

# Differentiation of Rural Territories According to the Conditions of Human Reproduction

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**Abstract**—In conditions of high spatial differentiation of rural territories, an objective assessment of the conditions for the reproduction of human capital is of particular importance. However, the developed methods, firstly, cannot always take into account all the components of human capital. Secondly, they do not affect the conditions for its accumulation. Thirdly, they include various indicator systems that are difficult to interpret when analyzing. In this regard, the results of such assessments lead to significant differences in the size of human capital and, accordingly, the impossibility of taking forehanded management measures for its normal reproduction. Therefore, the aim of the study is to develop and test an approach to the diagnosis of the conditions for the reproduction of human capital (demographic, migration, infrastructure and socio-economic), based on the method of scoring and ranking. In the process of the study, it was concluded that there are limitations affecting the reliability of the assessment, the most significant of which is the absence of a complete set of statistical indicators for analyzing the conditions for the reproduction of rural human capital in official Russian statistics. The practical application of the developed point-rating assessment allowed us to identify the degree of differentiation of rural areas of Russia according to the conditions of reproduction of human capital based on the identification of leading regions and outsider regions.

**Keywords**—human capital, rural territories, point-rating assessment, conditions for the reproduction of human capital, differentiation of rural territories.

## I. INTRODUCTION

In modern conditions, human capital is the main resource for the economic development of each country, since it is in demand for any activity and sets in motion the remaining elements of the productive forces. A structural improvement, based on the expanded reproduction of human capital might be considered as an effective impulse to accelerate the growth of the Russian economy.

A structural transformation of the Russian economy is taking place under the severe external pressure. Consequently there is an increase in the concentration of capital in industrialized regions of the country. First of all, this is due to

the fact that in the spatial structure of the Russian Federation. On the one hand, rural territories occupy a dominant position. On the other hand, the growing degree of differentiation in the level of their socio-economic development, both on inter-regional and intra-regional scales, creates a direct threat to the territorial integrity and national security of Russia. The outflow of human capital of the majority of rural areas hinders their sustainable development. Moreover the negative migration growth of the rural population is associated with a shortfall of gross regional product and with significant social and economic costs that accompany labor migration. A significant differentiation of regions in terms of the density of human capital and its reproduction, considering it to be higher than the differentiation in absolute value of human capital, means underutilization of the country's economic space.

At the same time, there are obstacles such as subsidization of rural budgets, disparities in the level of supply and demand on the rural labor market, low level of rural infrastructure development and investment unattractiveness of the countryside, which all together limit the normal reproduction of human beings and hinder the way of solving the problem of socio-economic development of rural territories capital.

Considering these limitations, the Spatial Development Strategy of the Russian Federation until 2025 was adopted [1]. According to the Strategy one of the most important strategic goals of state policy is the sustainable development of rural territories. In this regard, the study of the conditions for the reproduction of human capital, the analysis of the causes of its unequal allocations, the effectiveness of regulatory impacts aimed at preventing or eliminating the identified imbalances, and the development of proposals to prevent the degradation of human capital in rural areas are much needed to be studied.

## II. LITERATURE REVIEW

The evolution of ideas about the essence of human capital was mainly determined by the nature of the tasks facing the economy and society at a particular historical moment in time as well as the methods used to solve them. Representatives of the classical school (W. Petty, A. Smith, K. Marx and others

[2]) believed that people differ from each other in their abilities and gifts, which, in turn, are wealth, and determine the value of a person through income .

Neoclassical economists (I. Fischer, A. Marshall, L. Walras T. Schulz, G. Becker and others [3]) considered a person as an element of capital formed by investing in a person, including the cost for education, vocational training, health, migration.

In the mainstream of the post-industrial paradigm, many representatives (F. Mahlup, P. Drucker, L. Turrow, M. Costels and others [4]) defined modern society as a “knowledge society” and indicated that a person is becoming a key resource and the main value in the field of intellectual production.

