

Methodological tools for assessing the impact of priority factors in the development of the region on the quality of development of the fruit and vegetable market

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Abstract. The subject of the study is a complex of social relations in the fruit and vegetable industry that arise in the process of providing social support measures to the rural population of the region through the use of new information and communication technologies. The purpose of the work is to identify the digital architecture of methodological tools that help improve the efficiency of providing social support measures to the rural population of fruit and vegetable specialization. As a result of the study, it was revealed that the decreasing number of labor resources that provide fruit and vegetable specialization of the Chelyabinsk region can be replenished by immigrants from other regions and migrants. Based on the digital architecture for diagnosing labor resources and the level of employment of the rural population of the fruit and vegetable specialization of the Chelyabinsk region, the forecast of its number, proposals are put forward to increase the number of labor resources in working age and the effectiveness of these proposals is evaluated. Therefore, for the growth of the labor force, it is necessary to increase the level of employment at the expense of the economically inactive rural population or the growth of migration. Thanks to the digital architecture, the dynamics of employment in the fruit and vegetable specialization of the Chelyabinsk region in 2021–2022. a correlation-regression model has been built, demonstrating a downward trend in the share of the employed rural population in the total number of economically active population.

1 Introduction

For modern Russia, the need to solve the problem of employment is relevant in view of the fact that innovations as a tool for transforming agriculture lead to a reduction in the labor market.

Employment of the rural population is the most important parameter of the functioning of the labor market. According to its level, one can judge the material and economic

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situation of the state and the constituent entities of the Russian Federation. However, there is also a phenomenon opposite to employment - unemployment, which deprives citizens of the opportunity to have enough funds to meet their needs. [1, 5, 6, 7].

Both the employed and the unemployed make up the category of the economically active population.

One of the most important tasks of any country is to ensure a high level of employment. In most modern societies, wages are considered the main source of income for citizens, thanks to which most of their needs are met. The presence of a permanent place of work makes a person more confident in himself and in his future, and unemployment not only deprives him of prospects for a better future, but also leads to underutilization of the country's production potential, theft of the most valuable resource - human capital [2, 10].

Therefore, in order to ensure the well-being of all members of society, the state needs to maintain an optimal level of employment in the country, in agriculture and in the fruit and vegetable industry.

Statistical accounting of labor resources and employment of the rural population in Russia is carried out by the Federal State Statistics Service (hereinafter referred to as Rosstat), which is authorized in accordance with the Federal Law of November 29, 2017 No. 282-FZ "On official statistical accounting and the system of state statistics in the Russian Federation" to generate statistical data on the movement of the rural population in the country, as well as to control their collection. It formulates the legal framework for the functioning of statistical accounting bodies, the main tasks and principles of their activities, in particular, the provision of reliable statistical information on the rural population in full, the application of scientific methods, the use of verified sources [3, 8, 11, 12].

Each subject of Russia has its own territorial body of Rosstat. In particular, in the Chelyabinsk region this is Chelyabinskstat.

2 Materials and Methods

Rural population as a budget-forming indicator of the region. Establishing the number of rural population by age groups of the region (Table 1) is necessary both for the digital architecture for calculating indicators of providing the population with social infrastructure facilities, and for calculating other costs in the system of interbudgetary relations, taking into account the peculiarities of the formation and development of the innovation process in agriculture of the fruit and vegetable specialization of the Chelyabinsk region. areas that are:

- significant scientific, industrial, labor potential;
- developed infrastructure;
- diversity of resource base;
- advantageous transport and geographical position;
- unique natural conditions;
- plurality of types of agricultural products, fruits and vegetables and products of their processing, a significant difference in the technology of their agricultural production;
- significant dependence of agricultural production technologies on foreign suppliers;
- high degree of territorial disunity of agricultural production;
- different social level of workers in terms of the size of their property and income [3, 4, 5, 12].

Table 1. The structure of the population by age groups in 2017–2022, people

The name of the indicator	2017	2018	2019	2020	2021	2022
The entire population	3 490 053	3 497 274	3 500 716	3 502 323	3 493 036	3 475 753
Population aged younger than working age	622 721	639 801	657 296	670 694	677 111	678 221
Working age population	2 028 912	2 002 261	1 971 047	1 945 141	1 916 671	1 888 127
Population aged, older than working age	838 420	855 212	872 373	886 488	899 254	909 405

Source: compiled by the authors on the basis of [3, 4, 5, 12].

