let's focus on two of them.

Boys/girls. From the point of view of the formation of values, the period of study for girls plays a more important role than for boys. In all groups of qualities, they have marked growth, and especially the growth of collectivist qualities. As for young men, the period of study is much less relevant for them, and the value of such qualities that characterize humanity (modesty, adequacy, etc.), even negative dynamics develops (diagram No. 4).

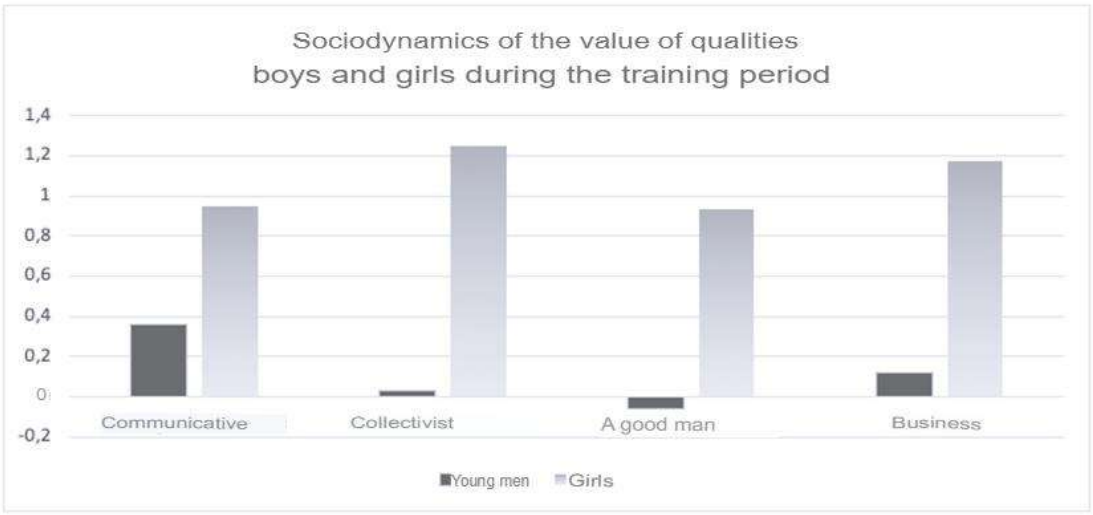


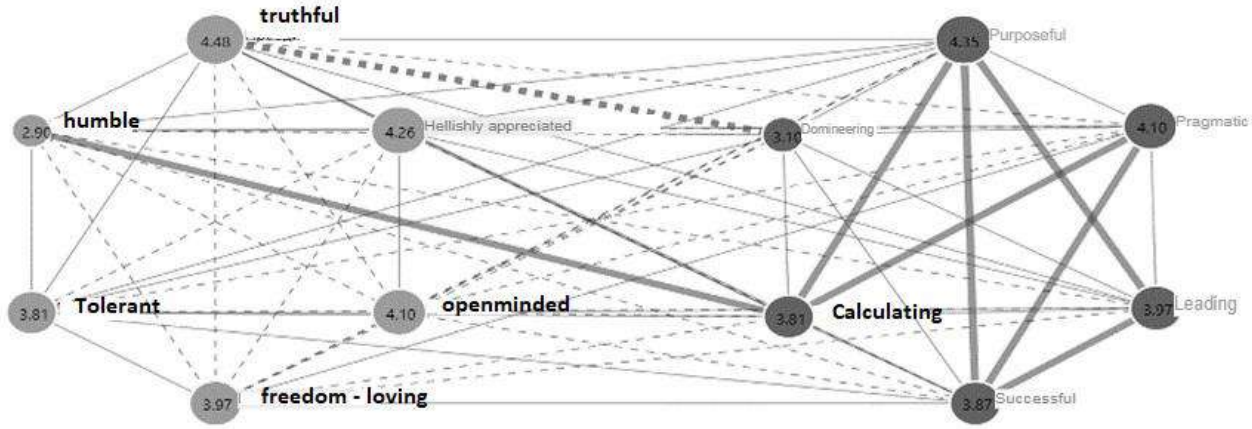
Diagram No. 4. Sociodynamics of the value of the qualities of boys and girls during the training period.

As for the value of business qualities, in the first years, their value in boys is 1.7 times more significant than in girls. However, during the period of study in young men, the value of these qualities increases only slightly.

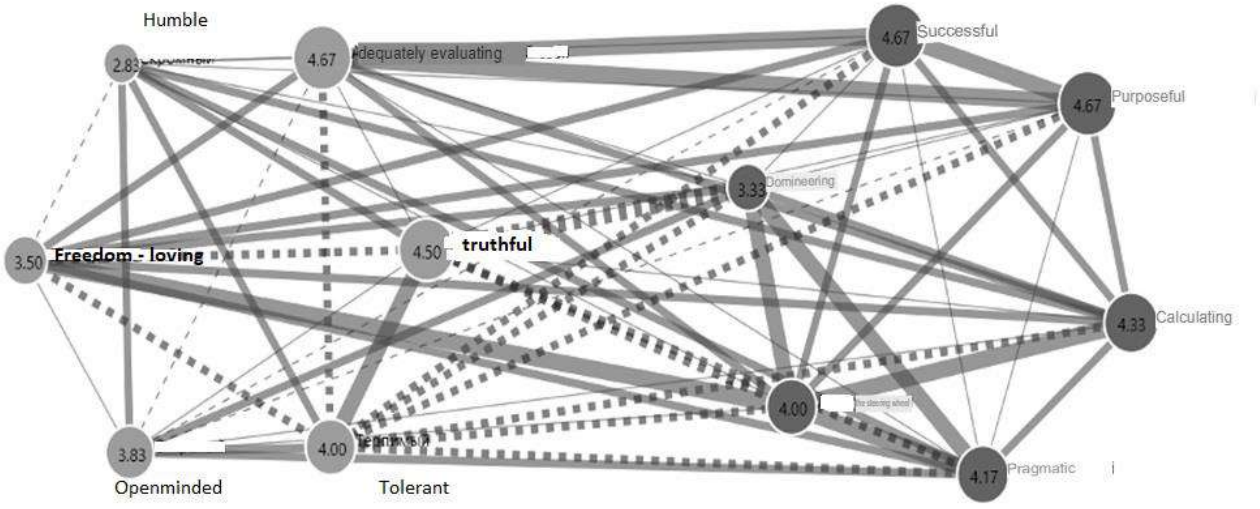
City/village. The values of students are specifically formed, depending on their places of birth and obtaining their first life experience. Technologically, the diagnostic methodology provided for the

