

# Investment in Human Capital as a Factor of Growth of the Gross Regional Product

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**Abstract**—The article is devoted to the study of investments in human capital of the Belgorod region for 2010-2019 and the identification of its share in the gross regional product of this territory. As a characteristic of human capital expenditures, we consider expenditures on education, health care, and the average monthly nominal accrued salary. The structure of human capital is presented, which consists of such elements as the contribution of a region or country to the level of education, professional training and competence, health, and so on. The aspects of human capital, which depend on the institutional, financial and economic, digital, demographic, socio-mental, environmental, and production factors, influence on the entire economy of the region are revealed. Authors states that in modern conditions of instability, the growth of the country's economy largely depends on how much money the state invests in human capital, which is one of the most important components of modern productive capital.

**Keywords**—macroeconomic indicators, gross regional product, region, development trends, investment, human capital

## I. INTRODUCTION

Currently, there are many indicators that characterize the socio-economic situation of regions, the main of which are the gross regional product, production of goods and services, income, investment, savings, etc. Gross regional product (GRP) is a General indicator of the economic activity of a region that characterizes the process of producing goods and services for final use. GRP is calculated in current basic prices (nominal GRP volume), as well as in comparable prices (real GRP volume). One of the most significant and growing factors affecting the volume of GRP is human capital.

## II. METHODOLOGY

Based on the review and analytical excursus of scientific and methodological theories, the content of regional indicators and indicators for assessing its development is described.

Methods of systematization, analysis and graphics are used to study the dynamics of the main indicators of the Belgorod region in 2010-2019.

The future GRP trends are presented using the graphical method until 2029 using exponential approximation, and generalizing conclusions on investments in the region's human capital are formed.

## III. RESULTS AND DISCUSSION

Gross regional product (GRP) is the gross value added of services and goods that are created by the region's participants. GRP is calculated as the difference between output and intermediate consumption. The GRP indicator is very close to the gross domestic product (GDP) in terms of financial content. However, there is a significant difference between GRP (at the regional level) and GDP (at the Federal level).

The amount of gross regional products in Russia is not equal to GDP, since it does not include value added for non-market collective services (defense, public administration, etc.) provided by state institutions to society as a whole [12].

There are several methods for calculating GRP:

### 1. Production method:

$$GRP = \text{Gross value added of economic sectors} = \text{Gross output} - \text{Intermediate consumption} \quad (1)$$

### 2. Distribution method:

$$GRP = \text{gross profit of the economy and gross mixed income} + \text{Wages} + \text{Net taxes on production} + \text{imports} \quad (2)$$

### 3. Use method:

$$GRP = \text{Final consumption} + \text{Gross capital formation} + \text{Net exports} \quad (3)$$

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Figure 1 shows the dynamics of the GRP of the Belgorod region for 2010-2019 in current prices and shows the trend line up to 2029.

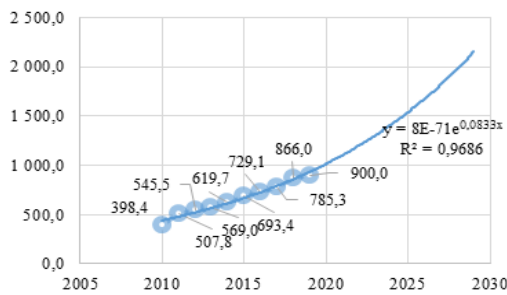


Fig. 1. Dynamics of 2010-2019 and forecast for 2020-2029. GRP of the Belgorod region in current prices, billion rubles

A trend line is a graphical method of technical analysis to identify trends in any factor, element, etc. a trend line is most reliable or reliable if its value (R2) is close to 1.

There are several types of trend lines:

1. Linear approximation is the most appropriate linear line that is used with simple data sets. Such data is called linear if the passing line at the data points resembles a string. In other words, a straight trend line is most suitable for increasing or decreasing at a constant rate of a certain value (R2=0.9817).

2. Logarithmic approximation is the most suitable curved line, which is characteristic for quickly increasing or decreasing the speed of data changes and for their alignment. A logarithmic trend line can use positive and / or negative values (R2=0.9817).

3. Polynomial trend line is a curved line that is used when the data presented changes. This line is most suitable for analyzing costs and profits in large data sets. The degree of the polynomial is determined by the number of extrema (minima and maxima) of the curve (R2=0.9827).

4. Power approximation is a curved line suitable for sets that compare data measurements and increase by a certain frequency. An example is the acceleration of a contest in a single second interval. If there are zero or negative values in such data, it is not possible to use a power trend line (R2=0.9838).

5. Exponential approximation is a kind of curved line that is most suitable for cases when the values of the presented data

gradually change or fall to higher units. However, for data that contains negative or zero values, the exponential trend line cannot be applied (R2=0.9838).

For this analysis, an exponential trend line was used, since R2 is as close to 1 as possible.

Based on these data, we can conclude that during 2010-2029, there was a positive dynamics of GRP: in 2010 – 398.4 billion rubles; in 2019 – 900 billion rubles, which indicates a stable economic situation in the region not only at present, but also in the presented forecast until 2029.