Based on the data in Table. 1, we can conclude that the number of the entire rural population of the Chelyabinsk region during the period under review did not undergo significant changes: compared to 2017, it decreased by 2022 by only 0.4%.

At the same time, the working-age population has been declining rapidly. In particular, if in 2020 this indicator was 55.5% of the total population, then in 2022 it decreased to 45.6%. In contrast to the two previous indicators, the number of rural population in the age group younger than working age increased by 55,500 people over the period under review.

The upward trend continued in the digital architecture of rural population indicators by age group older than working age: in the period 2017–2022. it increased by about 8%.

The number of able-bodied rural population is influenced by demographic factors, which include natural and migratory (mechanical) movement. In particular, the natural movement of the population is understood as a natural change in the population due to births and deaths, which depends on the standard of living, the development of medicine, the stage of development of society, etc. In table. 2 reflects the indicators of the natural movement of the population in the Chelyabinsk region in 2017–2022.

Table 2. Natural population movement in the Chelyabinsk region in 2017–2022, people

The name of the indicator	2017	2018	2019	2020	2021	2022
Born	49 599	48 592	46 649	40 191	37 692	34 452
Deceased	48 118	48 516	47 717	45 638	46 022	45 574
Natural increase, decrease (-)	1481	76	-1068	-5447	-8330	-11122
Those who died under the age of one year	343	317	274	257	215	178

Source: compiled by the authors on the basis of [3, 4, 5, 12].

According to the data given in table. 2, the number of births in the Chelyabinsk region for the considered period of time tends to decrease. In particular, 34,452 people were born in 2022, which is 15,147 people or 30.5% less than in 2017. Mortality, in turn, decreased by 2544 people, or by 5.3%. Infant mortality has also been decreasing over five years - it has decreased by 165 people, or by 48.1%.

Based on the available data, it should be concluded that there is a positive trend in the natural increase of the rural population in 2017–2018, which has become negative since 2019.

Under the migration (mechanical) type of population movement is meant the process of changing the permanent place of residence of individuals or social groups, expressed in the

movement of the population to another geographical area or country. The dynamics of migration of the population of the Chelyabinsk region is presented in Table. 3.

Table 3. Migration movement of the population in the Chelyabinsk region for 2017–2022, people

The name of the indicator	2017	2018	2019	2020	2021	2022
Number of arrivals	98 531	95 993	99 102	94 385	91 900	99 262
Number of retirees	92 791	92 627	96 427	98 225	100 853	97 457
Migration increase, decrease (-)	5740	3366	2675	-3840	-8953	1805

Source: compiled by the authors.

Given in table. 3 data show that until 2019 there was an upward trend: the number of arrivals exceeded the number of departures by 2675 people. After 2019, there was a decline in the population, which increased by 5113 people. by 2021 compared to the previous year. But in 2022, there was an increase in migration by 1805 people.

Employment of the rural population is a necessary condition for its reproduction in view of the fact that the standard of living of both the country or region and the individual depends on it, provided by the economically active population (labor force), which is understood as part of the corresponding age group, including the employed and the unemployed, for the production of agricultural products, fruits and vegetables and products of its processing.

In table. 4 shows the structure of the economically active population of the Chelyabinsk region.

Table 4. The structure of the economically active population of the Chelyabinsk region in 2017–2022, thousand people

The name of the indicator	2017	2018	2019	2020	2021	2022
Number of economically active population	1859.9	1856.9	1850.2	1863.2	1874.9	1874.7
Number of employees	1743.8	1727.5	1719.7	1736.8	1767.9	1779.6
Number of unemployed	116.1	129.4	130.5	123.5	105.3	95.1

Source: compiled by the authors.

From the data given in table. 4, it follows that the number of economically active population at the beginning of the period under review tended to decrease, and at the end - to increase. In 2022, compared to 2017, there was an increase by 14.8 thousand people, or by 0.8% [1, 10, 11]. Consequently, the number of people who have their own source of livelihood or who want to have it has increased in the region.