possibility of modeling value networks between students – residents of villages, villages, small and large cities, megacities. However, the most revealing was the sociodynamics of the growth of the value of business qualities among girls who entered the university from small towns. Naturally, students from the city or village have a lot of their own characteristics, the description of which deserves a separate study. In this case, only the value networks of girls who entered the university from small towns are presented, the ratio of the qualities of a good person (a group of qualities on the left) and business (a group of qualities on the right).

The reason for choosing these categories of respondents was that a number of such features are concentrated between the data of respondents of these groups, which should be recognized as indicative and which are quite actively discussed in society, including, for example, works of art, as shown in the feature film "Moscow does not believe in tears". The general picture of the sociodynamics of the values of a good person and business values is shown in Figure No. 8.



a) 1st year (girls from small towns)



b) 4th year (girls from small towns)

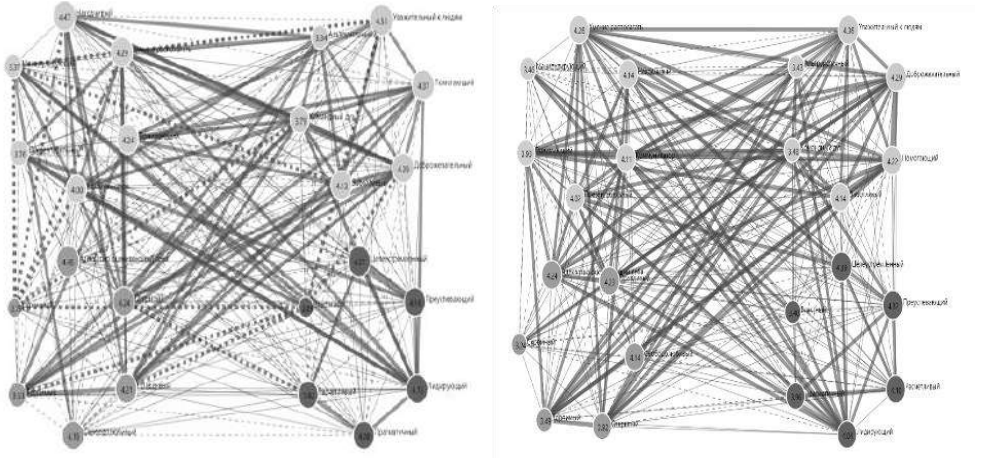
Figure No. 8. Sociodynamics of the qualities of a good person among girls from small towns and villages.

In general, by the fourth year of study, the value networks of this category of respondents become much more dense and weighty. Especially significant are the connections of networks of values of the business and communication order. However, in Figure 8 (b), serious contradictions are visible (thick dotted lines appear – a conflict of the value of qualities) in the evaluation of purely human qualities – modesty and truthfulness. There are also many contradictions in this group of respondents between the qualities of collectivism and the qualities of business order. This happens despite a rather long period of socialization of female respondents in an urban environment. This is a clear evidence of differences in the understanding of a number of values of certain qualities that girls from small towns will not connect with those values that are emerging in the new surrounding reality.

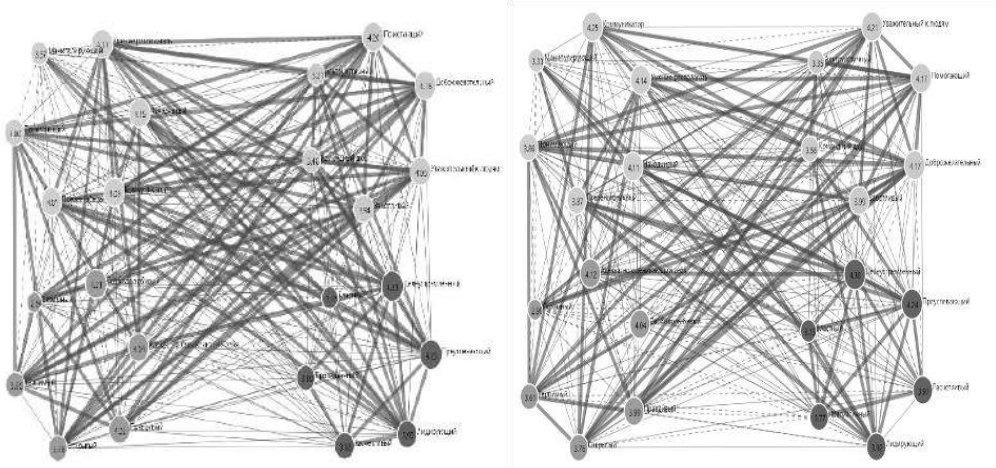
3. The following are the results of modeling and comparative analysis of the value networks of students and residents of the region, which roughly correspond to each other in age. In our opinion, such a comparative analysis demonstrates the peculiarities of the sociodynamics of values of young people who study at university and that part of young people and girls who do not study at university regarding the importance of qualities. The ratio of respondents-students and respondents-the other part of the youth is 1:2.6. The following shows the value networks of these groups of respondents (Figure No. 9).

Even purely visually, it can be noticed that the value networks of students over the years of study at the university are becoming more dense and connected. In Figure 9 (b), senior students have more solid lines (as a reflection of the frequency and strength of connections) and fewer dotted lines (these are conflicts of values). On the contrary, older people (Figure 9 d) have less dense networks in relation to respondents aged 17-19, and the number of conflict situations (dotted lines) remains as high.

