



Integral Assessment of Labor Potential of the Region in the Age of Digital Economy

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Abstract

The paper presents the results of studying theoretical concepts of the essence and structure of labor potential in the exact region in the age of the digital economy. The authors defined the prospect for the study of labor resources in national and foreign practices and analyzed the research activity in the aspect of human resources of the territory and their qualitative and quantitative characteristics. The authors noticed the increased interest of researchers in the issue of labor potential in terms of the impact of the digital economy at different levels. Special focus is made on the analysis of current approaches for the labor potential of the region implemented by national researchers. This paper presents a proprietary methodology for measuring labor potential based on the index approach. This methodology allows us to consider the specific conditions of its reproduction and use at the regional level. The methodology has also been tested on the data of the North Caucasus Federal District. The presented results indicate the negative tendency of labor potential usage. The conducted research shows that labor underutilization and market conditions are disproportionate. Thus, governmental policy in the labor sector has to be enforced considering the digitalization of the economy.

Keywords

Digital economy · Labor potential · Assessment of labor resources · Labor potential of the region · Population size of the region

JEL codes

E24 · J01 · J64

1 Introduction

The relevance and significance of the chosen research topic are due to the need to address the problem of labor, the establishment of economic relations, and their further development in the age of the digital economy. We consider labor potential as a basis of resource supply for the local job marketplace, the development of which requires new approaches relevant to the policy of optimization at the regional level. This circumstance is closely connected with structural changes in financial, industrial, innovative-investing, and labor sectors (Gorlov et al., 2015).

Working out strategic decisions in the field of managing human potential in the digital economy is the key aspect of governing the region and its economic security.

According to international analysts' data, the globalization process and accelerated scientific and technological progress cause structural changes in job marketplaces of all countries, including Russia, particularly the Stavropol Territory, which is a part of the North Caucasus Federal District. These changes coincide with problems and opportunities given by digitalization.

Present-day realities define the need for a new approach to labor resources of the region. Nonetheless, the socio-economic system did not facilitate the appearance of favorable conditions for self-realization, as some people occurred not to react properly to the changes. Economic growth would be significant if each person could fulfill their labor potential.

For this reason, workforce management requires objective information in a digital economy. This will provide a completely new sense of the process of forming labor potential. Consequently, studying this process within the North Caucasus Federal District appears to be highly important.

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We suppose that the significance of the issue can be explained by the fact that the formation of a flexible and effective mechanism for managing the socio-economic development of the country is possible only with an equal approach at regional levels.

The analysis and assessment of the labor potential of the North Caucasus Federal District may provide relevant information about the development and position of its population and become a basis for applying appropriate solutions in the social and employment sectors. Regional economic development is directly dependent on its resource potential.

The theoretical basis of labor resource management was firstly enunciated in works of western researchers such as K. Marks (1978), Jh. St. Mill (1972), D. Ricardo (1995), and others. Among Russian theorists, we can highlight L. I. Abalkin (1970), A. G. Aganbegyan (2018), L. A. Kostina (1998), I. S. Maslova (1994), and I. E. Zaslavsky (2000).

Market research from the position of institutional discourse was performed by A. Ya. Kibanov, I. B. Durakova, I. A. Esaulova (2013), A. E. Kotlyar (2000), A. G. Rofe (1995), and N. A. Volgin and Yu. P. Kokin (2008).

However, despite the theoretical basis, the issues of the structure of labor resources and the methods of evaluation and further analysis remain debatable. Moreover, there is no universal definition for regional labor potential.

All existing approaches to studying human potential have a common weak point: they practically do not reflect the formation of the level of development of regional workers' labor potential in the digital economy. The survey aims to further develop theoretical knowledge about the subject of regional labor potential of enterprises and objectivate theoretical-methodological approaches to forming and developing viable human capital in current realities.

2 Methodology

The theoretical and methodological basis of this research consists of fundamental works of Russian and foreign researchers considering issues of management, economic theory, and labor economy, and the content of research and practice conferences and seminars of different levels. The research basis is formed on a dialectic approach to studying objective laws of formation and development of socio-economic systems, as well as a systemic analysis of this system.

Thus, the methodology finds conceptual construct formulated for the complex approach, which, based on certain fundamental suppositions, allows us to consider the environmental characteristics of the processes and elicit particular qualities of usage and realization of the labor potential.

To solve the set of practical tasks, we used different methods of scientific knowledge, including abstract-logical,

analytical, statistic, expert, sociological, ranking, comparison, and logical and economic modeling. The authors also applied advanced software for analytical data processing.

