

# Rural Territories Differentiation According to the Level and Conditions of Human Capital Formation

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**Abstract** — The ambiguity of the concept “human capital” determines a great deal of approaches aiming at its measurement. The lack of a comprehensive assessment of the rural human capital development associated with its differentiation is currently extremely acute and considerable difficult. Firstly, existing methods do not always determine the level of human capital and the conditions for its formation. Secondly, 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 amount of human capital and, accordingly, the inability to take managerial actions for its normal reproduction considering the conditions of formation. Therefore, the purpose of the study is to develop a methodology based on a grade-rating assessment of the level of human capital of rural territories considering its elements, the conditions for its formation and testing, which in the context of regions using cluster analysis revealed the types of rural territories with varying degrees of balance. The practical application of the developed methodology made it possible to determine both the leading and the outsider regions, which will help the authorities to make timely management decisions to even out the situation.

**Keywords** — *human capital, rural territories, point-rating assessment, level and conditions of human capital development, differentiation of rural territories.*

## I. INTRODUCTION

Russia's transition to a market economy in conjunction with historical background, which was based on the policy of spatial distribution of productive forces, was accompanied by a systematic economic and social differentiation of rural territories, including: territorial and institutional differentiation of agriculture; differentiation of income and stratification of the rural population; differentiation of human capital by the level of its development.

The deepening of social differentiation occurs due to the strengthening of spontaneous processes in the distribution and redistribution of social benefits and is accompanied by a lag in the development of social infrastructure, escalation of inflation and unemployment. Strengthening of spontaneous differentiation is hardly to control. Thus, it impedes the reproduction and accumulation of human capital to a large extent, as well as an increase of investments into education, healthcare, culture and sports.

The nature and rate of economic growth of each rural area of the region individually and the socio-economic system of the region and the country as a whole influence the process of rural polarization and deepening differences in the level of human capital.

The specific nature of Russia lies in the unevenness and non-simultaneous passing of the rural development stages in different regions of our country. Therefore, having determined the degree of socio-economic differentiation according to the level of human capital development, it is necessary to develop basic approaches to overcome the existing inequalities and, accordingly, methods of equalizing the existing imbalances.

The Strategy for Spatial Development of Russia until 2025 was adopted on February 13, 2019 to solve this problem. It is aimed at reducing the interregional differences in the level and quality of living standards as well as reducing the interregional differentiation in the socio-economic development of the constituent entities of the Russian Federation, including rural areas [1].

As far as there is the lack of currently developed approaches to assessing the human capital of rural areas, a new approach should be worked out to determine the level of human capital and the conditions for its formation in order to

establish their balance in relation to each other taking into account the main provisions of the Strategy.

## II. LITERATURE REVIEW

The universally recognized concept of human capital in its modern form was born as a result of the logical formation of global philosophy, and then the development of political and economic scientific thought. But this took a considerable period of time, calculated over the centuries, which showed that the study of the process of formation and development of human capital goes through the approval and comprehension of a person-oriented approach, which is based on a person who is simultaneously a subject and an object.

The human person and both the knowledge and the abilities accumulated by them during the evolution can be described chronologically in the form of four stages (pre-industrial, agrarian, industrial and post-industrial). A person through the enrichment of his own knowledge and intellectualization underwent a consistent transformation: from a person who knows the world to a person who creates during the historical and economic development of civilization.

The emergence of the theory was prepared by the previous development of economic theory, both in methodological and in calculating and analytical aspects. In general, this theory combined different views, ideas, and provisions on the process of formation, use of knowledge, skills, and abilities of a person as a source of future income and assignment of economic benefits.

Thus, the representatives of the classical school (W. Petty, F. Quesnay, A. Smith, K. Marx, J. Mill, T. Malthus and others [2]) determines the value of people who differ from each other in their abilities and talents as the income they receive. They also consider the labor in various fields of material production to be the main creator of wealth.

Scientists-economists belonging to the neoclassical school (I. Fisher, A. Marshall, G. Becker et al. [3]) believe that the human person is an element of capital formed through investments into education, health, and morality.

The representatives of the Austrian school (F. Mahlup. P. Drucker, M. Costels et al. [4]) indicates that a person turns into a key resource and development value in the field of intellectual production, where the human capital of society is formed and most intensively used.

A significant contribution to the study of the problems of the formation and development of human capital has been made by Russian scientists (A.I. Butovsky, S.G. Strumilin, M.M. Kritsky, I.S. Melyukhin and others [5]). They distinguishes the essential characteristics of human capital which more precisely, revealing its specificity due to the moral component, which was not taken into account by foreign economists.