It should be noted that investments in human capital are expenditures that are made for the purpose of future growth of labor productivity of employees and that contribute to increasing future incomes both as individual carriers of capital and society as a whole. Investments in human capital include certain expenses for General and special education, and for maintaining health; costs that are associated with job search, migration, training in the workplace, finding economically relevant information about wages and prices, and other sources of personal income, as well as the birth and upbringing of children. For an employee of the organization, the economic effect of investment is expressed in their income. For a company that invests money in staff development - in increasing labor productivity. For society as a whole - in maintaining the stability of the competitiveness of the national economy and the growth of the gross domestic product, including the gross regional product [7].

For a more detailed analysis of human capital expenditures in the Belgorod region, let's look at their dynamics for 2010-2019, presented in table 1.

Based on the data presented in the table, it can be concluded that spending on education during 2010-2018 was constantly increasing. The increase in spending on vocational and General education may be due to the introduction of various projects and programs that are aimed at ensuring the competitiveness of all education in Russia (including education in the Belgorod region), the growth of the corresponding labor market needs, and the increase in spending on pre – school education-with the creation of additional places, the equipment necessary for them, and maintenance (including due to the growth in the number of relevant personnel) [5].

TABLE I. DYNAMICS OF LEADING EXPENDITURES ON HUMAN CAPITAL IN THE BELGOROD REGION FOR 2010-2019

Indicator	Years									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Education expenses, million rubles	14400,3	16154	18535	20679,2	22324,5	23578,7	24586,3	26214,9	29379,8	23763,8
Health care expenses, million rubles	16270	20479	24253	27231,7	9718,9	10552,2	10154,5	5931,4	7824,7	11381,9
Average monthly nominal accrued salary, rubles.	15938,4	17667,6	20002,1	22220,9	23895,1	25456,2	27090,9	29065,6	31851,9	34614,5
Total, million rubles	30670,3	3663,3	42788	47910,9	32043,4	34130,9	34740,8	32146,3	37204,5	35145,7

\* Compiled from materials [10]

The Federal project "Success of every child" provides for the creation of a mobile Technopark "Quantorium" - 16,934. 0 thousand rubles and the creation of new places in educational organizations of various types for the implementation of additional General development programs of all directions – 34,138. 7 thousand rubles.

Within the framework of the Federal project "Promotion of women's employment - creating conditions for pre - school education for children under three years of age" for the creation of additional places for children aged 1.5 to 3 years of any orientation in organizations engaged in educational activities (with the exception of state and municipal), and individual entrepreneurs engaged in educational activities for pre-school educational programs, including adapted ones, and child care-39,481,1 thousand rubles [9].

Healthcare costs in Russia are among the lowest in the world. Over the past ten years, this indicator has had an unstable trend: from 2010 to 2013, it increased (from 16,270 million rubles to 27,231. 7 million rubles – by 67.37%), in 2014 it sharply decreased to 9,718. 9 million rubles. (by 64.31%), further increased in 2016 to 10154.5 million rubles. (by 4.48%), in 2017 it decreased again to 5931.4 million rubles – by 41.59% and in 2019 it amounted to 11381.9 million rubles. This trend is due to the unstable economic state of the entire state.

The average monthly nominal accrued salary during 2010-2019 was constantly increasing: in 2010, this indicator amounted to 15938.4 rubles, in 2019 - 34614.5 rubles. remuneration is one of the most important indicators for assessing the material well-being of the population, which affects its standard of living. The system of setting and evaluating wages is one of the factors of macroeconomic stability both in the country and in the region. The level of wages plays a significant role in maintaining macroeconomic equilibrium. Changes in the ratio of wage levels, along with other factors, lead to the movement of employees between enterprises, industries, and regions. Similarly, wage differentiation by profession is one of the factors of professional mobility of employees [1].

For figure. 2 shows the proportion of human capital expenditures to GRP. These indicators show that the proportion of human capital expenditures to GRP has been constantly changing. Its maximum value reached in 2013 (0.084), the minimum – in 2011 (0.007). Changes in human capital expenditures depend on various factors: integration, socio-demographic, socio-mental, institutional, industrial, environmental, demographic, economic, and socio-economic. Thus, human capital needs to be considered at the sectoral, national, regional levels, as well as at the level of the individual and the organization.

According to Russian experts, investment in human capital reached its maximum size in the pre-crisis years (2005-2008 and 2012-2014) with the dynamic development of the financial, banking, communication, digital, service, and infrastructure components of the economy. These trends began to concentrate in large cities and regions, which required the availability of highly qualified personnel [3].

At the same time, the development of mass and accessibility of higher education has led to a decrease in employers' interest in University graduates, and educational effectiveness has begun to decrease with the emergence of an

understanding of professionalism as a portfolio or set of certain competencies, knowledge and skills. During periods of economic crises, there was a significant reduction in production and regions and industries that did not require a high proportion of workers with higher education, such as agriculture and the agricultural industry, began to develop. In addition, the impact of higher education has decreased as it has become almost ubiquitous. In many models, the factor of proximity to the most developed partner was definitely significant, which increased the opportunities for increasing access to the markets of personnel, services, goods and technologies [4].