If we talk about the level of employment, then by the end of the period under review it showed growth, amounting to 1779.6 thousand people by 2022, which is 1.5% more compared to 2020. The unemployment rate had the opposite dynamics by 2020 began to decline to a value of 95.1 thousand people. in 2022, which also differs from the figure for 2020 by 1.5%, but already down.

According to the digital architecture of the analysis carried out on the basis of Table. 4, with an increase in the economically active population, there is an increase in employment

and a decrease in unemployment. This indicates a positive trend in the development of the situation on the labor market in the Chelyabinsk region.

On the basis of the considered data, it can be concluded that labor resources are directly dependent on the age of the population. The rural population in the fruit and vegetable specialization of the Chelyabinsk region, which is of working age, prevails. This is also due to the natural and mechanical movement of the region's population. In 2022, the population decreased by 0.76% compared to 2020, amounting to 3,775,753 people. The natural decline became equal to 11,122 people, and the positive migration of the population amounted to an increase of 1,805 people.

The structure and dynamics of the labor force is given in Table. 5.

Table 5. The number and composition of the workforce in the Chelyabinsk region, thousand people

The name of the indicator	2017	2018	2019	2020	2021	2022
The number of the workforce including:	1859.9	1856.9	1850.2	1863.2	1874.9	1874.7
Women	932.8	933.8	934.3	939.7	943.8	945.0
Men	927.1	923.1	915.9	923.5	931.1	929.7
Number of employees including:	1743.8	1727.5	1719.7	1739.8	1769.6	1779.6
Women	881.9	876.1	875.5	884.2	896.5	902.2
Men	861.9	851.4	844.2	855.6	873.1	877.4
The number of unemployed including:	116.1	129.4	130.5	123.5	105.3	95.1
Women	50.9	57.7	58.8	55.5	47.3	42.9
Men	65.2	71.7	71.7	67.9	58.0	52.2

Source: compiled by the authors on the basis of [3].

Based on the data in Table. 5, we can conclude that there is an increase in the number of labor force: over the specified period, it increased by 14.8 thousand people. There are fewer men employed in agriculture specializing in fruits and vegetables than women. This phenomenon is caused by the fact that the number of male representatives, which is closer to retirement age, decreased due to their employment in life-threatening areas of activity.

Let's reflect the obtained data in the digital architecture of the percentage expression. In table. 6 shows the levels of participation of the rural population in the labor force, as well as the levels of employment and unemployment in the Chelyabinsk region in the period 2017–2022 [5, 8, 9, 12].

Table 6. The level of participation of the population in the labor force, the level of employment and unemployment in the Chelyabinsk region, %

The name of the indicator	2017	2018	2019	2020	2021	2022
The level of participation of the population in the labor force, including:	70.4	70.8	70.9	64.8	65.5	65.8
Men	75.6	75.7	75.5	72.0	72.9	73.2

Women	65.9	66.5	69.9	59.0	59.4	59.8
The level of employment including:	66.0	65.8	65.9	60.5	61.8	62.4
Men	70.3	69.8	69.6	66.7	68.4	69.1
Women	62.3	62.4	62.7	55.5	56.5	57.1
The unemployment rate including:	6.2	7.0	7.1	6.6	5.6	5.1
Men	7.0	7.8	7.8	7.4	6.2	5.6
Women	5.5	6.2	6.3	5.9	5.0	4.5

Source: compiled by the authors on the basis of [3, 4, 5, 12].

According to the data given in table. 6, in the period 2020–2022. the employment rate rose by 1.9%, while the unemployment rate decreased by 1.5%. In 2022, the employment rate of women was 12% lower than that of men. The employment rate of women has been increasing since 2018, reaching a value of 57.1% by 2022. The same indicator, but for men, has the same development trend and by 2022 reaches 69.1%. Unemployment increases in the first half of the period under review and falls in the second half of this period to 5.1%. Unemployment rate among men in 2017 - 2022 higher than women.

It should be noted that women are inferior to men in a relatively small percentage both among the digital architecture of unemployment indicators and among the digital architecture of employment indicators. This phenomenon can be explained by two opposite reasons: the first of them is related to human psychology and its nature: representatives of the “weaker” sex are more resilient than men, they are able to withstand heavy loads longer compared to the “strong” sex; the second reason is due to the reluctance of women who are housewives to classify themselves as unemployed.