Separately, the dynamics of the value of business qualities among first-year students (17-19 years old) and residents of the region - young people 17-19 years old in comparison with 4th-year students (22-23 years old) and residents of the region 22-23 years old (diagram No. 5) is shown. This graph confirms that for 3-4 years after graduation from school, the nature of the value attitude to business qualities changes in a peculiar way: the value of these qualities increases among students, it decreases among young people who do not study at university.



a. 1st year students (17-19 years old) b. 4th year students (22-23 years old)



c. Youth of the region (17-19 years old) d. Youth of the region (22-23 years old)

Figure No. 9. Value networks of 1st and 4th year students and youth of the region who are at the same age by years.

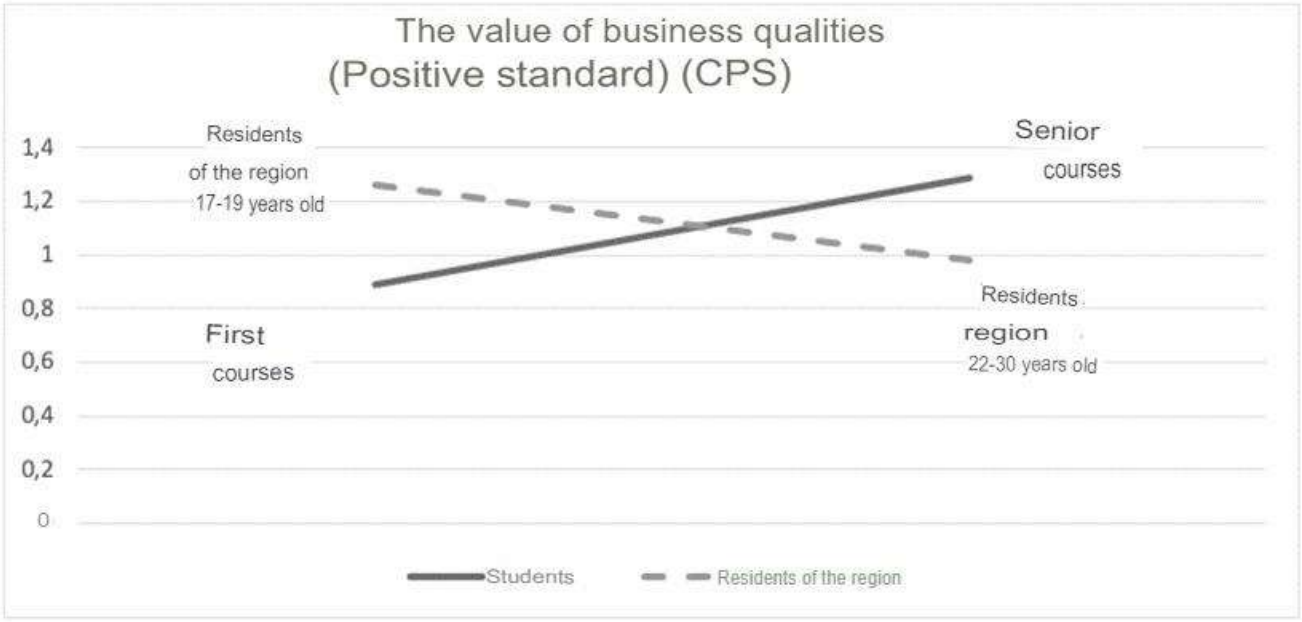


Diagram No. 5. The value of business qualities (a positive benchmark).

Further, diagrams No. 6-11 show examples of the sociodynamics of the value of business qualities in comparison with students and residents of the region who do not study at the university.

A generalized analysis of the trends shown reveals an important pattern of sociodynamics of the value of business qualities in the process of studying at universities: even if the value of some business qualities among school graduates who do not go to study at universities is somewhat higher, then four years later, by the time their colleagues graduate from university and have been trained at universities, the value of such qualities in the number of university graduates increases and turns out to be higher than those who did not study at the university. In the future, such values will form an important basis for increasing their human capital.

The main conclusions of this part of the empirical study can be presented as follows.

1. The sociodynamics of the growth of the value of business qualities in the conditions of universities reflects a positive trend that reveals the undoubted dignity of learning. In the vast majority of cases, students' value networks expand from course to course and become more connected, both in strength and in quality of connections. The greatest value among students is considered to be communicative qualities, the ability to communicate and the ability to maintain contacts. These qualities are connected by the most dense networks with business qualities. Next in importance are the collectivist qualities and qualities that characterize a person's personality as "kind".

2. In general, during the period of study at the university, business qualities are most dynamically formed, by the time of graduation, business qualities are becoming increasingly important. These qualities form the basis for the formation of human capital in the future. However, in the whole system of valuable and important qualities of the standard, business qualities both at admission to the university and at the time of graduation are characterized by the least network resources (the least weight, density and scope).