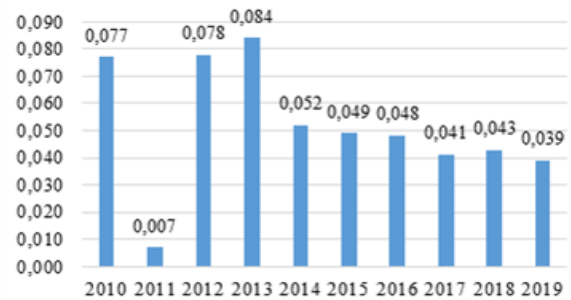


Fig. 2. The share of spending on human capital to the GRP of the Belgorod region for 2010-2019.

At the macroeconomic level, human capital includes the contribution of a country or region to the level of competence, education, health, professional training, and so on. This level includes the total human capital of the entire population of a country or region. At the enterprise level, human capital is the productive capacity of all its employees and their combined qualifications. At the individual level, human capital is the accumulated experience, knowledge, skills and other production characteristics that a person acquires in the course of training, practical experience, and professional training, with the help of which he has the opportunity to earn income.

One of the significant provisions of the theory of human capital is that its growth is among the most important causes of economic development, since human capital accounts for a large share of the welfare of society [15].

In modern conditions of instability, the growth of the country's economy largely depends on how much money the state invests in human capital, which is one of the most important components of modern productive capital, which can be represented by a rich stock of acquired knowledge, developed abilities, determined by creative and intellectual potentials. The main factor of existence, increasing the value and development of human capital is investment. Investment in human capital is any measure that is taken to increase labor productivity. All types of expenses that can be estimated in monetary or other form and that are appropriate in nature, as well as contribute to the growth of future earnings (income) of a person, are considered as investments in human capital [11].

The Main directions of the budget, tax, customs and tariff policy for 2021 and the planning period of 2022 and 2023 [8] present expenditures of the budget system budgets by sections of the functional classification (2019-2023) as a share of GDP that the state is going to invest in education, health and social policy.

TABLE II. THE PROPORTION (FRACTION) GDP TO SUPPORT THE SOCIAL SPHERE, %

Section	Years				
	2019	2020	2021	2022	2023
Education	3,7	4,0	3,9	3,7	3,6
Healthcare	3,5	4,1	3,8	3,7	3,6
Social policy (grants to the Pension Fund, social payments, etc.)	11,8	13,5	12,8	12,1	11,9

\* Compiled from the materials [8, p. 76]

The growth indicators in 2020, compared to the previous year is due to emergency economic measures related pandemic (new hospitals and additional places, additional payments to medical staff, financial payments to families with children, the growth of unemployment benefits and number of recipients, etc.). However, in 2021-2023. the indicators fall or rise by 0.1% and remain approximately at the level of the nineteenth year. An analytical digression in recent decades shows that investment in human capital in Russia has always been insufficient in comparison with developed countries, which spend on health and education from the budget (if you take a share of GDP) one and a half or two times more.

At the same time, an increase in the average level of education in a country (or region) leads to an increase in the output of products and goods on a scale of 3% to 6% per person employed in the economy, provided that an expanded neoclassical approach is used. According to research [6], this can lead to accelerated economic growth of more than a few percent, according to estimates based on the new growth theory. Digitalization and the transition to technological platforms for training and production can increase GRP growth by up to 10-15%.

The main factors of the macro environment include natural, demographic, scientific and technical, economic, cultural factors, and political factors.

The factors at the national level that affect the development and formation of human capital include: features of the current economic policy; features of the stage of economic development; the state and features of the country's economy; the level of financial development of the state.

The main regional factors that affect the state of human capital in the regions of the Russian Federation can be considered: natural and climatic conditions; economic and geographical location; demographic potential and population structure; natural resource potential; structure and specialization of the economy; type (level) of socio-economic development of the region; financial security.

Environmental factors at the national and regional levels can be divided into two main groups: direct and indirect impacts. Direct impact Factors include suppliers of financial, labor, material, information and other resources, competitors, consumers, etc. indirect impact factors are background factors that reduce or increase economic sustainability. This group of factors includes the state of the economy, socio-political, regulatory, natural factors, and so on [11].

#### IV. CONCLUSIONS

Our research allows us to draw the following conclusions:

1. Investment in human capital in Russia over the past decade has been unstable.

2. In the short term the share of social expenditures remains unchanged.

3. Investment instability is related to the discrepancy between the supply of human capital from education and the demand for future knowledge, skills and competencies in demand in the labor market.

4. The growth of investment in human capital will depend on the institutional, financial and economic, digital, demographic, socio-mental, environmental, and production trends of society

5. The growth of investment in human capital is becoming an important factor in the economic development of the state and regions.

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