Special attention should be paid to the consideration of employed persons depending on their age (Table 7).

Table 7. Distribution of employed persons in the Chelyabinsk region by age groups, %

Name of indicator	2021			2022		
	Total	Men	Women	Total	Men	Women
Total occupied	100	100	100	100	100	100
15–19	0.4	0.5	0.4	0.6	0.7	0.5
20–24	5.3	5.6	5.1	4.9	5.0	4.8
25–29	14.0	15.3	12.9	13.0	14.1	12.0
30–34	15.1	16.0	14.2	15.2	16.2	14.1
35–39	13.3	13.2	13.5	13.5	13.4	13.6
40–44	12.9	12.5	13.3	12.9	12.5	13.4
45–49	11.1	10.8	11.3	11.5	11.0	11.9
50–54	11.4	10.4	12.4	10.7	9.8	11.5
55–59	10.3	10.4	10.3	10.6	10.7	10.5
60–69	5.9	5.2	6.4	6.8	6.4	7.2
70 and older	0.2	0.1	0.3	0.3	0.2	0.5
Average age of employees, years	41.0	40.5	41.7	41.5	40.9	42.0

Source: compiled by the authors.

From the table. 7 data shows that the lowest percentage of employment is observed among people aged 15 to 19 years, as well as 70 years and older. This is explained by the fact that adolescents do not yet have enough "baggage of knowledge" to get a permanent

job, and pensioners have already left working age, and few of them, due to age-related changes in the physiology of the body, are able to work.

However, it is worth noting that employment among people aged 55 and over increased in 2022 compared to 2021, due to the effect of the pension reform, according to which women retire at 60 and men at 65. The largest percentage of employment during the period under review was observed among the categories of persons aged 25–29 and 30–34, since they already have qualifications and work experience and are in the prime of their physical strength. The average age of employees in both 2021 and 2022 ranges from 40.5 to 42 years.

It is interesting to consider the structure of the unemployed depending on their age (Table 8).

Table 8. Distribution of unemployed persons in the Chelyabinsk region by age groups, %

Name of indicator	2021			2022		
	Total	Men	Women	Total	Men	Women
Total unemployed	100	100	100	100	100	100
15–19	2.1	2.3	1.7	2.2	1.9	2.5
20–24	15.2	17.1	12.9	15.2	17.3	12.7
25–29	16.6	12.8	21.3	18.8	15.5	22.7
30–34	14.4	11.4	18.2	16.5	12.9	20.9
35–39	13.7	14.1	13.4	12.9	13.6	12.1
40–44	8.6	7.7	9.6	9.7	10.3	9.0
45–49	8.3	7.0	9.9	8.3	8.0	8.7
50–54	8.0	8.7	7.0	6.9	8.8	4.6
55–59	9.2	13.4	4.2	7.0	7.9	5.9
60–69	3.9	5.5	1.8	2.5	3.8	0.9
70 and older	-	-	-	-	-	-
Average age of the unemployed, years	37.3	38.6	35.6	36.0	37.0	34.8

Source: compiled by the authors.

From Table. 8 it follows that the highest unemployment rate during the period under review fell on the age of 25 to 29 years. A large percentage of unemployed among young people is due to a number of objective reasons. In particular, this is due to the fact that their experience is often not enough to find a prestigious job. Based on the table. 8 we can conclude that the older the population, the lower the unemployment rate. There is no unemployment among persons aged 70 and over, since this age group does not belong to the economically active population. Average age of employees in 2021 and 2022 - from 34.8 to 38.6 years, but it is gradually decreasing [3, 4].

A number of important steps need to be taken to improve labor force employment rates. According to the theory, the economically active population and the population of working age are included in the digital architecture of labor resources. The figure shows the dynamics of the working-age population.