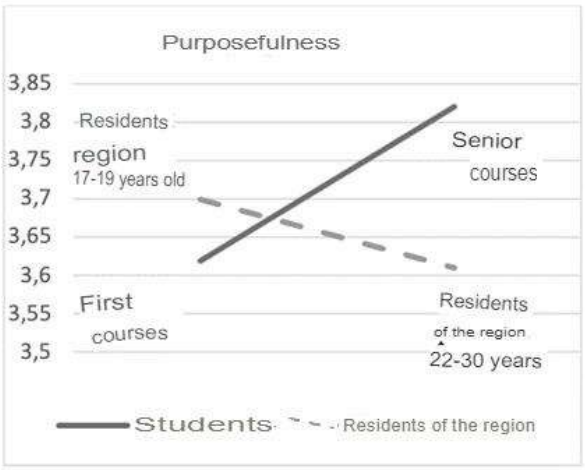


Diagram No. 6

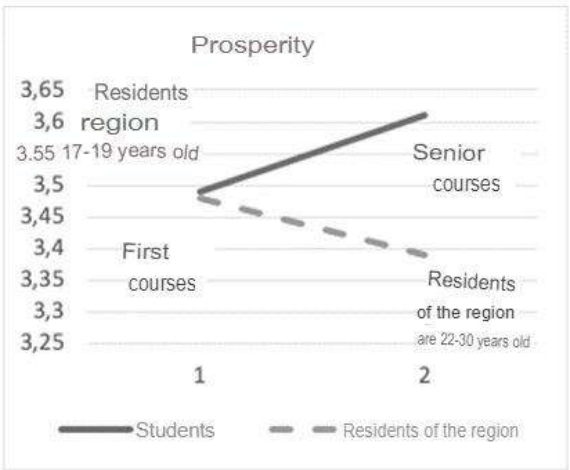


Diagram No. 7

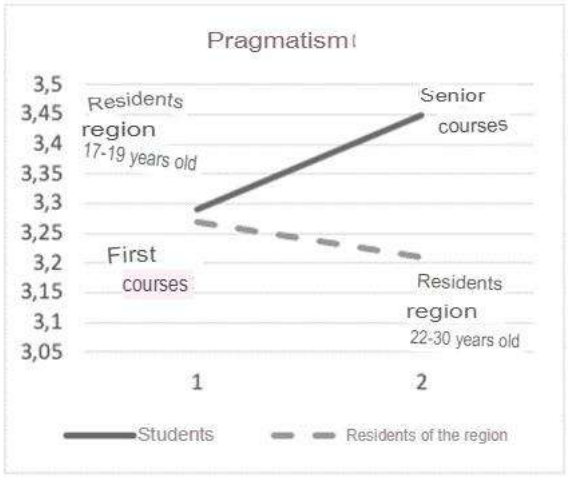


Diagram No. 8

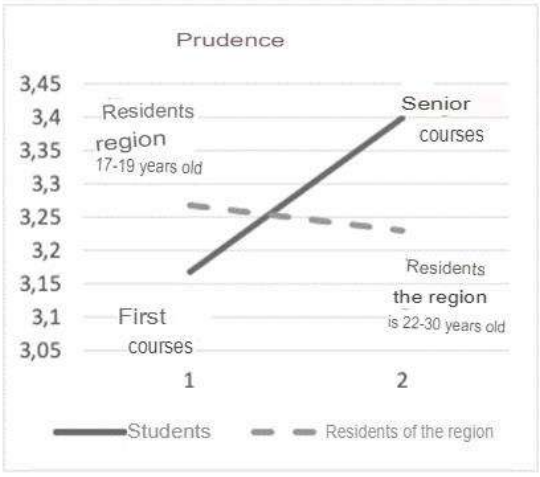


Diagram No. 9

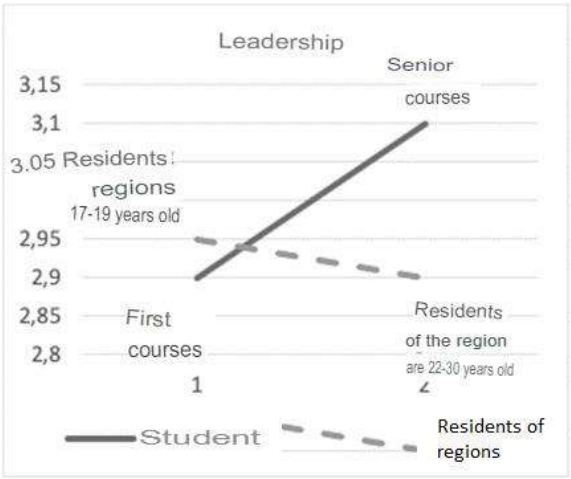


Diagram No. 10

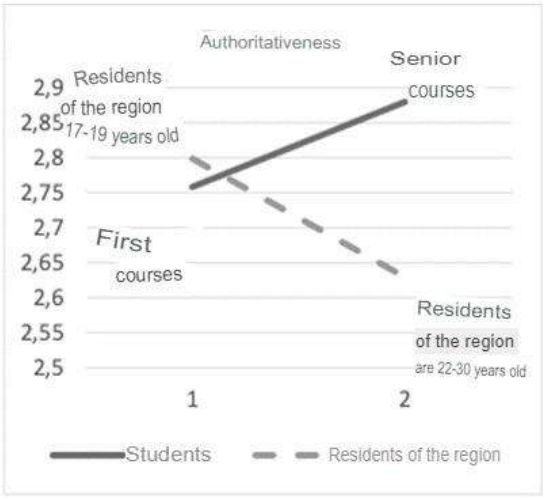


Diagram No. 11

3. Students representing different social strata and groups of the region, studying at the university has different effects on the dynamics of their values. Values are formed more dynamically among those students who represent small towns, villages and villages. Also, a more active dynamics of the growth of values in the process of studying at the university is typical for girls than for boys, as well as for those who do not have practical work experience. On the contrary, the least trends in the growth of the value of business qualities are observed in young men who lived in large cities before entering university and have work experience. Such students have even negative values for certain qualities (for example, assessments of the human qualities of other people).

4. It is obvious that higher education at universities distinguishes the dynamics of the value system of students and the part of young people who do not receive higher education. As it was presented in the results of an empirical study, in particular, all the business qualities of students over the years of study at the university, i.e. their value and significance, are growing – these qualities are becoming more

important, significant and valuable. Thus, it becomes obvious that graduates of the university in the future will make up the business potential of the human capital of the region.

It is necessary to emphasize the peculiarities of the sociological diagnosis of human capital and the use of the network approach as one of the options for special diagnostics, which is important for the organization of management of pedagogical and scientific work at universities.[202]:

- the use of digital technologies in the organization of sociological diagnostics allows you to quickly obtain information about the sociodynamics of the value of university students, which in itself is important in analyzing the success of the learning process;

- the visibility of the results of network diagnostics makes it an applied tool for evaluating the result obtained.

An important advantage of the strategy of sociological diagnostics of the growth of the value of business qualities is the possibility of modeling the unique characteristics of the students of a particular university, which, in turn, will allow the development and implementation of original management technologies.

2.4. Modern ideas about the formation of human capital of students studying in world-class scientific and educational centers in Russia

Additionally, as part of an integrated approach to the diagnosis of the sociodynamics of human capital of students studying at universities that are part of the SEC, a pilot study was conducted on modern ideas about the formation of students' human capital in Russia.

The task of the final stage of the empirical research was to identify the modern ideas of Russian citizens about how human capital is formed and should be formed, as well as whether an increase in human capital is created among students studying at universities that are part of the SEC.