The study and systematization of various scientific theories, concepts and views on human development made it possible to determine the place of the theory of human capital among them considering modern positions. It has been concluded that existing theories has not provided a holistic

picture of the role of man in the conditions of transformation of the world socio-economic system yet. There are certain positions prevailing in each of the numerous studies. However the simultaneous coverage of these positions is not possible at the moment. Therefore, the formation of the theory of human capital has not been completed yet. It continues to develop, be refined and supplemented.

Studies of the category "differentiation" have revealed various approaches to its interpretation.

Considering differentiation in the narrow sense, economic differentiation should be noted as an established system of economic relations, reflecting the structure, patterns and trends of the formation and future development of society, the properties of its current state, as well as social differentiation as differences between macro and micro groups, as well as individuals allocated for many reasons.

In a broad sense, this concept can be considered from the point of view of the specific state of the development of society, which is the result of complex processes of vertical socio-economic stratification, characterized by varying degrees of heterogeneity of different groups of the population and leading to the concentration of a number of social, cultural and life advantages of certain social groups and their absence (deficiency) in the rest of the population.

A study of these approaches allowed concluding that the essence of differentiation can be defined as the process of disintegration into territories that are heterogeneous in a comparable set of attributes. This process is carried out under the influence of objective and subjectively acting mechanisms and turns out to be the result of the process of partition into heterogeneous territories, expressed in significant differences between them, in the directions, forms and levels of socio-economic development [6].

## III. RESULTS

Currently, the following methodological approaches are used to measure human capital: representative approach, cost method, income approach and the one based on the evaluation of index units of measurement of human capital:

- the application of a representative approach involves the use of direct and indirect estimates of individual parameters of the population related to human capital. Such an indicator as population literacy is widely used as direct assessments. The average number of years of study; coverage with various levels of education of the corresponding age categories, etc is considered to be indirect assessments [7];
- assessment of human capital by a cost method is carried out on the basis of accounting for investments into its formation, i.e. the sum of all costs aimed at maintaining human life [8];
- the essence of the income approach consists in assessing the return on the use of human capital, which is divided into monetary benefits (the number of earnings for the entire period of work) and non-

monetary (benefits associated with a reduction in the risk of unemployment, career prospects, etc.) [9, 10];

- the approach based on the evaluation of index units of measurement of human capital is based on the calculation of an integral index characterizing the level of education, health care and other components [11].

There is no the universal to the assessment of human capital despite the large number of existing approaches [12–16]. The most effective approach should be chosen

considering the goals and objectives of the study, as well as the available information.

Considering the above and the lack of effective approaches to assessing the human capital of rural areas, we have developed a methodology that allows assessing the level of human capital and the conditions for its formation, in order to determine their balance with each other.

The evaluation algorithm is shown in Figure 1.