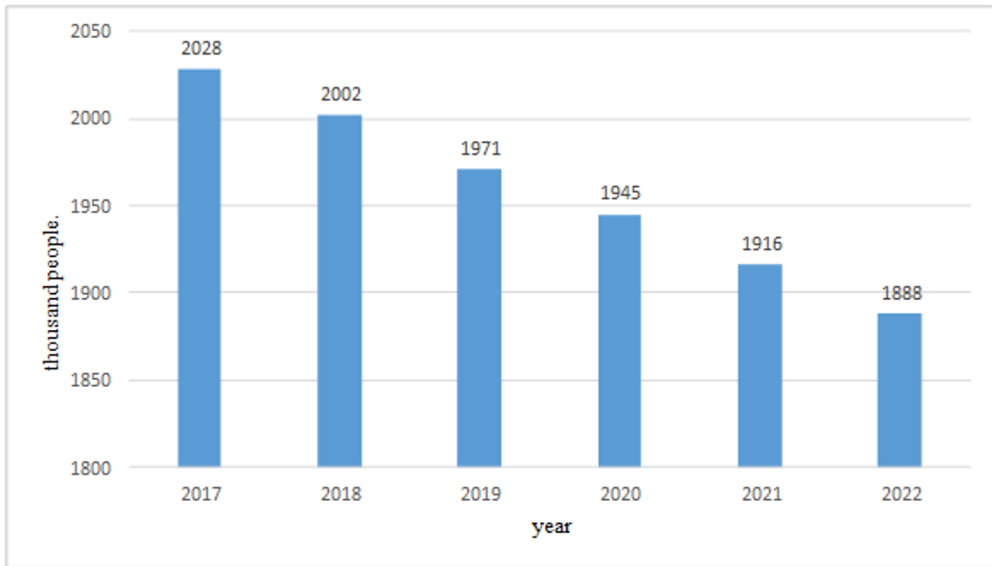


Fig. 1. Working-age population in the Chelyabinsk region, thousand people.
Source: compiled by the authors on the basis of [3, 4, 5, 12].

According to the data presented, the number of the rural working-age population has gradually decreased over time.

Among the methods of digital architecture for calculating labor resources, scientists distinguish economic and demographic methods. Using the economic method, the number of the employed population is determined, which includes employed persons in personal, subsidiary and fruit and vegetable specialization farms, which is typical for agriculture, as well as students with a separation from agricultural production, the unemployed and other persons without a permanent place of work in working age.

Using the demographic method, it calculates the amount of labor resources in the country as the difference between the population of working age and the sum of the number of disabled people of groups I and II, working adolescents and people of retirement age [6].

The number of the rural population of working age is decreasing every year for a number of reasons. The main among them are the natural and migratory movements of the population. In the Chelyabinsk region, the natural population decline in 2021 amounted to 11,122 people, the number of visitors gradually decreased in the period 2017–2019.

Persons with disabilities are one of the groups of persons not included in the labor force. According to statistics, their number in 2017–2019 decreased, and since 2020 began to increase [5]. As of 2022, it was 120.5 thousand people.

The economic consequences of disability include the costs of supporting this category of citizens and their families, as well as the costs associated with their unemployment. Nevertheless, part of the costs can be compensated by improving the organization of the system of employment of people with disabilities. It should be noted that a person can become disabled due to a number of environmental problems in his place of residence, accidents, and injuries. In table. 9 shows the indicators characterizing injuries in the Chelyabinsk region [1].

Table 9. Injuries in the Chelyabinsk region during the production process, people

The name of the indicator	2018	2019	2020	2021	2022
The number of victims of accidents at work with disability for one working day or more with a fatal outcome	1022	954	960	1016	875
The number of victims at work in case of fatal accidents at work	57	42	33	39	34

Source: compiled by the authors.

In accordance with the table. 9 data shows a general downward trend in injury rates. However, in 2021, the number of victims in agricultural production increased, which was accompanied by an increase in the number of people with disabilities in the region.

To reduce the number of disabled people of groups I and II in the Chelyabinsk region, it is necessary to improve the quality of control over the agricultural production process, which will help reduce the number of injuries. It is also necessary to strengthen control over the state of agricultural machinery and equipment in fruit and vegetable specialization, since in the event of failure of poor-quality or worn-out means of agricultural production directly during the work of an employee, he may suffer and become disabled.