The research method is an online questionnaire survey, the geography of the study is residents of Russia. Data collection was carried out through the online platform "Yandex.vzglyad" with the use of targeting all residents of Russia, both men and women who are interested in the category "Education".

The hypothesis of this part of the empirical research: the Russian society is poorly informed about the activities of world-class scientific and educational centers.

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[202] Dudina V.I., Deryugin P.P., Dubrovskaya S.E. Applied Sociology: Social modeling and Programming. Textbook / St. Petersburg, 2008

As part of this stage of the study, 201 people were interviewed. Despite the fact that the sample is not representative, the results obtained allow us to draw conclusions about the identified trends.

The questionnaire consisted of 10 main questions, the remaining 3 questions acted as control "passport". Let's look at the key ones.

With the help of the first question, we wanted to find out, according to the respondents, which science the study of human capital belongs to. The results are presented in chart No. 12.

According to the results, 40.2% of respondents believe that human capital is an interdisciplinary category, 32.4% of respondents believe that economics should study human capital, and 27.5% of respondents believe that the study of human capital is within the competence of sociology.

In the second question, respondents were asked to assess how much they agree with the statement that human capital consists of knowledge, skills and abilities. The rating scale assumed 4 points, where 1 point – completely disagree, 4 points – completely agree. The results on this issue are presented in chart No. 13.

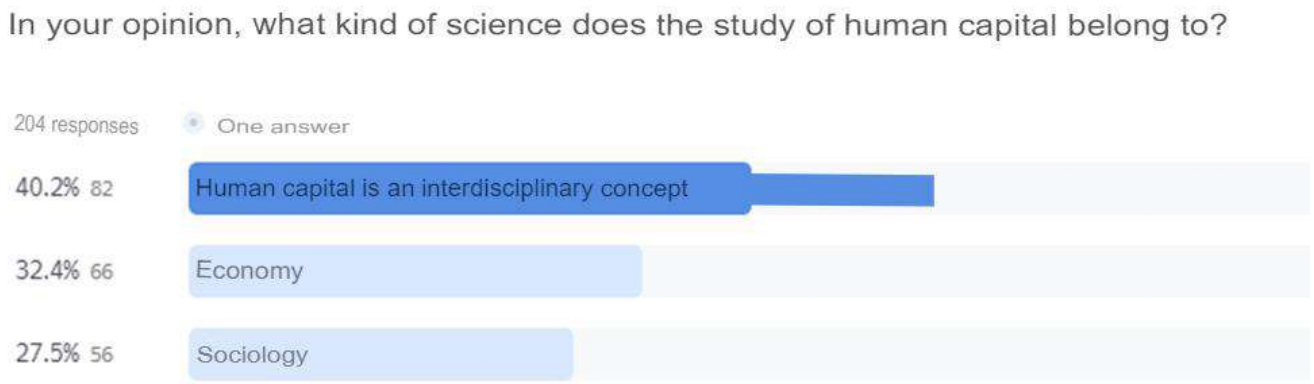

Diagram No. 12. Respondents' opinion on the involvement of human capital in a particular science.

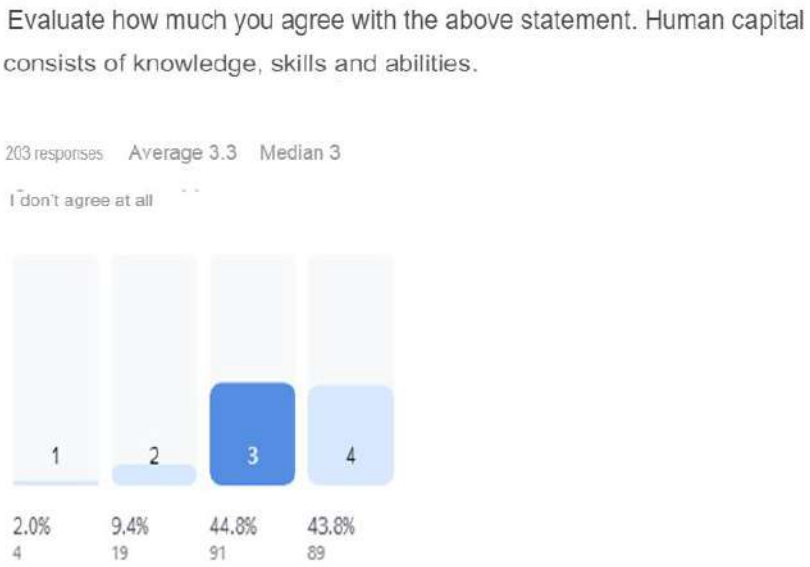

Diagram No. 13. Respondents' assessment of the definition of human capital.

Thus, 44.8% and 43.8% of respondents agree or completely agree with this statement, and only 2% and 9.4% of respondents completely disagree or rather disagree. Recall that the idea of human capital, as including knowledge, skills and abilities, is a classic in economic theory. The results obtained show a contradiction in the perception of Russian citizens about human capital, on the one hand, respondents believe that human capital is an interdisciplinary category, and on the other hand, they still define it from the perspective of economics.

In the next question, respondents were asked on the same scale to assess how much they agree with the statement that human capital consists of a wide range of personality qualities, including values that allow you to make a profit. The results on this issue are presented in diagram No. 14.