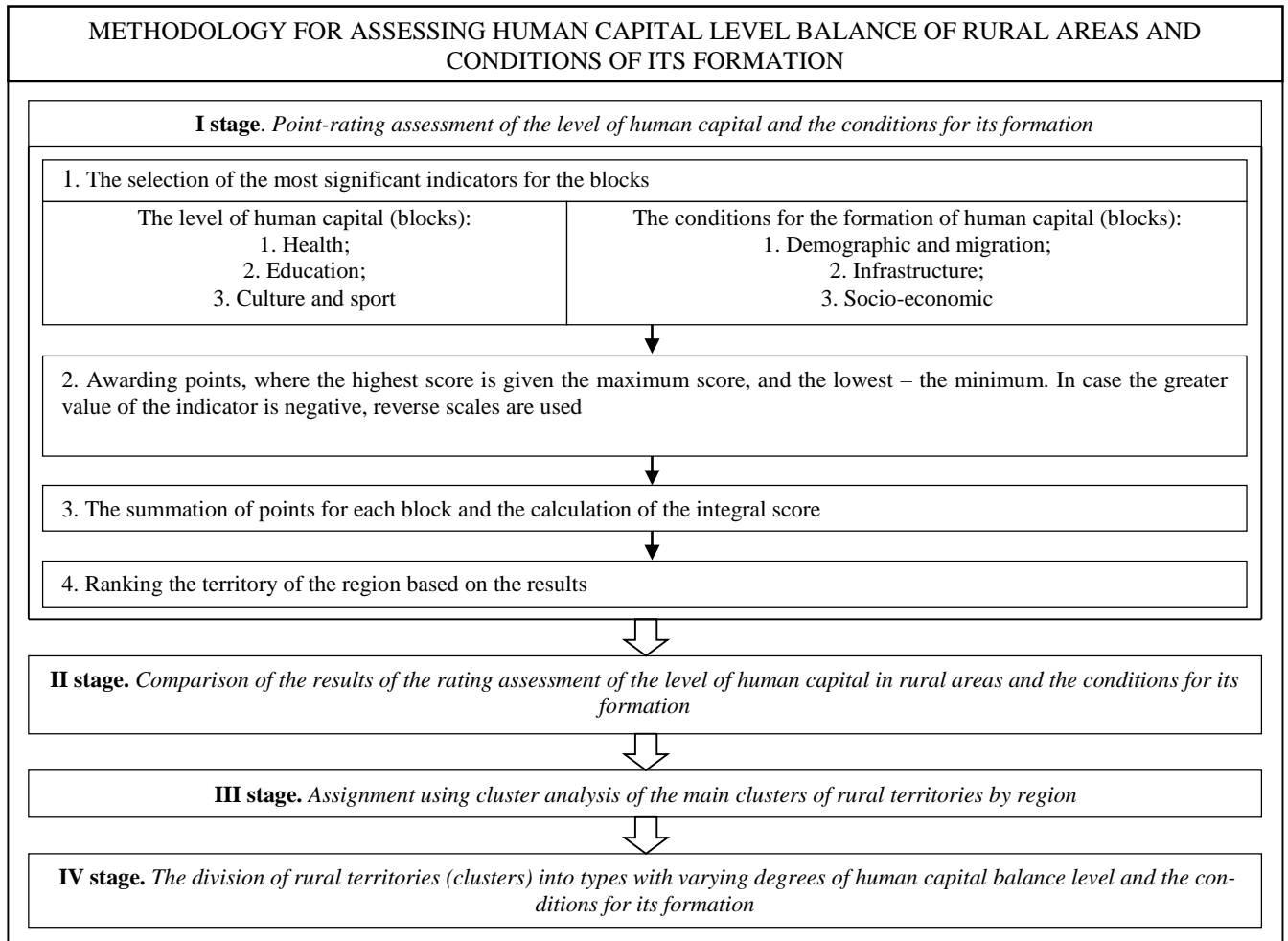


Fig. 1. Methodology for assessing the balance level of human capital in rural areas and the conditions for its formation

Rural territories of the Russian Federation belonging to different macro-regions were chosen as the object of study. The study period is 2018.

Two groups of indicators were proposed considering the level of development and the conditions for the formation of human capital to conduct the study (Fig. 2).

Next, there is a point-rating score for each group. The first block examined an important characteristic of human capital – health. The calculations showed that three regions from the Ural-Siberian macroregion were a group of leaders: the

Khanty-Mansiysk Autonomous Okrug – Ugra, Sverdlovsk and Chelyabinsk Regions.

At the same time, the highest indicator of the availability of doctors was recorded in the Chukotka Autonomous Okrug – 74 people, and in the Khanty-Mansiysk Autonomous Okrug – by the South – nursing staff – 153 people. The most difficult situation with the provision of doctors and nursing staff is in the Chechen Republic is 28 and 75 people, respectively.

The highest capacity of outpatient clinics is typical for the Moscow region, where the value of this indicator was 157,206

visits per shift, and the lowest value was 7393 people in the Republic of Ingushetia.

The worst in this block were the rural territories of the Republic of Ingushetia and the Chechen Republic, which have the lowest scores.