In addition to the disabled, the workforce includes pensioners, employed people, and employed teenagers. According to statistics, by 2021 the number of pensioners with jobs has almost halved compared to 2018: from 421.5 thousand people. up to 232.1 thousand people This trend can be traced not only in the Chelyabinsk region as a result of the implementation of the pension reform, as a result of which the retirement age for women has risen to 60 years, and for men - up to 65 years. This affected the values of a number of indicators. In particular, the growth of the rural population over working age in 2021 compared to 2020 was 1.5%, and in 2022 - 1.1%, i.e. decreased by 0.4%. The total load factor for the able-bodied rural population in 2022 was 2.2%, while in 2021 it was 0.5% higher and equaled 2.7%. If we talk about working youth, then its number in the period 2018-2022. gradually increased, and in 2022 its increase was 4.5% compared to 2021.

Today, it is much more difficult for retired people to find a job than for teenagers. This is due to the growth in the number of professions related to the Internet and computer technology. If young people use them in everyday life, then it is much more difficult for older people to master high innovative technologies. The ways of earning money for young people through information technology include monetization of their content on social networks: for each “like” or “repost”, the account owner receives a profit. The microservices exchange is also an affordable and fast way to earn easy money: for example, copywriting text, translating information from audio format to text, and others. This type of earning money is popular not only because of its simplicity, but also due to the ability not to interrupt the learning process if there is a job.

The digital architecture of the analysis of labor resources and employment of the rural population in the fruit and vegetable specialization of the Chelyabinsk region showed that the population is aging: the potential labor force is inferior in number to the population older than working age, the burden on people of working age increased in 2021 and amounted to 840.8%, while that it tends to decrease. When assessing the employment of the rural population and unemployment, it was revealed that the latter indicator decreased in 2022, and amounted to 5.1%, which should have a positive impact on agriculture with fruit and vegetable specialization, but the share of the employed rural population has been

declining since 2020, which indicates an increase load on the employed rural population [5].

Based on the latest Rosstat data for 2023, the difference in pensions between working and non-working pensioners is on average 31,886 rubles (with an average pension in the Russian Federation - 17,791 rubles). In the Chelyabinsk region, according to Chelyabinskstat, as of January 1, 2023, 1 million 20.5 thousand pensioners were registered as pensioners.

The total number of working pensioners in the Chelyabinsk region decreased by 9.1 thousand people compared to 2022, and their share in the total number of pensioners - up to 19.7% (201 thousand pensioners).

The digital architecture of the labor resources of the Chelyabinsk region is declining due to the outflow of the rural population to other regions and the natural movement of the population - recently the death rate exceeded the birth rate, the natural decline in 2022 was 11,122 people, which indicated that the renewal rate in the future there will be less pension burden [7].

In the main sectors of agriculture in the Chelyabinsk region in 2021–2022 there was a decrease in the number of employees: in agriculture and forestry - by 1.6 thousand people.

To compile a digital architecture for forecasting the number of people employed in the Chelyabinsk region, it is necessary to consider the tightness of the relationship between employment and other socio-demographic phenomena. To do this, consider their data for the period 2007–2022. All values are presented in table. 10.

The factors that are described in Table. 10:

Y – employment rate, %;

X₁ – migration increase (decrease), people;

X₂ – unemployment rate, %;

X₃ – number of registered unemployed, thousand people;

X₄ – GRP per capita in basic prices, rub.;

X₅ – labor force, thousand people;

X₆ – number of agricultural organizations engaged in fruit and vegetable specialization;

X₇ – average monthly nominal accrued wages, rub.

Table 10. Indicators needed to forecast employment in the Chelyabinsk region

Year	Y	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇
2007	59.9	-7608	5.1	5.0	81894.8	1756.5	84970	5959.6
2008	61.8	-4143	5.3	36.3	99159.8	1806.1	91972	7462.7
2009	62.5	3338	5.1	30.5	127442.5	1818.3	87223	9356.5
2010	61.4	3102	2.5	2.9	164797.5	1732.8	94618	11897.5
2011	64.5	3411	4.3	33.6	190565.5	1850.8	103642	14829.2
2012	62.4	1493	8	65.8	15990.0	1854.1	109589	15021.2
2013	63.8	-2712	7.5	42.5	187673.7	1870.9	105507	17730
2014	65.4	6572	6.6	31.7	222664.2	1882.3	105182	20015
2015	66	4660	6.4	28.2	241758.0	1879.3	105215	22501
2016	66.1	4115	6	26.1	252988.8	186.6	108316	25651
2017	66	5740	6.2	27.5	284486.7	1859.9	108881	27683
2018	65.8	3366	7	34.6	345597.1	1856.9	113979	29642
2019	65.9	2675	7.1	33.2	363023.3	1850.2	110429	30941
2020	60.5	-3840	6.6	26.7	386862.1	1863.2	110429	32253
2021	61.8	-8953	5.6	21.5	422950.8	1874.9	98305	35219
2022	62.4	1805	5.1	22.7	422950.8	1874.7	89244	37431.8