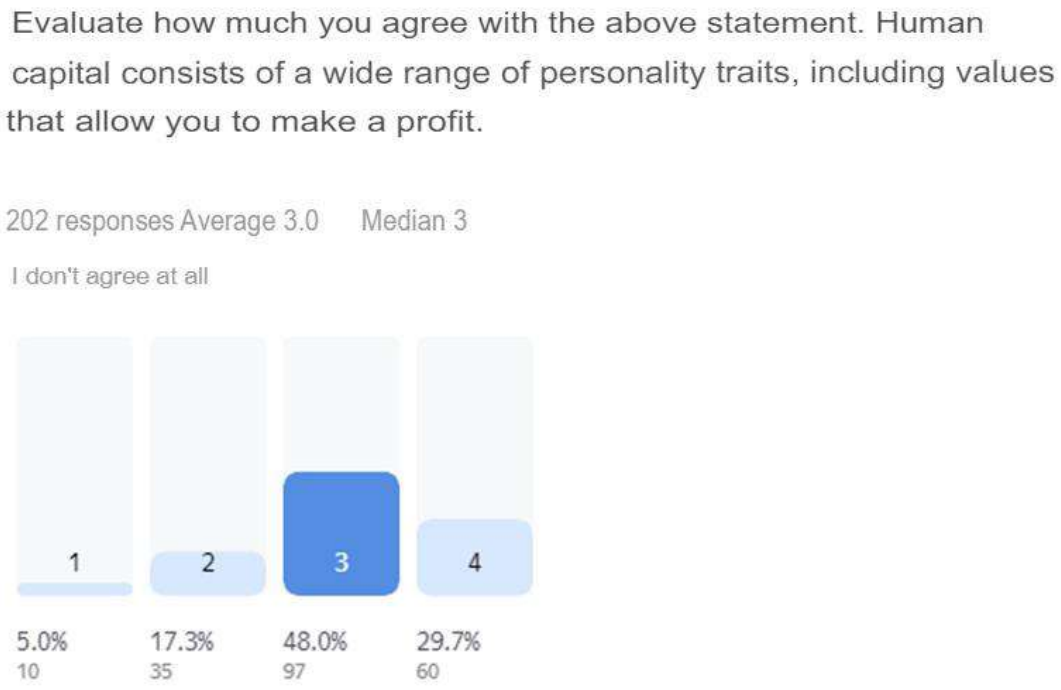

Diagram No. 14. Respondents' assessment of the definition of human capital.

The results in this question were that 48% and 29.7% of respondents rather agree or completely agree with the statement characterizing the understanding of human capital from the standpoint of sociology.

In the following questions, we wanted to find out the opinion of citizens about whether, when an individual's human capital changes, his business qualities change. The results of the answers to this question are presented in diagram No. 15.

Diagram No. 15. Respondents' answers about changes in human capital.

In the results, most of the respondents, 49.5%, believe that a person's business qualities rather change when human capital changes. 37.6% of respondents believe that human capital will change, and only 8.4% and 4.5% believe that it rather does not change and does not change, respectively. The results obtained indirectly confirm the results obtained in paragraph 2.1 of this research paper, namely: the causal relationships between the knowledge, skills and abilities acquired at the university (human capital) and values (in this case, business qualities) have a direct positive relationship.

Then the respondents were asked to answer the question of whether they know about the activities of world-class scientific and educational centers in Russia. The results obtained are presented in diagram No. 16.

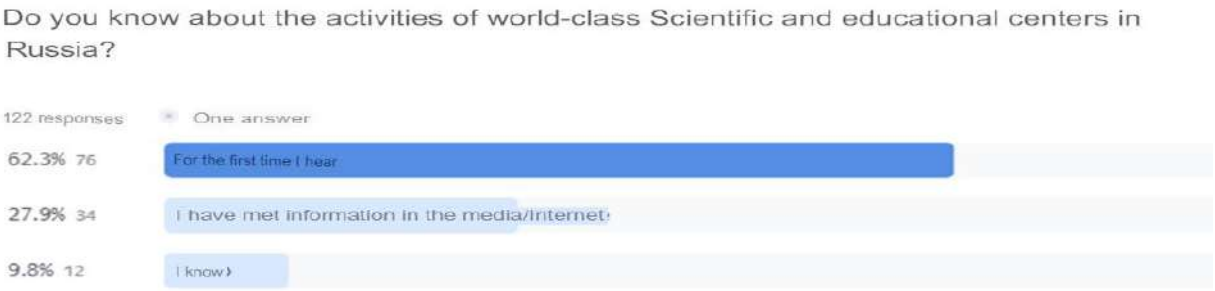

Diagram No. 16. Awareness of respondents about the activities of the SEC.

Thus, 62.3% of respondents generally hear about the activities of world-class scientific and educational centers for the first time. 27.9% have only seen information about them on the Internet or in the media, and only 9.8% of respondents know about their activities[203].

In the next question, it was suggested to answer the question of how respondents believe that studying at universities that are part of world-class scientific and educational centers contributes to the formation of their human capital or not. The results on this issue are presented in diagram No. 17.

[203] Popov, R. E. Empirical research of sociodynamics of human capital of students studying in world-class scientific and educational centers / R. E. Popov, P. P. Deryugin // Information–Communication–Society. – 2023. – Vol. 1. – pp. 309-314.

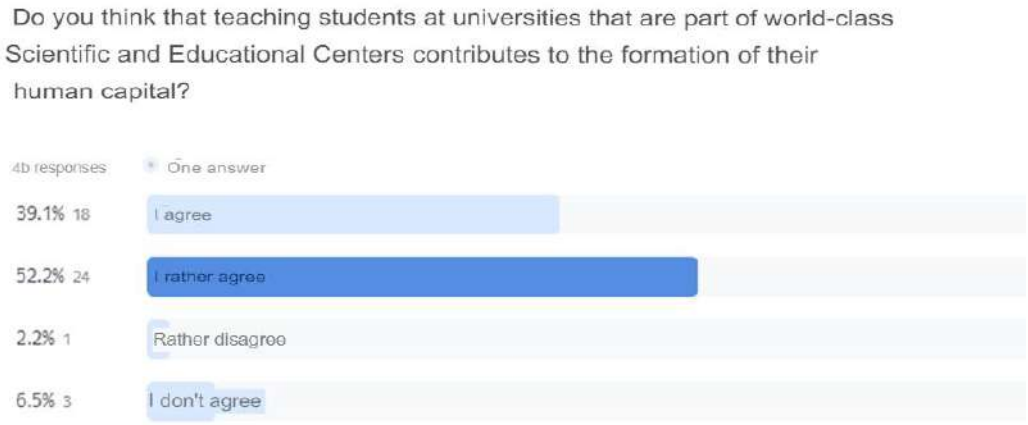

Diagram No. 17. Respondents' opinion on the impact of studying at universities of the SEC on the formation of human capital.

