European Proceedings of
Social and Behavioural Sciences
EpSBS

www.europeanproceedings.com
e-ISSN: 2357-1330

DOI: 10.15405/epsbs.2022.02.73

LEASECON 2021
Conference on Land Economy and Rural Studies Essentials

IMPROVING THE PROCESS OF HUMAN CAPITAL FORMATION IN THE REGIONS OF RUSSIA

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Abstract

The goal of the study is to determine the degree of human capital development in the regions of the Russian Federation's Volga Federal District (VFD) and to create recommendations for enhancing the human capital building process. The following tasks were assigned and completed in order to fulfil the research goal: the characteristics of the region's human capital creation were investigated; the techniques for measuring the region's degree of human capital development were examined; human capital in the Russian areas was assessed; prospects for human capital development in the examined topics of the Volga Federal District of the Russian Federation were disclosed; and corresponding suggestions were developed. The period 2015-2019 was examined for analyzing the degree of human capital development of the regions, and the author's technique for measuring regional human capital was employed. The Republic of Tatarstan was identified as the leading subject by the level of human capital development for all five years. Furthermore, recommendations were given to improve the production and development of human capital in the areas. These programs aim to boost the birth rate and natural population increase, lower mortality and morbidity, improve the efficiency of pre-school, general, secondary vocational, and higher education, raise the educational level of the employed people, and expand the cultural sphere.

Keywords: Human capital, human capital assessment, human capital formation factors, human development index, region, subindex

https://doi.org/10.15405/epsbs.2022.02.73
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Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

1. Introduction

The formation of human capital is one of the main conditions for economic growth in the region and becomes its competitive advantage, as high quality development of abilities and skills of the population allows the region to successfully adapt to modern economic conditions, realize innovation potential and become more competitive (Xing et al., 2021; You et al., 2021). One of the important features of human capital is knowledge and competencies which each person accumulates during education and which he/she later uses in his/her work activity (Adejumo et al., 2021; Zakirova et al., 2019a). As a result, one of the most important aspects of human capital is its ability to be gathered, utilised, and converted into economic capital. It is self-evident that, first and foremost, the population's human capital is developed through investing in individual talents via a system of ongoing education. However, human growth and personality formation are multidimensional processes, which implies that human capital production is impacted by a variety of variables (Klychova et al., 2019). As a consequence, examining the most essential variables in the creation of human capital in the region helps us to identify the major flaws connected with regional human capital's qualitative features (Zhang & Wang, 2021).

When singling out the factors of formation of the region's human capital, a number of distinctive features of human capital should be taken into account:

1) direct returns from the use of human capital are primarily acquired by its bearer, regardless of the nature of investment in the formation of human capital (Bosi et al., 2021);

2) human capital is formed of qualitative, intangible characteristics (knowledge, skills health, etc.);

3) the return on human capital occurs in the course of human interaction with economic factors of production (Usman et al., 2021; Zakirova et al., 2019b);

4) human capital cannot be completely exhausted, but it can gradually "wear out";

5) individual human capital is inseparably connected with the individual, its carrier (Faizrakhmanov et al., 2019);

6) the bearer of human capital himself determines the peculiarities of its application during the period of his economic activity;

7) certain investments are necessary for the formation and development of human capital (Chen et al., 2021; Tang et al., 2021).

The variables that influence human capital creation in the region may be systematized and separated into the following expanded categories of factors: 1) socio-economic; 2) institutional; 3) demographic; 4) informational.

The socio-economic group includes such factors as education, skills development, demand for labor force and labor market, social development of the population, the level of economic development (Gillman, 2021; Lee et al., 2018).

Of course, human capital depends on investing in human education at all stages (preschool, general education, specialized secondary or higher education). It is important that the system of education be of high quality and continuous, so that the individual can become a bearer of a certain list of knowledge and skills. Constantly transforming modern labor market, where an individual can realize his human capital, also has a special impact on human capital and sets various new conditions to its characteristics, giving preference, for example, to such requirements as: availability of profile

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professional education; creativity and multitasking; stress resistance; initiative; desire for self-development and self-education; regular skill improvement; ability to take responsibility and realize For the development of the education system and a decent level of investment in it, for increasing the competitiveness of the modern labor market, of course, a high level of economic development of the region and increasing the standard of living of the population are required (Bobba et al., 2021; Naval et al., 2020; Sun et al., 2020).

The institutional group includes such factors as family, state, political and legal conditions, legislation regulating the spheres of health care, education, culture, labor.

The family (or household) is the important economic, social, and spiritual foundation of human life in society. It is the household that seeks to make the best investments in its members in the areas of professional training, health, and spiritual and moral development. First of all, within a household, a future full-fledged bearer of human capital is formed as a personality.

The state, including at the regional level, forming the legislative environment, distributing large sums of money within the framework of various socio-cultural state programs, forms a unified and voluminous policy on the formation of human capital. State regional bodies understand that a fully developed person, who has received support both from his household and from the state in the process of formation of his human capital, will bring much more money into the regional economy, compared to the person, who would be formed in conditions, where state bodies are not properly responsible for creating conditions for formation and accumulation of human capital, in particular by eliminating market imperfections in health care systems (Bi et al., 2021; Campbell & Üngör, 2020).