The research is based on the following methodological principles:

1. The principle of the system approach to the study of the mechanism of managing human potential requires the analysis of the studied events and objects not only as an independent system but also as part of a complex system, in relation to which the smaller cannot be considered as a closed system;
2. The principle of diversity of forms of research and comprehensive assessments is based on a combination of different methods of human potential management and multivariate in making management decisions;
3. The principle of information support of the study, according to which, based on the existing statistical reporting database, reliable data sets representing extensional and temporal differentiation should be prepared;
4. The principle of the practicability of research results means the development of relatively simple and accessible procedures and the transformation of research findings into certain recommendations.

The practical value of this research is that its conceptual statements on the effectiveness of the use of labor potential can serve as the ground for increasing the effectiveness of managing the labor capital in the region in terms of the digital economy.

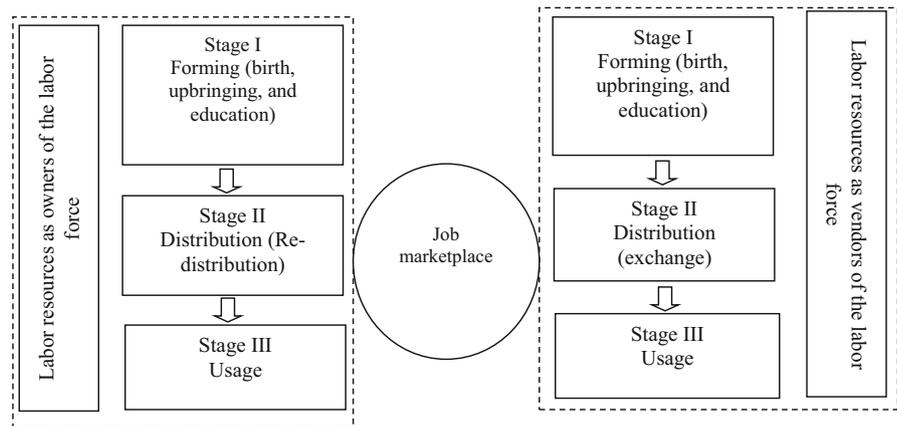
3 Results

As a source of all material and moral benefits, labor was studied in the works of Russian and foreign researchers in all economic fields because people can realize their personal qualities only through the performance of labor functions. Methods of individual involvement in the labor process are not accepted categorically.

Having analyzed labor theories, we have concluded that a complex approach is vital when studying labor potential. Russian researchers consider factors of forming, reproducing, and using labor resources, unlike their foreign colleagues, who limit their analysis to gender, age, and education. We agree with N. R. Khadasevich, whose opinion is that the important feature trait of a labor force of an enterprise, territory, or country is labor potential. It influences the competitive performance of the economy and increases the standard of living (Khadasevich, 2014).

Nowadays, the quality of labor and the characteristics of decent work has become more relevant. Late changes in regional development caused many problems, especially in

Fig. 1 Forming, using, and reproducing labor potential in the NCFD. Source: Compiled by the authors



using labor potential at the meso-level. The conducted research confirmed the fact that labor resources are not fully used, and the state of the market is disproportionate. Consequently, the government has to intensify the policy in the labor sector.

Current realities, the slowdown in economic growth, and the intensification of interindustry competition and structural disproportions in the industry dictate the need for finding optimal ways of using limited resources to confront devastating crises.

In the North Caucasus Federal District (NCFD), including the Stavropol Territory, there are two ways of developing labor potential: as an owner of the labor force and as a vendor of the labor force. Therefore, there are two reproduction stages (Fig. 1).

- The first stage—the formation of labor potential in the NCFD—is characterized by compensation of its natural decline, forming an outlook, skills, and abilities.
- The second stage—distribution (re-distribution, exchange) of labor resources in the NCFD—reflects the process of distribution to economic entities of different branches and fields in the NCFD. At this stage, the previously formed labor potential is distributed.

The third stage—usage—is the longest and most crucial stage in forming labor potential in the NCFD. Some part of labor resources stops their work search resulting in not being included in the last step. Thus, it is critical to monitor labor potential in the NCFD according to the steps described above.

We have concluded that the labor potential of the region has to be studied at every stage of its development, considering the fact that the owners of labor potential are labor resources.

We believe that specific indicators characterizing the development of labor potential should be developed for each stage.