According to the results obtained, most of the respondents 52.2% rather agree with the above statement, 39.1% completely agree, 6.5% disagree and only 2.2% rather disagree. These results confirm the hypotheses that when studying at universities that are part of world-class scientific and educational centers, the human capital of students itself changes.

In the final question, respondents were asked to express an opinion on whether the education of students at universities that are part of world-class scientific and educational centers contributes to changing their values. The results of the answers to this question are presented in diagram No. 18.

In the results, the majority of respondents 39.1% and 37% agree and rather agree with the above statement. 19.6% and 4.3% rather disagree and disagree, respectively.

Thus, a pilot study conducted on the modern ideas of Russian citizens about the formation of human capital of students studying at universities that are part of world-class scientific and educational centers allows us to draw the following conclusions.

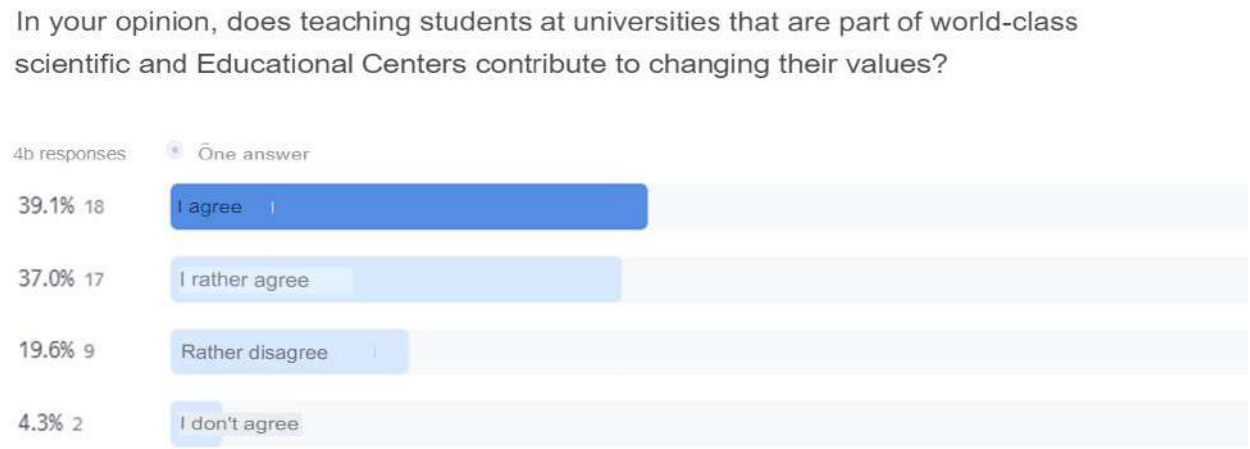

Diagram No. 18. Respondents' opinion on the change in values when studying at the universities of the SEC.

First of all, it should be noted that the results were contradictory. This confirms the fact that, on the one hand, respondents, in accordance with the modern theoretical concept of the evolution of human capital presented in this study, believe that human capital is indeed an interdisciplinary category, and only a minority (32.4%) still believe that economics studies it. On the other hand, when assessing the definitions of human capital from the standpoint of economics and sociology, the majority of respondents still tend to be closer to the economic definition.

At the same time, the results obtained largely confirm the conclusions obtained in paragraph 2.1 of this study. The majority of respondents agreed with the statements that when studying at universities that are part of world-class scientific and educational centers, students should change their human capital, and with it their values as a whole change.

The obtained results of the pilot study also indirectly confirm some of the conclusions of paragraph 2.3 of this study. In particular, it was concluded that during the period of study at the university, business qualities are most dynamically formed, by the time of graduation, business qualities are becoming increasingly important. This is confirmed by the fact that the majority of respondents (49.5%) agree with the statement that when human capital changes, the business qualities of a person also change.

Moreover, a result was obtained confirming that Russian citizens practically do not know about the activities of world-class scientific and educational centers (9% of respondents said they had heard about their activities before). As discussed in paragraph 2.2. of this study, world–class scientific and educational centers established in 15 regions of Russia, forming as a specific social institution, are at the stage of their formation, aimed at ensuring a scientific breakthrough in a number of areas of economic activity. As noted, scientific and educational centers are only in the development stage, which confirms the low level of awareness of the population about their activities. Despite this, world-class scientific and educational centers still remain potential drivers of activating the human capital of the regions, but this requires additional efforts and active development.

Conclusion

The research conducted by the author allows us to draw the following conclusions.

1. Firstly, the evolution of scientific ideas about the content and characteristics of human capital is associated with the dynamics of social and economic development of society, its social structure and social institutions, with the emergence of new forms of society. Starting from the traditional society, and further in the conditions of industrial and post-industrial society, the concepts and theoretical and methodological foundations of the study of human capital are transformed, expanded and increasingly go beyond purely economic approaches to understanding its essence, content and characteristics. The main trend of scientific explanation of this phenomenon increasingly goes beyond the purely economic theory and acquires a socially conditioned character, involving consideration of human capital in combination with a variety of characteristics of the social and socio-psychological order.

The periodization of scientific ideas about human capital is associated with the changing social structure of society and is built up in a series of successive periods, at each of which this phenomenon is interpreted more and more extensively, acquiring a number of social characteristics. At the present stage, the most adequate representation of human capital reflects the integrative paradigm, in which the understanding of human capital integrates a variety of diverse characteristics, conditions and factors that determine the multifaceted manifestations of human capital in various fields of human activity, corresponding to the characteristics of post-industrial (information) society.

2. Secondly, the study presents a systematization of human capital research strategies. Within the framework of particular theoretical and methodological approaches, it is shown that the one-dimensional and mainly pragmatic analysis of the multifaceted and multidimensional characteristics of this capital contradict its real nature and characteristics in modern society. It is proved that, on the contrary, sociological research presupposes the integration of many internal and external characteristics, conditions and factors that allow us to talk about an integral conceptual paradigm as an adequate research platform for studying the human capital of a modern personality, the foundations of which were formulated by P.A. Sorokin and modified to the conditions of a network society by S.A. Kravchenko.