The demographic group includes such factors as population size, sex and age structure of the population, population growth rate, life expectancy.

Demographic factors are extremely important for the region's total human capital, because as individuals develop, the state can invest more in forming an individual's human capital, while individuals can regularly self-develop, invest in their health, education and spiritual and moral development, and acquire new (Bairoliya & Miller, 2021; Craig & Faria, 2021; Han & Lee, 2020).

The information group includes such factors as information and communication technologies (ICT) and Internet resources. The development of ICTs and Internet resources accelerates the process of forming individual human capital, as knowledge becomes more "mobile", people develop their abilities more quickly, receive education and improve their qualifications. In addition, Internet resources allow people to spend their leisure time comfortably, increase the level of civic activity of the population, exchange people's professional experience (Bäker et al., 2021; Haini, 2021).

In addition, such secondary factors of human capital formation as the factor of geographical mobility of professional experience and skills of employees and the environmental factor of living conditions of labor resources can also be identified (Flückiger & Ludwig, 2018; Langnel et al., 2021).

2. Problem Statement

Human capital is presently one of the most essential factors determining many firms' high efficiency and a state's genuine economic competitiveness. It is important to note, however, that the majority of the country's human capital is created at the regional level. It is critical to assess the economic

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level of human capital development in the region on a regular basis in order to identify successful public administration practices in health care, education, and culture, as well as the weaknesses of certain regions in terms of human capital formation and the effectiveness of public administration in the field of human capital formation.

3. Research Questions

The characteristics of human capital production in the subjects of the Volga Federal District of the Russian Federation were the focus of the study.Human capital is not only a set of intellectual abilities and professional-labor skills of the population as a whole (total human capital of the region) and each individual in particular (individual human capital), but also physical, moral and psychological qualities inherent in them (population and individual), which are important for favorable production activity.

4. Purpose of the Study

The study's goal is to analyze the state of human capital development in Russian Federation regions and offer recommendations for enhancing the human capital production process.

5. Research Methods

There are several types of methods for assessing the human capital of a region, which have their own advantages and disadvantages: cost methods (based on the assessment of investments in the formation of human capital), income methods (methods for calculating the economic return on human capital), representative methods and methods based on the assessment of index and value units of human capital.

Representative assessment methodologies are often used to compare the development of regional human capital. Their essence is to assess human capital and its components with the help of appropriate statistical indicators (indices).

When normalizing the statistical indicators the human development index (HDI) of the territory is calculated using the methodology of the United Nations Development Program. HDI of a certain territory is the geometric average of three indices: the index of life expectancy (LEI), the index of education (EI), consisting of the index of the average duration of education (MYSI) and the index of life expectancy (EYSI), income index (II). But it is important to understand that this approach has a number of significant drawbacks: inconsistency of methods for collecting the necessary statistical data in different territories, the possibility of lack of statistical collection of quite specific indicators related to education, the absence of many other important statistical indicators of regional development in this methodology.

We can highlight a number of features of the selection of statistical indicators to assess the human capital of regions: a limited number of indicators; absence of recurring indicators; the relatedness of specific indicators to certain regions; achievement of comparability of indicators through rationing.

Currently, to assess human capital the methodology is used, according to which the human capital of the region is proposed to be assessed by the following components: demographic capital, educational capital, labor capital, research capital, socio-cultural capital.

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Demographic capital consists of the indicators forming the state of human resources and reproductive characteristics of the population. The state of human resources is formed by such components as the age structure of the population (the indicator is the specific number of population under working age) and its general state of health (morbidity rate). Reproductive characteristics of the population are characterized by such indicators as mortality and life expectancy.

Educational capital determines the availability of qualified human resources in the regional economy, as well as characterizes the effectiveness of its educational system. Educational capital consists of such indicators as the share of students enrolled in higher education programs and regional expenditures on education.

The status of employment in the region, the degree of education of the employed people, and the performance of labor activity all influence labor capital. The percentage of the economically active population in the total population unemployment rate is used to determine the condition of employment. The proportion of people working in the producing sector to the overall number of people employed in the economy determines labor efficiency.

The number of people working in research and development, the number of researchers with a scientific degree, the number of graduate students, the number of doctorate students, and the number of patent applications received all contribute to research capital.

Sociocultural capital is characterized by the level of economic well-being of the population, which is determined by the ratio of average per capita income to the subsistence minimum in each particular region, consumer spending and provision with sociocultural facilities.

In order to apply the index method of human capital assessment, there are three groups of indicators, which can be found in the official federal statistics on the subjects of the Russian Federation.

The first set of variables, such as gross regional product (GRP) per capita, wage levels, migration rates, labor force participation rates, unemployment rates, and crime rates, determine the general state of labor capital and the socio-economic status of an area. The second set of indicators is concerned with the population's health and the region's demographic capital. Life expectancy, morbidity rate, and health-care spending are all included in this category. The third category contains statistics such as the number of people working in research and development, the number of researchers with advanced degrees, and so on. attendance of cultural institutions (museums and theaters), educational expenses. This group of indicators determines the state of educational, research and socio-cultural capital of the region.