Along with foreign researchers, Russian scientists also studied the problem of the formation and development of human capital (A.K. Shtorkh, A.I. Butovsky, D.I. Mendelev, S.G. Strumilin, M.M. Kritsky, I.S. Melyuhin, M.V. Mateckas [5]). Their theoretical position is distinguished by a more accurate distinction between the essential characteristics of human capital, as well as its main types and the process of reproduction in the chain: formation - accumulation - socialization - activation - replenishment - investment. The specifics of the content of the category “human capital” is revealed by taking into account the moral component in the works of Russian scientists. It should be noted that the component was not taken into account by the foreign economists.

In the context of these studies, the human capital of rural areas is a complex category that must be studied from the perspective of both the social nature (place of formation — rural territories) and the economic nature (sources of use — rural economy sectors) nature [6].

The analysis of scientific works showed that the issue of reproduction of rural human capital in modern conditions is not sufficiently studied. First of all, this is due to the diversity and complex-specific nature of the socio-economic processes taking place in the countryside, formed by the mentality of the local population and the prevailing conditions for its reproduction [7-8]. Consequently if the necessary socio-economic and other social conditions and resources for the integral reproduction of human capital are not created in the entire “reproductive chain”, the expected economic effect is not achieved.

Social human capital in the reproductive cycle is in direct correlation with the economic system, which affects production, distribution, exchange and its final consumption. The main peculiar feature of human capital in rural areas is its static, constant, relatively slow renewal, which forms the sectoral orientation of the rural economy and the structure of employment, limits the scope of professional interests [9].

Also the important features of rural human capital have been highlighted by V.V. Paciorkovsky [10]:

- implementing its labor function, it acts as the subject of labor supply (labor resources). Being purchased by employers (commercial agents of the rural economy), it is assigned to the enterprise and, using the production resources of the economic unit, creates a product of the rural economy;

- living in the area of the rural territorial system and being fixed in a certain place, the population (human capital)

consumes the products of the rural economy, satisfying the demand for local goods and services or accumulating on the local market;

- the availability of production capital (land and other resources) allows for individual (entrepreneurial) activities.

Proceeding from this, the reproduction of the human capital of rural territories considering to be an integral socio-economic phenomenon has its own specifics and is manifested through the dialectic of the interaction of the basic levels of the socio-economic environment (micro-, meso-, macro- and mega-levels).

Therefore, in modern conditions, it is necessary to take into account not only the specifics of the floating of rural human capital at each level, but also the features of the level’s interconnection and mutual influence in the process of reproduction.

### III. RESEARCH METHODOLOGY

Currently, the main problem in measuring human capital is its reliable assessment. There has not been developed an approach that could determine its real volume. There are several reasons for this:

- difficulties in statistical accounting, imperfection of mathematical models and measurement technologies;

- the inability to assess specific factors and the difficulty of predicting the consequences of the development of events that can cause these factors;

- fragmentation of approaches to structuring individual, regional, national and global human capital.

Most often, human capital is considered as a set of certain elements, which include individual education (education capital), health (health capital), work experience and skills (labor capital), the subject's value system (culture capital). Through their further unification, they are transformed into regional and national capitals of education, health, labor, culture and in the aggregate show the human capital of the region and the country as a whole.

It should be noted that the currently developed methods evaluate only human capital directly, while not taking into account the conditions for its reproduction and formation. In addition, due to the specificity of the available statistical information, such studies are carried out only at the regional level (without identifying rural areas) [11-13].

The work of I.A. Gurban and A.L. Myzin [14] is an example of a methodological approach to assessing human capital at the regional level. The authors set the task to differentiate regions according to the state of human capital. Modeling was carried out according to 45 indicators, which were grouped into five modules: demographic, educational, labor, research and sociocultural. In each module, private indicators were combined into 2-4 synthetic indicators. According to the authors, the integral indicator made it possible to assess the active aggregate human capital of the region considering the economically active permanent population.