Having analyzed the existing methodology for the formation, development, and use of labor potential in the NCFD, we decided that the following set of indicators is the most appropriate:

- The indicator of the working capacity of the population as the ratio of the able-bodied part of the total population;
- The indicator of economic employment as the ratio of the employed part of the population to the economically active part of the population;
- Unemployment rate as the ratio of the unemployed to the economically active part of the population;
- Education rate as a qualitative indicator of the current productive power as the ratio of people with secondary vocational and higher education to the total number of people;
- The rate of average monthly salary in the region, which is counted on statistical data of economic entities;
- The real volume of capital equipment per unit of labor.

Specific indices for all basic indicators are calculated with the following universal formula:

$$In = \frac{(K_{\text{fact}(n)} - K_{\text{min}(n)})}{K_{\text{max}(n)} - K_{\text{min}(n)}}, \quad (1)$$

where:

In —the number of specific indicators of labor potential;
 $K_{\text{fact}(n)}$, $K_{\text{min}(n)}$, and $K_{\text{max}(n)}$ —real, minimal, and maximal amounts of n in labor potential, respectively.

The integral index is performed by synthesizing specific indices according to the arithmetic mean. The integral index value can be from 0 to 1; it allows assessing how successful the region is in reaching the maximal level of the considered index. In our opinion, this approach is the most correct because index calculation helps to adjust labor potential indicators.

Within the research, we have analyzed the dynamics of the integral index of the development rate of labor potential in the NCFD in the context of structural territories in current realities.

In this work, we have done calculations of the integral indicator with an arithmetic mean formula (Fig. 2).

According to calculations for 2019–2021, the integral indicator of the development of labor potential in the Russian Federation decreased by 1% (0.64–0.63). Thus, national labor potential has a negative dynamic. However, within the first half of the studied period, the integral indicator of labor potential development slightly increased, opposing to a decrease in the second half. The most significant decrease of 11% was observed in the Republic of North Ossetia-Alania, whereas the Kabardino-Balkarian Republic, the Republic of Ingushetia, and the Stavropol Territory have a positive tendency. Anyway, the level of the development of

labor potential in all southern regions is under average national level.

Official statistics served as a basic indicator for calculating parts of the integral indicator. Next, the authors calculated and analyzed the labor potential assessment indicator (Table 1).

First, the authors analyze the overall population in the studied territories.

The conclusion is that the overall population of the country decreased by 0.61%, whereas the NCFD has a positive tendency (+0.84%). Population growth is noticed in all parts of the district, primarily in the Republic of Ingushetia (+3.5) and the Chechen Republic (+2.68%). A negative tendency is observed only in the Republic of North Ossetia-Alania (–1.06%).

Next, the authors count specific indices of chosen indicators—the indicator of the working capacity of the population as a ratio of the able-bodied part to the total population.

According to Table 1, this indicator in Russia decreased over 3 years. This trend can be explained by the reduction of the overall population and, consequently, the number of employed and unemployed who are economically active population. Despite the evident growth of this indicator in