With such a set of indicators, it is feasible to cover all of the categories of capital suggested in the approach under consideration and provide an impartial assessment of the region's human capital.

In order to determine the state of human capital in each specific region, we should normalize all the proposed statistical indicators, then group the obtained indices within the framework of the already actual sub-indices (demographic capital, educational capital, labor capital, research capital, sociocultural capital), and then calculate the aggregate index of human capital of the RF regions.

In our opinion, a significant drawback of this methodology is the lack of a clear division of indices and sub-indices into qualitative and quantitative, that is, cost and non-cost. This division is present in the author's methodology, which was used in this research.

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The total human capital index of the area is computed on the basis of economic and social sub-indices, according to the author's methodology for measuring the human capital of Russian Federation regions.

The economic subindex is made up of the index of education expenditures from the RF subjects' consolidated budgets (based on the ratio of expenditures of the consolidated budgets of the RF subjects on education to the subsistence level of the RF subjects), the index of healthcare expenditures in the consolidated budgets of the RF subjects (based on the ratio of healthcare expenditures in the consolidated budgets of the RF subjects to the RF subjects' subsistence level), the index of social welfare expenditures in the consolidated budgets of the RF subjects (based on the ratio of expenditures of the consolidated budgets of the RF subjects on health care).

The education index, the health index, the culture index, and the labor force qualification index combine to produce the social subindex. The education index, on the other hand, is calculated using the index of higher education and the index of secondary vocational education.

The health index is calculated using the birth rate index (which is based on the statistic of total fertility rates (number of births per 1000 people in the population), the death rate index (which is based on the statistic of total mortality rates (number of deaths per 1000 people in the population), and the natural population growth index (which is based on the statistic of natural population growth). The morbidity index (which is based on the statistical indicator - morbidity per 1000 people of the population (diseases were registered in patients with a diagnostic established for the first time in their lives)), and the natural population growth rate per 1000 people of the population.

The index of culture is calculated on the basis of the index of museum visits (which is based on a statistical indicator - the number of museum visits per 1000 people of the population) and the index of theatergoers (the number of theatergoers per 1000 people of the population).

The index of workforce qualification is calculated using the index of the employed population with general education (which is based on the statistical indicator - the employed population with general education, as a percentage of the total), the index of the employed population with secondary vocational education, and the index of the employed population with higher education.

To normalize each indicator, that is, to create an index for each index whose value fluctuates from 0 to 1, the following formulae were employed.

For metrics indicating a positive influence on the region's socioeconomic indicators, the following formula should be used:

$$X_i^p = \frac{x_i - X_{min}}{X_{max} - X_{min}}, \quad (1)$$

where X_i^p is the index of indicator i for the p-region; X_i is the value of indicator X for the p-region; X_{max} and X_{min} are the maximum and minimum values of indicator X for all of the areas studied in a particular year. The following formula should be used for the indicators characterizing the adverse impact on the socio-economic indicators of the region:

$$X_i^p = \frac{X_{max} - x_i}{X_{max} - X_{min}}, \quad (2)$$

where X_i^p – index of indicator i for p-region; X_i is the value of indicator X for the p-region; X_{max} and X_{min} – the maximum and minimum values of indicator X for all the regions under study in a given year.

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Formula (2) is used to calculate the index of mortality, the index of morbidity and the index of the employed population with general education, as this methodology considers such a population as a labor force without specific professional skills. The formula (2) is used to calculate all other indices except the index of labor force qualification, the index of culture, the index of health, the index of education, the social subindex and the economic subindex, and the aggregate index of human capital of the region

The following formula should be used to calculate the workforce qualification index, culture index, health index, education index:

$$\acute{X}_i^r = \frac{X_{i1}^p + X_{i2}^p + X_{in}^p}{n}, \quad (3)$$

where $\acute{X}_i^r$ is the index of index i for the p-region; X_{in}^r is the index of index i for the r-region, including that on the basis of which the index X_i^p is calculated; N is the number of indexes X_{in}^r, on the basis of which the index$\acute{X}_i^p$ is calculated.

The formula used to calculate the economic sub-index is:

$$\check{X}_E^p = \frac{X_{i1}^p + X_{i2}^p + X_{in}^p}{n}, \quad (4)$$

where $\check{X}_E^p$ is the economic subindex for the p-region; X_{in}^p – index of index i for the p-region, including the economic subindex $\check{X}_E^p$.

To calculate the economic sub-index, the formula is used:

$$\check{X}_E^p = \frac{X_{i1}^p + X_{i2}^p + X_{in}^p}{n}, \quad (4)$$

where $\check{X}_E^p$ is the economic subindex for the p-region; X_{in}^p is index of index i for the p-region, including the economic subindex $\check{X}_E^p$; n is the number of indices X_{in}^p, on the basis of which the economic subindex is calculated$\check{X}_E^p$. The following formula should be used to calculate the social sub-index:

$$\check{X}_S^p = \frac{\acute{X}_{i1}^p + \acute{X}_{i2}^p + \acute{X}_{in}^p}{n}, \quad (5)$$

where $\check{X}_S^p$ is social subindex for the p-region; $\acute{X}_{in}^p$ is the index of index i for the p-region, including the social subindex $\check{X}_E^p$; n is the number of indices$\acute{X}_{in}^p$, on the basis of which the social subindex $\check{X}_S^p$.