The most promising strategy for diagnosing human capital at present is the implementation of an integrated approach, in which objective and subjective indicators of human capital are simultaneously analyzed.

3. Thirdly, the study presents a sociological analysis of the activities of universities included in the structure of world-class scientific and educational centers, considered as drivers of the formation of students' human capital, as well as an analysis of Russian and foreign experience in ensuring the integration of science, education and economics as the leading principle of the formation of students' human capital. The main data characterizing the activities of scientific and educational centers are

summarized: the stages of their institutionalization; social factors influencing the development of the human capital of the students of NOCs; characteristics of NOCs as social organizations; the main differences in the formation of the human capital of students in NOCs and the results of the research of the activities of NOCs, problems and difficulties of their formation.

4. Fourth, V.P. Tugarinov's conceptual ideas about the unity of cognition-evaluation-practice, revealing the basic strategy of value formation in the process of teaching students at universities, are empirically confirmed. It is proved that obtaining new knowledge cannot be an impartial act of formal mastering of information, but it is always a trigger for changing values.

Within the framework of the conducted research, based on the conceptual ideas of V.P. Tugarinov, it was revealed that:

- students consider the relationship of knowledge, skills and abilities - as the main elements of human capital – with values as a significant and positive correlation;

- the value system of students is grouped by types related to various spheres of public consciousness and practical activity. Students quite clearly distinguish a number of such values, which differ in indicators and evaluation criteria;

- a relatively insignificant part of students assess scientific and educational activities as an important and significant prospect, recall that about 8% of respondents stated the importance of these values. Even less relevant for students were the values of the market economy – at the level of statistical error;

- the hypothesis about students' awareness of factors and conditions important for the formation of a system of actual values has been confirmed: students are more aware of how actual conditions and factors affecting values are less focused on methodological approaches that reveal the practice of the organization and methodology of the university;

- the hypothesis about the transformation and revision of previous values under the influence of the learning process has received some confirmation. To one degree or another, more than 70% of respondents stated about such transformations. The acquisition of new knowledge acts as an incentive for the development of a new understanding of previous values and activates the development of new values.

5. Fifthly, scientific and educational centers should be considered from the standpoint of the principles of formation of a special social organization - an innovative ecosystem with a set of important characteristics that ensure the co-evolution of its participants throughout their interaction. The following are presented: analysis of the development of the regulatory framework for the activities of scientific and educational centers; analysis of the coverage of the problems of the activities of the SEC in scientific publications; analysis and evaluation of the problem field of the formation of this social institution.

The conducted research of world-class scientific and educational centers allows us to draw conclusions:

– world-class scientific and educational centers established in 15 regions of Russia, forming as a specific social institution, are at the stage of their formation, aimed at ensuring a scientific breakthrough in a number of areas of economic activity. As for the activation of the human capital of the regions, this will require additional efforts and potentials, the development and implementation of modern methodologies and technologies of educational activities and information work, in particular, with students;

– according to the direction of scientific and applied research, SEC are focused on a set of goals that reflect Russia's strategic interests in the modern world. At the same time, the development of human capital and, in particular, the motivational and value structures of young people and students remain in the space of weak social and informational influence;

– the formation and development of SEC is associated with a number of problems and difficulties in mastering the world practice of such centers. Among such problems, the most relevant are: firstly, orientation mainly on one's own strength and limited use of the experience of other countries. Secondly, the focus is mainly on Western standards of conducting scientific activities, professional training, educational and informational work with students, weak communication with universities and research centers of the East, in particular, with such centers in China, where the experience of working on the formation of values and motivation of young people deserves some attention.

In general, as the study showed, the value-motivational aspects of the formation of human capital of the participants of scientific and educational centers constitute a significant issue that needs to be addressed. The existing gap between value-motivational structures and their exclusion from the system of analysis of human capital is scientifically untenable, and in a practical sense has a negative effect in real activity. Overcoming such a gap can be considered an urgent and promising scientific problem that requires further research.

6. Sixth, the nature of the sociodynamics of the growth of students' business qualities during the period of study at the university as the main indicators of the success of the formation of human capital is revealed. The features of the sociodynamics of human capital growth depending on the socio-demographic characteristics of students representing different strata, groups and regions are shown. It is proved that obtaining higher education significantly affects the formation of general human capital, as well as the delayed nature of the influence of this capital on the success of graduates.

The sociodynamics of the growth of the value of business qualities in the conditions of universities reflects a positive trend that reveals the undoubted dignity of learning. In the vast majority of cases, students' value networks expand from course to course and become more connected, both in strength and in quality of connections.

During the period of study at the university, business qualities are most dynamically formed, by the time of graduation, business qualities are becoming increasingly important. These qualities form the basis for the formation of human capital in the future. However, in the whole system of valuable and important qualities of the standard, business qualities both at admission to the university and at the time of graduation are characterized by the least network resources (the least weight, density and scope).

Students representing different social strata and groups of the region, studying at the university has different effects on the dynamics of their values. Values are formed more dynamically among those students who represent small towns, villages and villages.

7. Seventh, a pilot study conducted on the modern ideas of Russian citizens about the formation of human capital of students studying at universities that are part of world-class scientific and educational centers allows us to draw the following conclusions.

The results of the pilot study largely confirm the conclusions obtained in paragraph 2.1. The majority of respondents agreed with the statements that when studying at universities that are part of world-class scientific and educational centers, students should change their human capital, and with it their values in general change.

Some conclusions of paragraph 2.3 of this study are also indirectly confirmed. In particular, it was concluded that during the period of study at the university, business qualities are most dynamically formed, by the time of graduation, business qualities are becoming increasingly important. This is confirmed by the fact that the majority of respondents (49.5%) agree with the statement that when human capital changes, the business qualities of a person also change.

It was revealed that Russian citizens practically do not know about the activities of world-class scientific and educational centers (9% of respondents said they had heard about their activities before), which confirms the low awareness of the new social institution and its being in the formative stage.

Despite this, world-class scientific and educational centers still remain potential drivers of activating the human capital of the regions, but this requires additional efforts and active development.

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