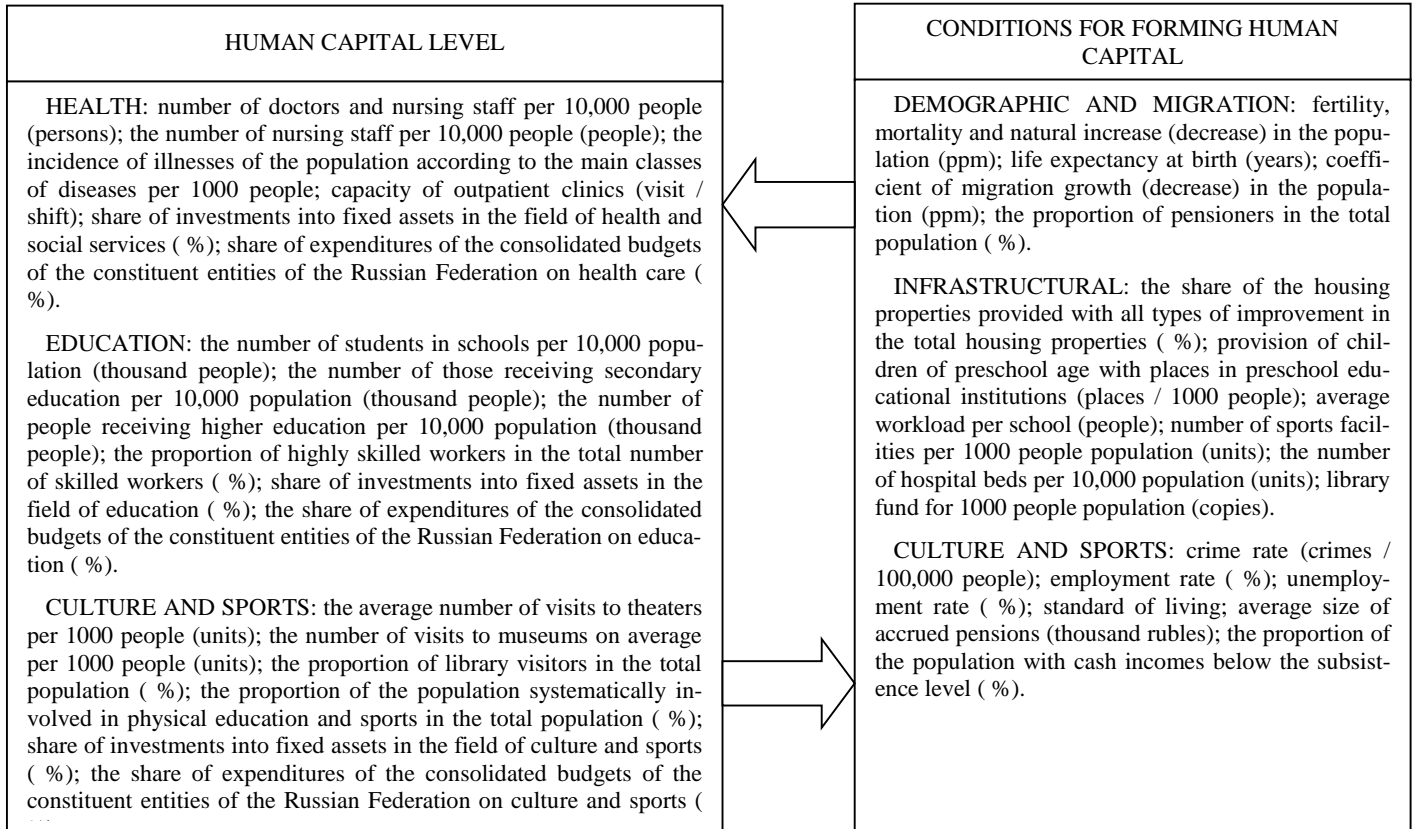


Fig. 2. Scorecard to assess the level of human capital and the conditions for its formation

Then, the education block was analyzed, in which the North Caucasian macroregion is the leader. Two regions scored the most points in this block: the Republic of Ingushetia and the Chechen Republic.

However, the number of students at all levels of education is different. The number of students in schools per 10.000 population in the leaders' regions varied from 2006 thousand in the Republic of Tuva up to 1409 thousand people in the Republic of Buryatia in 2018. The number of people receiving secondary education per 10,000 populations is varied from 284 thousand people in the Altai Republic up to 180 thousand people in the Republic of Ingushetia. The number of people receiving higher education per 10.000 populations is varied from 143 in the Republic of Tuva to 253 thousand people in the Republic of Buryatia.

One of the main indicators that make it possible to assess the sphere of education is the proportion of the number of highly skilled workers in the total number of skilled workers. The resulting data difference is significant from 22.4 % in the Pskov region to 40.8 % in the Moscow region. The share of investments into fixed assets in the field of education varies from 0.2 % in the Yamalo-Nenets Autonomous Okrug to 31.8% in the Republic of Ingushetia. The share of expenditures of the consolidated budgets of the constituent

entities of the Russian Federation on education increased from 11.9 % in the Kaliningrad Region to 36, 7 % in the Chechen Republic.