To calculate the aggregate index of human capital of the region, formula 6 is used:

$$\tilde{X}_{HC}^p = \frac{\check{X}_E^p + \check{X}_S^p}{2}, \quad (6)$$

where $\tilde{X}_{HC}^p$ is the region's aggregate human capital index for the p-region; $\check{X}_E^p$ is the economic subindex for the p-region; $\check{X}_S^p$ is social subindex for the p-region.

Normalization of statistical indicators, grouping of the acquired indices within the framework of sub-indices, and calculation of the total index of human capital of the region on the basis of sub-indices were proposed within the scope of the author's approach. In contrast to other techniques, the author's methodology clearly divides indices into qualitative and quantitative categories..

6. Findings

Let us evaluate the state of human capital in five regions of the Volga Federal District of the Russian Federation in the dynamics for five years from 2015 to 2019 using the author's methodology for assessing the region's human capital.

https://doi.org/10.15405/epsbs.2022.02.73
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Table 1. Economic subindex of the subjects of the Russian Federation

Region/Year	Index	2015	2016	2017	2018	2019
Republic of Bashkortostan	Index of expenditures of the consolidated budgets of the constituent entities of the Russian Federation on education	0,7492	0,7049	0,7226	0,5926	0,7056
	Index of expenditures of the consolidated budgets of the constituent entities of the Russian Federation on health care	1,0000	0,9225	0,6977	0,7504	0,9048
	Index of expenditures of the consolidated budgets of the subjects of the Russian Federation on social policy	0,8185	0,7726	1,0000	1,0000	1,0000
	Index of consumer expenditures per capita on average	0,7296	0,7428	0,7159	0,6791	0,6936
	Economic subindex	0,8243	0,7857	0,7841	0,7555	0,8260
Republic of Tatarstan	Index of expenditures of the consolidated budgets of the constituent entities of the Russian Federation on education	1,0000	1,0000	1,0000	1,0000	1,0000
	Index of expenditures of the consolidated budgets of the constituent entities of the Russian Federation on health care	0,9800	1,0000	1,0000	1,0000	1,0000
	An index of expenditures of the consolidated budgets of the constituent entities of the Russian Federation on social policy	0,8764	0,8626	0,9102	0,8477	0,7927
	Index of consumer expenditures on average per capita	1,0000	1,0000	1,0000	1,0000	1,0000
	Economic sub-index	0,9641	0,9656	0,9776	0,9619	0,9482
Nizhny Novgorod Region	Index of expenditures of the consolidated budgets of the constituent entities of the Russian Federation on education	0,5859	0,5824	0,6173	0,4638	0,5417
	Index of expenditures of the consolidated budgets of the constituent entities of the Russian Federation on health care	0,6116	0,5010	0,4484	0,4561	0,8204
	An index of expenditures of the consolidated budgets of the constituent entities of the Russian Federation on social policy	1,0000	1,0000	0,8841	0,8777	0,8803
	Index of consumer expenditures on average per capita	0,5864	0,6348	0,6524	0,6568	0,6909
	Economic sub-index	0,6960	0,6795	0,6505	0,6136	0,7333
Ulyanovsk Region	Index of expenditures of the consolidated budgets of the constituent entities of the Russian Federation on education	0,0960	0,1276	0,1222	0,0997	0,0842
	Index of expenditures of the consolidated budgets of the constituent entities of the Russian Federation on health care	0,1740	0,1243	0,1574	0,0920	0,6444
	An index of expenditures of the consolidated budgets of the constituent entities of the Russian Federation on social policy	0,2421	0,2736	0,2496	0,2398	0,2185
	Index of consumer expenditures on average per capita	0,1811	0,1692	0,1819	0,1454	0,1635
	Economic sub-index	0,1733	0,1737	0,1778	0,1442	0,2777

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Let us calculate the economic subindex. To calculate the economic subindex, let us calculate the index of expenditures of the consolidated budgets of the subjects of the Russian Federation on education, the index of expenditures of the consolidated budgets of the subjects of the Russian Federation on health care, and the index of consumer spending on average per capital.

From Table 01 we can see that during all five analyzed years the Republic of Tatarstan was the leader and had consistently high values of the quantitative sub-index. Bashkortostan also showed high values of the economic sub-index, but they were lower than those of Tatarstan. Nizhny Novgorod region can be generally defined as a region with average values of the economic subindex. The Ulyanovsk region showed low values by the quantitative subindex in 2016-2019. In the Republic of Mari El the values of all indices under consideration were equal to zero.

Let us calculate the social subindex. To calculate the social subindex, let us calculate the education index, the health index, the labor force qualification index and the culture index.

To calculate the index of higher education, the index of secondary vocational education, the index of general education and the index of pre-school education (Table 02).