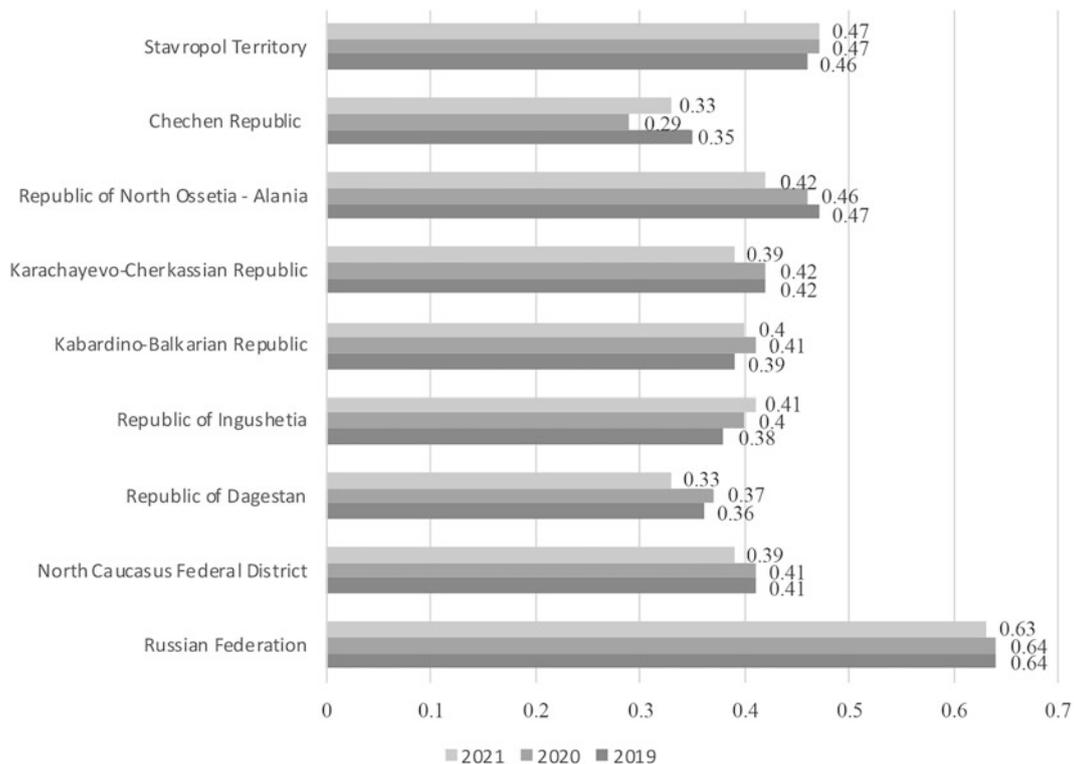


Fig. 2 Calculation of integral indicator of labor potential assessment. Source: Developed and compiled by the authors based on data from the Federal State Statistics Service (Federal State Statistics Service of the Russian Federation, n.d.)

Table 1 Calculation of the labor potential assessment indicator

Indicator	I			II			III		
Region	2019	2020	2021	2019	2020	2021	2019	2020	2021
Russian Federation	0.83	0.81	0.79	0.92	0.93	0.94	0.08	0.07	0.06
North Caucasus Federal District	0.46	0.48	0.47	0.68	0.7	0.68	0.32	0.30	0.32
Republic of Dagestan	0.30	0.32	0.32	0.63	0.65	0.60	0.37	0.35	0.40
Republic of Ingushetia	0.78	0.73	0.77	0.10	0.12	0.12	0.90	0.88	0.88
Kabardino-Balkarian Republic	0.61	0.67	0.64	0.70	0.70	0.69	0.30	0.30	0.31
Karachayevo-Cherkassian Republic	0.37	0.40	0.31	0.58	0.63	0.65	0.42	0.37	0.35
Republic of North Ossetia—Alania	0.59	0.64	0.48	0.67	0.71	0.66	0.33	0.29	0.34
Chechen Republic	0.34	0.33	0.37	0.57	0.58	0.60	0.43	0.42	0.40
Stavropol Territory	0.58	0.61	0.61	0.91	0.92	0.92	0.09	0.08	0.08
Indicator	IV			V			VI		
Region	2019	2020	2021	2019	2020	2021	2019	2020	2021
Russian Federation	0.78	0.77	0.78	0.29	0.28	0.24	0.96	0.98	0.98
North Caucasus Federal District	0.48	0.51	0.50	0.19	0.16	0.13	0.3	0.28	0.23
Republic of Dagestan	0.20	0.34	0.30	0.23	0.19	0.16	0.41	0.38	0.18
Republic of Ingushetia	0.37	0.53	0.64	0.10	0.08	0.05	0.03	0.03	0.01
Kabardino-Balkarian Republic	0.53	0.58	0.53	0.15	0.13	0.10	0.07	0.05	0.13
Karachayevo-Cherkassian Republic	0.72	0.73	0.63	0.12	0.10	0.08	0.29	0.26	0.32
Republic of North Ossetia—Alania	0.92	0.86	0.83	0.18	0.16	0.13	0.15	0.10	0.06
Chechen Republic	0.35	0.07	0.29	0.18	0.16	0.13	0.20	0.20	0.17
Stavropol Territory	0.64	0.7	0.67	0.18	0.17	0.13	0.38	0.36	0.38

Source: Developed and compiled by the authors

the NCFD, we cannot avoid its inequality in the structural parts. We suppose it is due to the population growth within the studied territory. As for the NCFD index, the highest rate (0.48) was recorded in 2020.

Further, the authors calculate the second part of the integral index of the use of labor potential in the region—the index of economic employment as the ratio of the employed part to the economically active part.

The tendency of alteration of this indicator in the Stavropol Territory reflects the tendency in the country. The indicator in the Republic of Ingushetia is the opposite due to the growing unemployment in the republic.

The third indicator is the ratio of the unemployed part to the economically active part.

During the calculation of this indicator, we emphasize the Republic of Ingushetia, which has the highest unemployment rate in the country. We explain this by the conditions of the local economy: there are no significant economic players, and production focus is placed on small enterprises and private households. The economy of this type produces high unemployment. It should also be noted that due to low living standards, people have to register as unemployed to receive meager allowances. Indices of the Stavropol Territory are equal to standard across Russia.