Source: compiled by the authors.

Using the data presented in table. 10, we will carry out a correlation analysis, the results of which are presented in Table. eleven.

Table 11. Results of correlation analysis

Factor	Y	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇
1	2	3	4	5	6	7	8	9
Y	1							
X ₁	0.73484	1						
X ₂	0.37948	0.033482	1					
X ₃	0.207986	0.285231	0.503278	1				
X ₄	0.23597	-0.01615	0.09846	-0.35877	1			
X ₅	0.574319	0.241132	0.665315	0.272961	0.517806	1		
X ₆	0.637905	0.379454	0.647589	0.480108	0.297642	0.591328	1	
X ₇	0.318779	0.069347	0.321413	-0.12169	0.935444	0.671524	0.465059	1

Source: compiled by the authors.

Based on the data presented, it can be concluded that the factors X₁, X₅ and X₆ have a close relationship with the variable Y. In this regard, the model will look like this:

$$Y' = a_0 + a_1 X_1 + a_2 X_5 + a_3 X_6.$$

Using the available indicators, we will find using *Statistica 10.0* vector of regression parameter estimates a:

$$a = \begin{pmatrix} a_0 \\ a_1 \\ a_2 \\ a_3 \end{pmatrix} = \begin{pmatrix} 31,34829 \\ 0,000261 \\ 0,014114 \\ 0,058241 \end{pmatrix}$$

In this regard, the digital architecture of the regression equation of the dependence of the level of employment of the rural population of the Chelyabinsk region on the migration gain (loss), the number of labor force, the number of agricultural organizations will have the following form:

$$Y' = 31,34829 + 0,000261 * X_1 + 0,014114 * X_5 + 0,00058241 * X_6.$$

Student's t-test will help evaluate the significance of the coefficients a₁, a₂ and a₃ of the derived regression equation:

$$\begin{aligned} ta_1 &= a_1 / Sa_1 = 3,61; \\ ta_2 &= a_2 / Sa_2 = 1,59; \\ ta_3 &= a_3 / Sa_3 = 1,32. \end{aligned}$$

Tabular values of the criterion $t_{table} = 2.1788$ with values of significance level and degree of freedom equal to 0.05 and 12, respectively.

Because the $ta_1 = 3,61 > t_{table} = 2,1788$; $ta_2 = 1,59 < t_{table} = 2,1788$; $ta_3 = 1,32 < t_{table} = 2,1788$, the coefficients a₂ and a₃ do not matter, and a₁ is the only significant coefficient. In this regard, the regression equation takes on a different form and looks like this:

$$Y' = 63,23918 + 0,000336 X_1.$$

Thus, the Student's criterion showed that a significant coefficient is the migration increase (decrease) of the population, the other two factors are excluded from the digital architecture of the model.

Since the digital architecture of regression coefficients is usually not applied in relation to the assessment of the influence of a factor on a variable due to discrepancies in units of measurement, using *Statistica 10.0* it is necessary to find elasticity coefficients and β -coefficients. Get:

$$E_1=0,003338; \beta_1=0,570028.$$

Consequently, the share of employed will increase by 0.3% in 2022, subject to a migration increase of 1%, or 18 people.

3 Results and Discussion

The Chelyabinsk region needs the development of the labor market due to a decrease in the number of labor resources. As a result of the study, it was revealed that it is possible to replenish the labor resources of the Chelyabinsk region with the help of immigrants from other regions and migrants, and the involvement of pensioners in the labor market.