Table 2. Education index of the constituent entities of the Russian Federation

Region/Year	Index	2015	2016	2017	2018	2019
Republic of Bashkortostan	Higher education index	0,0000	0,0000	0,0000	0,0000	0,0000
	Vocational secondary education index	0,4576	0,7000	0,8000	0,8750	0,9200
	General education index	1,0000	1,0000	1,0000	1,0000	1,0000
	Pre-school education index	0,0000	0,0000	0,1504	0,1481	0,1705
	Education index	0,3644	0,4250	0,4876	0,5058	0,5226
Republic of Mari El	Higher education index	0,0355	0,1111	0,1846	0,1705	0,1016
	Vocational secondary education index	0,4757	0,7333	0,7714	0,8333	0,9600
	General education index	0,6581	0,7098	0,7346	0,7473	0,7909
	Pre-school education index	0,6818	0,6370	0,7068	0,8519	0,7054
	Education index	0,4628	0,5478	0,5994	0,6508	0,6395
Republic of Tatarstan	Higher education index	1,0000	1,0000	1,0000	1,0000	1,0000
	Vocational secondary education index	0,0465	0,3000	0,4571	0,7917	0,9600
	General education index	0,4458	0,4283	0,4564	0,4980	0,5675
	Pre-school education index	0,0606	0,0148	0,0000	0,0000	0,0000
	Education index	0,6266	0,6108	0,6141	0,6245	0,6419
Nizhny Novgorod Region	Higher education index	0,1418	0,1556	0,1385	0,1240	0,1563
	Vocational secondary education index	0,6116	0,5010	0,4484	0,4561	0,8204
	General education index	0,1378	0,1777	0,1937	0,2134	0,2242
	Pre-school education index	1,0000	1,0000	1,0000	1,0000	1,0000
	Education index	0,3315	0,4083	0,4473	0,5323	0,5851
Ulyanovsk Region	Higher education index	0,2199	0,2593	0,3154	0,3488	0,3750
	Pre-school education index	0,0833	0,0593	0,0977	0,1704	0,0930
	Education index	0,0758	0,0796	0,1033	0,1298	0,1170

Table 02 shows that the leader in the education index in 2015-2017 and 2019 was the Republic of Tatarstan, in 2018 - the Republic of Mari El. The Republic of Bashkortostan and the Nizhny Novgorod region can be defined as regions with average values of the education index, and the Ulyanovsk region -

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as an outsider region (vocational secondary education index and general education index had a zero value).

To calculate the health index, let us calculate the birth rate index, the mortality index, the index of natural population growth and the morbidity index (Table 03).

Table 3. Health index of the subjects of the Russian Federation

Region/Year	Index	2015	2016	2017	2018	2019
Republic of Bashkortostan	Birth rate index	0,9286	0,7778	0,8696	0,8696	0,9450
	Mortality index	0,6286	0,6579	0,6765	0,7222	0,6944
	Index of natural population growth	0,7458	0,6935	0,7358	0,7679	0,6909
	Morbidity index	0,5884	0,6332	0,6839	0,5748	0,6571
	Health index	0,7228	0,6906	0,7414	0,7336	0,7468
Republic of Mari El	Birth rate index	0,8929	0,8519	0,7826	0,5217	0,8991
	Mortality index	0,4857	0,5789	0,6765	0,6389	0,7222
	Index of natural population growth	0,6441	0,6774	0,6981	0,5714	0,6182
	Morbidity index	0,0000	0,0000	0,0000	0,0000	0,0000
	Health index	0,5057	0,5271	0,5393	0,4330	0,5599
Republic of Tatarstan	Birth rate index	1,0000	1,0000	1,0000	1,0000	1,0000
	Mortality index	1,0000	1,0000	1,0000	1,0000	1,0000
	Index of natural population growth	1,0000	1,0000	1,0000	1,0000	1,0000
	Morbidity index	1,0000	1,0000	1,0000	1,0000	0,9278
	Health index	1,0000	1,0000	1,0000	1,0000	0,9820
Nizhny Novgorod Region	Birth rate index	0,1429	0,1111	0,1739	0,1304	0,8257
	Mortality index	0,0000	0,0000	0,0000	0,0000	0,0000
	Index of natural population growth	0,0000	0,0000	0,0000	0,0000	0,0000
	Morbidity index	0,0262	0,1583	0,4225	0,1928	0,3906
	Health index	0,0423	0,0674	0,1491	0,0808	0,3041
Ulyanovsk Region	Birth rate index	0,0000	0,0000	0,0000	0,0000	0,0000
	Mortality index	0,1714	0,1579	0,2059	0,2222	0,2222
	Index of natural population growth	0,0339	0,0484	0,0566	0,0893	0,1091
	Morbidity index	0,2103	0,4414	0,3914	0,3881	1,0000
	Health index	0,1039	0,1619	0,1635	0,1749	0,3328

Table 03 indicates that the Republic of Tatarstan led the health index in 2015-2017 and 2019, followed by the Republic of Mari El in 2018 and a region with high index values in general. The Republic of Bashkortostan and the Nizhny Novgorod area are considered to have reasonably average index values, while the Ulyanovsk region is considered an outlier.

To calculate the index of labor force qualifications was calculate the index of the employed population with general education, the index of the employed population with secondary vocational education, the index of the employed population with higher education.