The next indicator describes the education rate as a quality indicator of contemporary productive power. It is calculated as a ratio of people with secondary vocational and higher education to the total number of people.

In this case, it is necessary to note the Chechen Republic, where the number of people with higher education decreased in 2020. On average, in the NCFD, the rate of education level increased except for the Republic of North Ossetia-Alania. The nationwide education rate is 79%, indicating an increase in the quality of labor potential in the country and the region.

Another important indicator is the average monthly salary in the region, which is calculated from statistical data of economic entities. The highest salary rate is based on the highest salary in the region (the Yamalo-Nenets Autonomous Region), whereas the lowest on minimum wage for the corresponding period.

The rate of average monthly salary plays a considerable part in enhancing labor productivity and ensuring growth in the gross output because the higher the average salary, the higher the employee's motivation to realize their labor potential.

The presented data comply with the nationwide tendency in all structural parts of the NCFD. The lowest indices of the gross salary were indicated in the Republic of Ingushetia and the Karachayevo-Cherkassian Republic, whereas the highest is in the Republic of Dagestan.

Next, the authors counted the real volume of capital equipment per unit of labor.

This characteristic is essential in terms of the digital economy. Nationwide, this indicator has increased by 9.6%. There is a decrease in the real volume of capital equipment per unit of labor in most of the regions in the NCFD. The data

obtained can be explained by the significant amount of old equipment, the general state of underdevelopment, and the lack of investment. However, the average indicators for the Republic of Dagestan are higher than the average for the district and the Stavropol Territory in particular, which can be viewed as a positive trend.

Thus, the performed calculations show that opportunities for growth of labor potential within the NCFD have to be considered when developing a regional policy, especially in the labor sector.

4 Conclusions

To conclude, the authors analyzed the labor potential of the NCFD. It is apparent that organizing a single line of developing regional institutes along with developing industrial institutes is vital for improving an innovative regional economy in terms of digital technologies.

Moreover, a comparative analysis of the existing methods and approaches used in assessing the labor potential of a particular territory has shown that there is no universal method and, together with indicators for its assessment, does not exist in relation to the digital economy. It should be noted that the existing methods are to be used at the micro-level and do not consider specifics of the region and its territories.

The proposed methods, supported by calculations, are flexible, open, and easy to use because they are based on free statistical data. The received results allow us to get complete information about the process of the development of labor resources in a certain region. This allows us to implement the methods when making strategic decisions aimed at creating conditions for improving the labor potential

of a country, territory, or city and for governments of different levels.

References

- Abalkin, L. I. (1970). *Political economy and economic policy*. Mysl.
- Aganbegyan, A. G. (2018). *On the priorities of social policy*. Delo.
- Federal State Statistics Service of the Russian Federation. (n.d.). *Official website*. Retrieved from <https://rosstat.gov.ru> (Accessed 26 May 2022).
- Gorlov, S. M., Lazareva, N. V., & Fursov, V. (2015). Competence-based approach to the HR management using in industrial branch. *Asian Social Science*, 11(7), 349–355. <https://doi.org/10.5539/ass.v11n7p349>
- Khadasevich, N. R. (2014). Evaluation of labor potential: Approaches and methods. *Internet Journal "Naukovedenie"*, 6(25). <https://doi.org/10.15862/202EVN614>
- Kibanov, A. Y., Durakova, I. B., Esaulova, I. A., Shatalova, N. I., Mitrofanova, E. A., Sotnikova, S. I., et al. (2013). *Personnel management in Russia: History and modernity*. Infra-M.
- Kostin, L. A. (1998). *Russian labor market: Issues of theory, history, and practice*. Trade Unions and Economics.
- Kotlyar, A. E. (2000). Theoretical employment problems remain relevant. *Man and Labor*, 5, 9–11.
- Marx, K. (1978). *Capital: A critique of political economy* (Vol. 1, Book 1). : Politizdat.
- Maslova, I. S. (Ed.). (1994). *Russian labor market*. Institute of Economics of RAS.
- Mill, J. S. (1972). *Auguste Comte and positivism: Collected works*. University of Toronto Press.
- Ricardo, D. (1995). *The beginning of political economy and tax taxation*. Russia.
- Rofe, A. (1995). On the content of the concepts of "labor resources" and "labor force". *Economic Issues*, 5(10).
- Volgin, N. A., & Kokin, Y. P. (2008). *Incomes of the population and wages in modern Russia: Analysis of the situation, justification of the actions of state authorities and management*. Russian Presidential Academy of National Economy and Public Administration.
- Zaslavsky, I. E. (2000). *Current problems of labor market regulation: Federal and regional aspects*. Parnas-Press.