To replenish the digital architecture of the labor resources of the Chelyabinsk region with the help of immigrants from other regions, it is proposed:

- 1) creation of new and promising jobs;
- 2) ensuring a high level of education at any level;
- 3) improving the conditions for the development of small and medium-sized businesses.

Moreover, new jobs should be created in those areas that will be the most popular in the next few years. In particular, they include specialists in the field of agrogenetics, new innovative agricultural technologies, agroecological engineers. The minimum wage of such specialists is 50 thousand rubles, their activities will require a high level of qualification.

In turn, ensuring a high level of agricultural education also depends on a number of significant factors. Among them, one can single out an increase in the salary of teachers, an increase in the availability of educational programs of agricultural universities.

The activities of small and medium-sized businesses need to be modernized through the creation of digital agricultural farms, "smart" agricultural production, etc.

The total amount of regional state support measures for small and medium-sized businesses in the Chelyabinsk region, as well as industry and agro-industrial complex for 2022 exceeded 4 billion rubles.

The purpose of the implementation of the national project "Small and Medium Enterprises and Support for Individual Entrepreneurial Initiatives" is to popularize entrepreneurial activity and involve the rural population in economic relations through self-employment. Thus, as of nine months of last year, the number of people employed in the field of SMEs in the Chelyabinsk region amounted to 591.7 thousand people, which is 48 thousand people. more than at the beginning of 2022.

Due to migration growth, the number of labor resources will increase by 1%, and subject to their employment, budget revenues of the Chelyabinsk region will increase:

- based on the average nominal wage of 37,431.8 rubles. - by 673.8 thousand rubles.;
- based on the minimum wage, taking into account the Ural coefficient, 12,972 rubles. (from 2022 increased to 13,890 rubles) - by 233.5 thousand rubles.

4 Conclusions

To replenish the digital architecture of the labor resources of the Chelyabinsk region by involving pensioners in the labor market, it is proposed to eliminate discrimination against working pensioners, to pay them the same amount of pension that they would receive if they belonged to the category of non-working pensioners.

Due to the increase in the labor resources of the Chelyabinsk region due to the involvement of non-working pensioners by 25 thousand people, the number of labor resources will increase, and if they are employed, the budget revenues of the Chelyabinsk region will increase:

– based on the average nominal wage of 37,431.8 rubles. - by 935,795 thousand rubles.;

– based on the minimum wage, taking into account the Ural coefficient, 12,972 rubles (increased to 13,890 rubles from 2022) - by 324,300 thousand rubles.

References

1. K.A. Volkova, M.A. Kolmogorova, *Enterprise: strategy, structure, regulations on departments and services, job descriptions*, (Moscow: Ekonomika; 2007) 460. (in Russian)
2. L.V. Loginova, *Bulletin of the Saratov Law Academy*, **(5)**, 28–32 (2020) (in Russian).
3. S.I. Shtogrin, *Analytical Bulletin*, **(20)**, 20 – 25 (2021) (in Russian)
4. E.I. Andreeva, *Problems of forecasting*, **(5)**, 105–109 (2021) (in Russian)
5. A.S. Bolshakov, *Theory and practice*, **(6)**, 399–411 (2018) (in Russian)
6. I.G. Vladimirova, *International Relations*, **(5)**, 50–57 (2016) (in Russian)
7. K.O. Abramov, *International Relations*, **(5)**, 65–370 (2016) (in Russian)
8. S.D. Kapelyuk, F.A. Shaklein, *Bulletin of the Siberian University of Consumer Cooperation*, **(4)**, 45–54 (2019) (in Russian)
9. K.S. Kondakov, E.V. Vasil'eva, V.V. Panchenko, Yu.V. Bochkareva, O.S. Bashinskaya, R.R. Gafurov, *Bulletin of the Altai Academy of Economics and Law*, **(11-1)**, 97-103 (2022) (in Russian)
10. M.V. Postnova, E.A. Smirnova, N.R. Aleksandrova, *Labor Economics*, **(12)**, 1217-1234 (2020) (in Russian)
11. E.A. Smirnova, *Bulletin of Agrarian Sciences*, **(6)**, 135-144 (2019) (in Russian)
12. E.A. Tarasova, *Economics of agriculture in Russia*, **(10)**, 52-56 (2018) (in Russian)