The analysis showed that throughout the entire period under consideration only Nizhny Novgorod region was stable with average values of the labor force qualification index. In 2015-2017, the Republic of Bashkortostan was a region with high values of the index, and in 2018-2019 - with low values. The opposite was the case in the Republic of Tatarstan, which was a region with below-average index values in 2015-2017 and became a region with high index values in 2018-2019. The Republic of Mari El in 2015 was a region with an average value of the index, but after that it became an outsider region. Ulyanovsk region was also an outsider in this index during the entire period.

https://doi.org/10.15405/epsbs.2022.02.73
Corresponding Author: Guzaliya Klychova
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

To calculate the culture index, let us calculate the index of visits to museums, the index of theatergoers (Table 04).

The Republic of Mari El and the Republic of Tatarstan are the leading regions in the cultural index, as shown in Table 4. The regions with the lowest index values were Nizhny Novgorod and Ulyanovsk. The Republic of Bashkortostan can be defined as an outsider region according to the culture index. Using the obtained values of non value indices, let us calculate the social subindex (Figure 01).

Table 4. Cultural index of the subjects of the Russian Federation

Region/Year	Index	2015	2016	2017	2018	2019
Republic of Bashkortostan	Museum attendance index	0,0000	0,0000	0,0000	0,0000	0,0000
	Theater audience index	0,1649	0,1667	0,1866	0,2667	0,1893
	Cultural index	0,0825	0,0833	0,0933	0,1333	0,0947
Republic of Mari El	Museum attendance index	0,5956	0,4819	0,4517	0,3192	0,5286
	Theater Audience Index	1,0000	1,0000	1,0000	1,0000	1,0000
	Cultural Index	0,7978	0,7410	0,7258	0,6596	0,7643
Republic of Tatarstan	Museum attendance index	1,0000	1,0000	1,0000	1,0000	1,0000
	Theater audience index	0,5619	0,5556	0,5694	0,6872	0,5432
	Cultural index	0,7809	0,7778	0,7847	0,8436	0,7716
Nizhny Novgorod Region	Museum attendance index	0,3485	0,3102	0,3428	0,3634	0,3382
	Theater Audience Index	0,2474	0,2778	0,2297	0,3026	0,2716
	Cultural Index	0,2979	0,2940	0,2862	0,3330	0,3049
Ulyanovsk Region	Museum attendance index	0,4446	0,3110	0,2101	0,1709	0,1682
	Index of theaters visitors	0,0000	0,0000	0,0000	0,0000	0,0000
	Cultural Index	0,2223	0,1555	0,1051	0,0854	0,0841

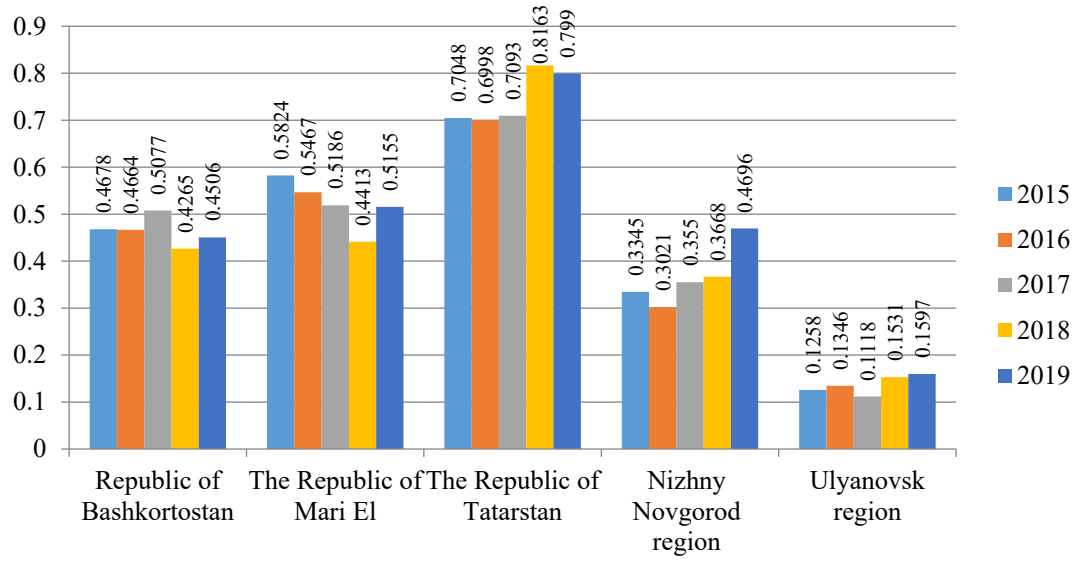

Figure 1. Social subindex

Figure 1 shows that, similar to the economic sub-index, the Republic of Tatarstan led the social sub-index throughout the five years under consideration. The subjects with average index values were the Republic of Bashkortostan and the Republic of Mari El, whereas the Nizhny Novgorod area had low ones. The region of Ulyanovsk can be classified as an outsider region.

https://doi.org/10.15405/epsbs.2022.02.73
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eISSN: 2357-1330

Finally, using the obtained values of the two sub-indices, let us calculate the aggregate index of human capital of the regions (Figure 02). Figure 02 shows that the Republic of Tatarstan was the leading area in terms of aggregate human capital index values during the whole examined period. The Republic of Bashkortostan and the Nizhny Novgorod area may be classified as regions with average index values, whereas the Republic of Mari El and the Ulyanovsk region can be classified as regions with low index values during the study period.