The foregoing and other methodological approaches do not always take into account other equally important aspects of human capital, which is associated with the inability to quantify some of its structural elements. Therefore, in such

cases, it is necessary to apply various indirect techniques, which, in turn, significantly complicates and slows down the whole process.

#### IV. RESULTS

In modern society, the development of human capital leads to the increased competition between regions seeking to offer the best conditions for its formation and development, which is especially important for rural areas.

In this regard, in order to assess the conditions for the reproduction of human capital in the village, it was proposed to conduct a point-rating assessment, the algorithm of which is given below:

1) The selection of the most significant indicators characterizing the demographic and migration, infrastructure, as well as socio-economic conditions for the reproduction of human capital.

2) Awarding points. The highest value index is given the maximum score, and the lowest value index is given the minimum. In case of negative character of the highest value index, the reverse scales are used.

3) The summation of points for both the rural territories of each region and the blocks that affect the reproduction of human capital.

4) The calculation of the integral score for all indicators for the rural territories of each region by summing them.

5) Ranking of rural areas of the region based on the results.

The study was carried out considering three blocks, which include the following conditions for the reproduction of human capital: demographic and migration, infrastructure, socio-economic.

The first block includes the following indicators: fertility, mortality and natural increase (decrease) of the population (ppm); life expectancy at birth (years); coefficient of migration growth (decrease) in the population (ppm); the proportion of pensioners in the total population (%).

The following indicators are selected for the analysis of the second block: the share of the housing stock provided with all types of improvement in the total housing stock (%); the provision of pre-school age children with places in preschool educational institutions (places / 1000 persons.); the average workload per school (people); the number of sports facilities per 1,000 people (unit); the number of hospital beds per 10,000 people (unit); library fund per 1000 people (ind.).

The third block includes indicators such as: crime rate (crimes / 100,000 people); employment rate (%); unemployment rate (%); standard of living; average size of accrued pensions (thousand rubles); the proportion of the population with cash incomes below the subsistence level (%).

The calculations shows that, according to demographic and migration conditions, the leaders in this assessment are the rural territories of the North Caucasus macroregion (Table 1), where there are almost all indicators of the block are in the best group.

TABLE I. SCORE-RATING ASSESSMENT OF RURAL REGION'S HUMAN CAPITAL LEADERS AND OUTSIDERS UNDER THE DEMOGRAPHIC AND MIGRATION DEVELOPMENT

Type	Macroregion	Entities of the Russian Federation	Scores	Rank
Leaders	North Caucasian	The Republic of Ingushetia	36	1
		Chechen Republic	34	2-3
		The Republic of Dagestan	34	2-3
	Far Eastern	The Republic of Buryatia	32	4
Outsiders	Ural-Siberian	Yamal-Nenets Autonomous District	31	5
		Central	Tver region	12
	North-Western	Novgorod region	12	78-80
		Pskov region	12	78-80
		Republic of Karelia	10	81
Far Eastern	Magadan Region	9	82	

In modern conditions, the natural movement of the population is characterized by depopulation, when mortality exceeds the birth rate, which leads to a reduction in the number of rural residents. However, in the leading regions this indicator has a positive value, i.e. in the Chechen Republic - 15.9 ppm, the Republic of Ingushetia - 13.7, and in the Republic of Dagestan - 12.9. In addition, it is worth noting that the Republic of Buryatia, where the value of this indicator is 14.4 ppm and the Yamalo-Nenets Autonomous Okrug - 12 ppm. All these regions in terms of fertility, mortality and natural growth were in the group with the highest number of points.

The opposite situation is developing in outsider regions, where the values of the same indicators are much worse. So, in Pskov, Novgorod and Tver regions, the lowest values of the level of natural population grow were recorded as -13.2; -11.8 and -10.2 ppm, respectively.

The most important problems in the development of natural reproduction are a high proportion of elderly people, total low reproduction and the high mortality rate among men of working age due to social problems (alcoholism, drug addiction, crime, poor working conditions).