In the third block, the level of human capital of rural areas of the regions in the field of culture and sports was measured. Here, the leader was the Volga-Kama macroregion, in which two regions received the highest number of points: the Republic of Mari El and the Nizhny Novgorod Region.

Currently, in rural areas, activities are underway to reconstruct and build sports facilities. In this regard, in all analyzed regions, there is a high level of the share of the population systematically engaged in physical education and sports in the total population from 22.7 % in the Jewish Autonomous Region to 47.9 % in the Republic of Tyva. The Republic of Crimea is an exception, for which the value of this indicator is only 14.0 %, and this is due to the fact that it has only recently become part of Russia.

The ongoing restructuring and updating of the rural cultural fund is much slower than the destruction of existing facilities. Because of this, the number of visits to theaters on average per 1000 people varies from 76 units in the Altai Republic up to 395 units in the Republic of Mari El. The number of visits to museums, on average per 1000 population

varied from 58 units in the Karachay-Cherkess Republic to 1914 units in the Novgorod region. Due to the development of the Internet, the share of library visitors in the total population has significantly decreased, which currently varies from 22.1 % in the Chechen Republic to 65.7 % in the Sakhalin region.

The calculation of the final score and ranking of macro-regions based on it showed that the highest level of human capital in rural areas is in the Angara-Yenisei and Volga-Kama macro-regions, where the Krasnoyarsk Territory and the Republic of Tatarstan can be distinguished. The lowest is in the North-West macroregion and especially within the rural territories of the Leningrad region.

The second group of indicators for which a point-rating assessment was carried out was the conditions that affect the formation of rural human capital. The calculations showed that according to demographic and migration conditions, the leaders in this assessment are the rural territories of the North Caucasian macroregion, which in almost all indicators of this block fell into the best group.

Thus, for leading regions, the indicator of natural population movement has a positive value in the Chechen Republic – 15.9 ppm, the Republic of Ingushetia – 13.7, and in the Republic of Dagestan – 12.9. All of these regions in terms of fertility, mortality and natural growth hit 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 the Pskov, Novgorod and Tver regions, the lowest values of the level of natural increase were recorded as following (–13.2, –11.8 and –10.2 ppm, respectively).

Migration growth of the rural population in all macro-regions 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 one indicator did not allow them to become leaders in the block under consideration.

The assessment of infrastructural conditions showed that the leading regions in terms of demographic and migration conditions were outsiders here. Thus, it is necessary to note the extremely low share of the housing properties provided with all types of improvement in the total housing properties in rural areas of the North Caucasus macroregion, where it varies from 8.0 % in the Republic of Dagestan to 34.0 % in the Karachay-Cherkess Republic, and in the Republic of Buryatia it reaches only 4.0 %.

The situation is no better in the field of education and health. Provision of preschool children with places in preschool educational institutions and the average load of one school in these regions vary 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 value of these indicators is 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 subjects of the Russian Federation. The largest is in the Chukotka Autonomous Okrug.

Further, an assessment of the socio-economic conditions for the formation of human capital was made. The results showed that the Far East macroregion was the leader, and the North Caucasian macroregion again became an outsider.

Thus, in terms of unemployment, the group with the highest rates included almost all the subjects 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 employment level also has a significant scale and varies from 30.8 % in the Republic of Tuva to 78.3 % in the Yamalo-Nenets Autonomous District.

The standard of living was used when considering the cash incomes of the population. 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.

The calculation of the final score and the ranking of macro-regions based on it 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 [17].

Having analyzed the level of human capital and the conditions for its formation, we will evaluate their balance in relation to each other, i.e. how consistent is human capital with the prevailing conditions of its formation.

For this, a rating was compiled for each of the two groups of assessment indicators based on the integral points received, the results of which were adjusted using an additionally introduced indicator – average per capita income (rubles).

Then, the results of the rating assessment are compared with each other and a cluster analysis is carried out by the method of full connection with the Manhattan distance metric, which made it possible to identify the types of rural territories of the regions with different degrees of balance.

The analysis of the results made it possible to identify 11 clusters that were combined into 6 types (Table 1).

The results allow concluding that in only 13.4 % of the rural territories regions of the Russian Federation are balanced in terms of human capital and the conditions for its formation (type I). The leaders are the Central and Far Eastern macroregions. The other rural areas are unbalanced types (types II–VI) with varying degrees of balance. Outsiders are the Angara-Yenisei and Northern macroregions. Carrying out such assessments will allow authorities to make timely management decisions to even the situation, support outsider regions and apply the best practices of leading regions.