Based on the results of the assessment of the level of human capital development in the five regions of the Volga Federal District of the Russian Federation under consideration (Republic of Bashkortostan, Republic of Mari El, Republic of Tatarstan, Nizhny Novgorod region, and Ulyanovsk region), let us analyze and group the general problems of human capital development in different regions. Then, based on the substance of the highlighted difficulties, we will provide different ideas (proposals) to enhance the process of human capital creation in the listed disciplines.

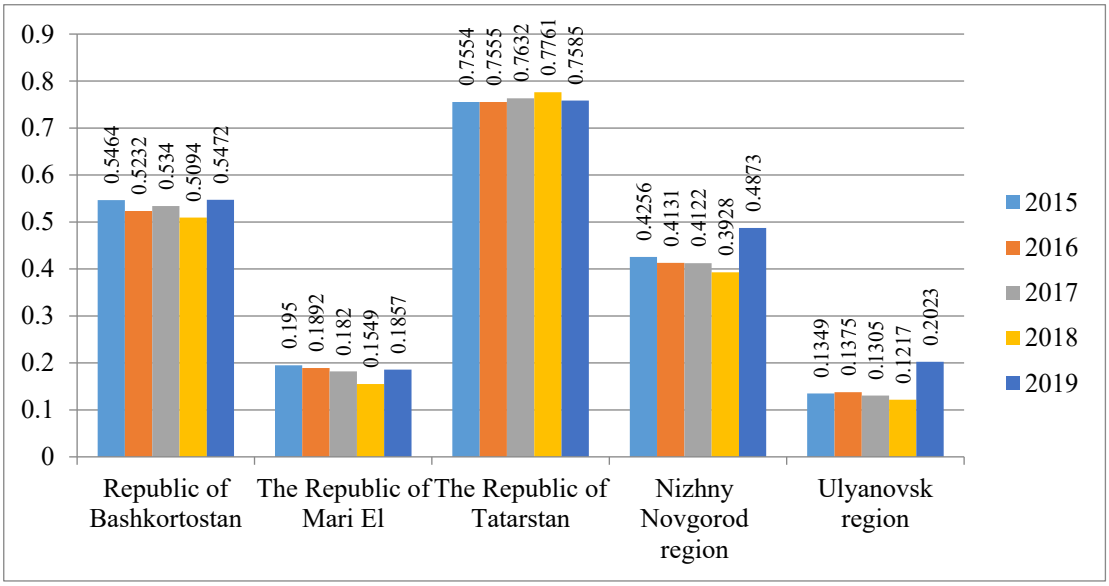

Figure 2. Aggregate Human Capital Index of Regions of the Russian Federation

Consider the issues that exist in the regions under examination in terms of the development of the population's education and the regional educational system (Table 05).

Table 5. Shows the problems that the examined areas face in terms of human capital development in the field of human capital investment

Problems	Regions
Low level of consolidated budget investment in the education system	Republic of Mari El, Ulyanovsk region
Low volume of the consolidated budget investments into the health care system	Republic of Mari El, Ulyanovsk region
Low level of consolidated budget investments in social policy	The Republic of Mariy El
Low level of consumer spending per capita on average	Republic of Mari El, Ulyanovsk region

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eISSN: 2357-1330

From Table 05 we can see that the problem of both public and private investments in human capital is mainly faced only by the Republic of Mari El and the Ulyanovsk region, which have significantly limited budgetary resources.

Let us consider what problems exist in the regions under consideration from the point of view of the development of the population's education and the educational system of the regions (Table 06). From Table 06 we can see that Ulyanovsk region has the most problems in the field of education, which has no serious problems only with the number of students enrolled in higher education. Next comes the Republic of Mari El, which in turn has a problem with the number of students in higher education in the region, and also has problems with the number of employed people with secondary vocational or higher education.

The Republic of Bashkortostan has issues with the number of students enrolled in higher education programs, the percentage of the workforce with a higher education, and the coverage of children in pre-school education. The Republic of Tatarstan has only one issue, which is connected to the lack of kindergarten spaces. Let us consider the challenges that the areas face in terms of population health and the efficacy of the health-care system (Table 07).