It should be noted that the proportion of pensioners in the total population in the leading regions varies from 22.4% in the Republic of Dagestan to 29.4% in the Chechen Republic, and in the outsider regions from 34.0% in the Magadan Region to 10.3 % in the Republic of Karelia.

Migration growth of the rural population in all macroregions has a different tendency. Thus, the undoubted leaders in this indicator are the Leningrad Region - 171.1 ppm, Moscow - 111.3 ppm, Tyumen - 104.7 ppm and Kaliningrad - 99.3 ppm. However, the high value of the only indicator did not allow them to become leaders in the block under the consideration.

Undoubtedly, a significant damage to the demographic and labor potential is caused by the migration of the rural population to cities, which is primarily associated with problems in providing the villagers with the necessary living conditions [15-16].

It should be borne in mind that human capital is inseparable from the individual, therefore health is its organic part. Good health allows you to work fully, provides a return on investment. More educated people are more attentive to their health, striving for active longevity, and thus in the long

term they determine the effect of reducing the cost of treatment, both state and personal [17].

Education, like culture determines the welfare of the state and the specificity of national consciousness in many respects. Accelerating social life requires a new approach to the educational process, ensuring the possibility to adapt more quickly to the latest achievements of scientific and technological progress, to be individualized, to correspond to the real prospects of development of economic sectors, and to serve as a prerequisite for the formation of human capital [18].

The assessment of the above conditions is reflected in table 2, which shows that the leading regions by demographic and migration conditions are the outsiders in terms of the development of infrastructural conditions for the reproduction of human capital. This is mainly due to the fact that there is insufficient provision of infrastructure facilities considering a significant number of rural population.

**TABLE II. SCORE-RATING ASSESSMENT OF RURAL REGION'S HUMAN CAPITAL LEADERS AND OUTSIDERS UNDER THE INFRASTRUCTURE CONDITIONS**

Type	Macroregion	Entities of the Russian Federation	Scores	Rank
Leaders	Central Black Earth	Tambov Region	31	1
	Far Eastern	Chukotka Autonomous District	29	2
		Magadan Region	28	3-4
	Northwestern	Murmansk region	28	3-4
	Central Black Earth	Belgorod region	24	5
Outsiders	Far Eastern	The Republic of Buryatia	16	78
	North Caucasian	The Republic of Ingushetia	15	79-80
		Karachay-Cherkess Republic	15	79-80
		Chechen Republic	12	81
The Republic of Dagestan		9	82	

The situation is no better in the field of education and health. The provision of preschool children with places in preschool educational institutions and the average load of one school in these regions varies from 258 people in the Republic of Ingushetia up to 553 people in the Republic of Buryatia and 269 people in the Republic of Dagestan and 559 people Republic of Ingushetia. In the leading regions, the values of these indicators are much better.

In the field of healthcare, the Republic of Ingushetia has the lowest number of hospital beds per 10,000 people of the population among all entities of the Russian Federation, and the same index is the largest in the Chukotka Autonomous District.

Currently, the activities on reconstruction and construction of sports facilities are carried out in rural areas. In this regard, in all analyzed regions there is a significant number of sports facilities per 10,000 people population: from 107 units in the Chechen Republic up to 434 units in the Tambov region.

In connection with the development of the Internet, the library fund per 1000 people has significantly decreased and varies from 1330 ind. in the Chechen Republic up to 12829 copies in the Chukotka Autonomous Okrug.

Next, an assessment of the socio-economic conditions for the reproduction of human capital was made. The results are shown in table 3.

**TABLE III. SCORE-RATING ASSESSMENT OF RURAL REGION'S HUMAN CAPITAL LEADERS AND OUTSIDERS UNDER THE SOCIO-ECONOMIC CONDITIONS**

Type	Macroregion	Entities of the Russian Federation	Scores	Rank
Leaders	Ural Siberian	Yamal-Nenets Autonomous District	38	1-2
	Far Eastern	Chukotka Autonomous District	38	1-2
	North	Nenets Autonomous District	34	3
	Far Eastern	Magadan Region	32	4
		Sakhalin Oblast	31	5
Outsiders	North Caucasian	Chechen Republic	19	78
	South	Republic of Kalmykia	18	79
	North Caucasian	Karachay-Cherkess Republic	15	80
		The Republic of Ingushetia	12	81
	Angara-Enissey	Tuva Republic	9	82

It can be seen from the above data that the following changes has occurred in this block: the Far Eastern macroregion turned out to be the leader, and the North Caucasian macroregion again became an outsider.