TABLE I. TYPIZATION OF RURAL TERRITORIES BY THE DEGREE OF THE BALANCE OF THE HUMAN CAPITAL LEVEL AND THE CONDITIONS OF ITS FORMATION

Type	Cluster (characteristic)	Degree of balance (classification criteria)	Number of regions (% of the total)
<b>Balanced</b>			
I type	2222 The level of rural human capital meets the conditions for its formation	from (-4) to +4	11 (13,4 %)
<b>Unbalanced</b>			
II type	1221 The level of rural human capital is slightly better than the conditions for its formation	from (-15) to (-7)	14 (17,1 %)
	2221 Conditions for the formation of rural human capital are slightly better than its level		9 (11,0 %)
III type	1222 The level of rural human capital is slightly better than the conditions for its formation	from (-28) to (-19)	13 (15,5 %)
	2211 Conditions for the formation of rural human capital are slightly better than its level		8 (10,0 %)
IV type	1212 The level of rural human capital is better than the conditions for its formation	from (-40) to (-32)	7 (8,5 %)
	2212 Conditions for the formation of rural human capital are better than its level		9 (11,0 %)
V type	1211 The level of rural human capital is much better than the conditions for its formation	from (-56) to (-48)	3 (3,7 %)
	211 The conditions for the formation of rural human capital are much better than its level.		3 (3,7 %)
VI type	11 The level of rural human capital is much better than the conditions for its formation	-81	1 (1,2 %)
	212 The conditions for the formation of rural human capital are much better than its level		4 (4,9 %)

Thus, the developed methodology for assessing the level of human capital and the conditions for its formation can be applied to both at the level of regions and macroregions, and to the country as a whole. Its implementation in practice is aimed at the formation and development of full-fledged modern statistical information-analytical bases, which will facilitate the adoption of timely management decisions. Due to the fact that this methodology evaluates both the level of human capital and the complex of all created conditions (including each block separately), measures developed on the basis of the results obtained will contribute to the comprehensive development of human capital at all levels.

**IV. CONCLUSION**

The theoretical understanding of the ideas about the essence of human capital is carried out, due to the development of scientific thought and ways of solving problems in the process of evolution. On the basis of domestic and foreign experience, a direct relationship between human capital and the differentiation of rural territories has been revealed, which is expressed in significant differences between them.

The analysis of approaches to the essence of differentiation in relation to the formation of human capital has shown that a sufficient number of publications are devoted to this direction. At the same time, the existing developments has not yet provided a holistic view o differentiation of rural territories by the level and conditions of the formation of human capital due to problems associated with an insufficiently formed information base and lack of necessary tools.

Currently, there are a large number of methodological approaches to assessing human capital, but a universal one has not yet been developed. Therefore, a choice of this or that approach is carried out based on the goals and objectives of the study, as well as the available information. Therefore, we have proposed a methodology that takes into account the inter-regional differentiation of rural territories and allows assessing the level of human capital and the conditions for its formation in order to determine their balance.

For the study, two groups of indicators have been selected: the first group characterizes the level of human capital in rural areas of the regions (blocks: health, education, culture and sports), and the second – the conditions for the formation of rural human capital in the regions (blocks: demographic and migration, infrastructure, social-economic conditions).

The practical approval of the developed methodology resulted in the identification of 11 clusters, which are grouped into 6 types of rural territories (in the context of regions belonging to different macro-regions) with varying degrees of balance between the level of human capital and the conditions for its formation. Type I included 13.4 % of rural territories in all regions of the Russian Federation, which are characterized by almost complete correspondence of the level of rural human capital and the conditions for its formation.

All unbalanced types (types II-VI) were divided into two subtypes: with a predominance of either the level of human capital (the first subtype) or the conditions for its formation (second subtype). The results allow concluding that the Central and Far Eastern macroregions are the leaders in balancing the level of rural human capital and the conditions for its for-

mation, while the Angara-Yenisei and Northern macroregions are outsiders.

The existing differentiation of rural territories undoubtedly affects the effectiveness of state policy in the field of rural development. Therefore, it is necessary to take into account territorial differences when developing and implementing strategic measures. This will ensure the targeted and efficient use of the internal resources of the territory, the development of acceptable living conditions for the rural population, that is, comprehensively equip the village in accordance with the peculiarities and available potential, and the preventing of the process of degradation of some rural areas and excessive concentration of the population in others.

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