Table 6. Problems of the analyzed regions in terms of development of population education and educational system

Problems	Regions
Low number of students in Bachelor's, Specialist and Master's Degree programs	Republic of Bashkortostan, Republic of Mari El, Nizhny Novgorod Region
Low number of students enrolled in secondary professional training programs	Nizhny Novgorod region, Ulyanovsk region
Low number of students enrolled in general education programs	Nizhny Novgorod region, Ulyanovsk region
Low supply of preschool age children with places in kindergartens	Republic of Bashkortostan, Republic of Tatarstan, Ulyanovsk Oblast
High number of employed people with general education	Ulyanovsk region
Low working population with secondary vocational education	Republic of Mari El, Ulyanovsk region
Low employment rate of population with higher education	Republic of Bashkortostan, Republic of Mariy-El, Ulyanovsk region

Table 7. Problems of the analyzed regions in terms of the level of human capital development in the field of investment in human capital

Problems	Regions
Low birth rate of the population	Nizhny Novgorod region, Ulyanovsk region
High mortality rate	Nizhny Novgorod region, Ulyanovsk region
Low level of natural population growth	Nizhny Novgorod region, Ulyanovsk region
High morbidity rate	Republic of Mari El

From Table 07 we can see that Nizhny Novgorod Oblast and Ulyanovsk Oblast have serious problems with both fertility and mortality rates, and accordingly with the level of natural population growth. The Republic of Mari El has been facing a high morbidity rate for the entire period.

https://doi.org/10.15405/epsbs.2022.02.73
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eISSN: 2357-1330

Table 8. Problems of the analyzed regions from the point of view of the sphere of culture

Problems	Regions
Low museum attendance	Republic of Bashkortostan
Low theater attendance	Republic of Bashkortostan, Ulyanovsk region

Let us consider what problems the regions have in terms of culture (Table 08). From Table 08 we can see that some problems in the sphere of cultural development of human capital exist in the Republic of Bashkortostan, which has both low attendance of museums and a low number of theatergoers, and in the Ulyanovsk region, which also has a weak occupancy rate of theater halls of various types.

Here are a number of recommendations (proposals) to improve the process of human capital formation in the mentioned subjects, which will concern different spheres of its development.

1. Increase of birth rate and natural population growth:

1) Increase in the point of measures for socio-economic support of families with children (in particular, young families with children), offered including monetary form;

2) Increasing the efficiency of the distribution of measures of socio-economic support to families with children on the main stages of family development;

3) Reproduction and renewal of infrastructure aimed at physical development and moral education of children;

4) Expanding the number of ways and measures that allow parents or other legal representatives of minors to effectively combine economic activity and child care;

5) Increasing the number of ways and activities that allow women with children to be freely active in the labor market;

2. Reducing mortality and morbidity:

1) Increasing the economic independence of state and municipal hospital and clinic managers, increasing the role of nurses in working with elderly clients, and increasing the link between the health care system and social services;

2) Expansion of practices of using mobile systems for monitoring and diagnosing diseases, including in the elderly, increasing the interest of employers in preserving the health of employees through economic measures of influence;

3) Development of the system of public-private partnership and municipal-private partnership in the sphere of high-tech medicine, promotion of some regional medical organizations in the sphere of inter-regional and international cooperation;

4) Gradual expansion of accumulative health insurance systems;

3. Increasing the level of education of the employed population:

1) Development of part-time and extramural programs of professional training and retraining of specialists of different levels, including those attracted from outside the region, and creation of conditions for subsequent employment of students of these programs;

2) Creation of digital educational resources on the basis of electronic educational systems of regional universities, consolidating extramural (remote) digital programs of professional development and professional training;

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3) Creation of universal educational plans and intra-industry / inter-industry career paths for working citizens of the region;

4) Creating a system of grant support for universities and SPE that develop and implement educational programs for working citizens of the region, connected through a system of internships and traineeships with employers of the industry;

4. Development of the sphere of culture:

1) Development of the system of grants aimed at support of cultural figures and creative teams of the world region.

2) Digitalization of museums, development and provision of modern digital interactive programs at each exhibition.

3) Supporting regional museums in organizing intraregional, interregional and international museum cooperation.

4) Involving state regional TV channels and Internet media in recording theatrical performances, museum tours and interactive programs in order to popularize regional museums and theaters and disseminate the results of their activities among a wide range of viewers on the Internet and television.

5) Provision of legal and economic conditions for improving the quality and diversity of services of cultural and art institutions.

7. Conclusion

As a result, the study found that while there are many ways for measuring a region's human capital, representative methods of evaluation which allow for the use of statistical indicators, are the most desirable for inter-regional comparisons. We looked at the author's approach for generating the region's human capital index, as well as the methodologies and concepts for indexing statistical variables. The aggregate human capital index of the area is computed using economic and social subindices, according to the author's methodology for measuring the human capital of Russian Federation regions. The economic subindex is made up of the index of education expenditures in consolidated budgets of Russian Federation subjects, the index of health care expenditures in consolidated budgets of Russian Federation subjects, the index of social policy expenditures in consolidated budgets of Russian Federation subjects, and the index of consumer spending. The education index, the health index, the cultural index, and the labor force qualification index combine to produce the social sub-index.

In the period 2015-2019, the research looked at the condition of human capital in five areas of Russia's Volga Federal District. The Republic of Tatarstan was the leading region in terms of aggregate human capital index scores throughout the whole time studied.

Furthermore, recommendations were given to improve the production and development of human capital in the areas. These programs aim to boost the birth rate and natural population increase, lower mortality and morbidity, improve the efficiency of pre-school, general, secondary vocational, and higher education, raise the educational level of the employed people, and expand the cultural sphere.

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