Thus, in terms of unemployment, the group with the highest rates has included almost all the entities of the North Caucasian macroregion. At the same time, the highest values of this indicator in 2018 were recorded in the Republic of Ingushetia (27.0%), and the lowest - in the Chukotka Autonomous Region (2.9%).

The level of employment is also significant and varies from 30.8% in the Republic of Tuva to 78.3% in the Yamalo-Nenets Autonomous District. At the same time, it worth noting that the North Caucasian macro-region has an average employment value of 39.0%, and the Far East - 54.0%, which affected their ranking.

When considering the cash incomes of the population, the standard of living was considered. Its highest values were obtained in the Ural-Siberian (Yamal-Nenets Autonomous Okrug - 4.9) and the Far East (Sakhalin Oblast - 4.2) macroregions. The lowest value was recorded in the Kabardino-Circassian Republic - 1.8. These data are indirectly confirmed by the indicator of the share of the population with cash incomes below the subsistence level. So, in the Yamal-Nenets Autonomous District, the proportion of such a population is only 7.5%, and in the Republic of Tuva and Ingushetia - 41.5% and 31.6%, respectively.

Calculation of the final score and ranking of macroregions showed that the best conditions for the reproduction of human capital were created in the rural territories of the Ural-Siberian and Far Eastern macro-regions, where the Yamalo-Nenets and Chukotka Autonomous Districts can be distinguished. The Angara-Yenisei macro-region and especially the Republic of Tuva have worse conditions.

**V. DISCUSSION**

The ambiguity of the concept of "human capital" determines the diversity of approaches to its measurement. The indicated problem has many solutions considering the works of various foreign scientists. However, they cannot be adapted for Russia and, in particular, for the rural territories, since they do not take into account their peculiar features, such as the quality of employment in the rural economy, the degree

of its mobility, and social investments in terms of capital components. The problem of the lack of clear methodologies, assessment criteria and indicators of the conditions for the reproduction of rural human capital is currently extremely acute and presents considerable difficulties.

It should be borne in mind that the assessment of human capital largely depends on the level of socio-economic environment. This is due to the fact that when measuring individual, regional, national and global human capital, completely different indicator systems must be used as well as the different methods for assessing the conditions of its reproduction should be applied. Moreover, the results obtained in practice will be used to analyze the implementation of tasks that are different from each other and to develop each level of special strategic measures.

## VI. CONCLUSION

In the framework of this study, a theoretical understanding of the concepts of the essence of human capital is carried out, due to the tasks and methods of studying them in the process of evolution. A direct relationship between human capital in the reproductive cycle and the economic system is revealed based on domestic and foreign experience. The main features concerning human capital in rural areas are shown.

A new approach was proposed in order to assess the conditions for the reproduction of rural human capital (demographic, migration, infrastructural, socio-economic) and to determine the degree of heterogeneity. The approach ensures the possibility to assign points to the selected blocks of conditions on the basis of selected statistical data to the rural areas of the macro-regions and rank them based on the results, and to calculate the integral score.

The study allows us to conclude that it is possible to apply the developed approach to differentiating the conditions for the reproduction of human capital both at the level of regions and macroregions, and at the country level as a whole. Its implementation in practice is aimed at the formation and development of full-fledged modern statistical information-analytical bases, which will contribute to the adoption of forehanded management decisions. Due to the fact that this approach simultaneously evaluates the complex of all created conditions, and each of its blocks separately, the measures developed on the basis of the results obtained will contribute to the comprehensive development of human capital at all levels.

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