

Comparative analysis of ESG factors of sustainable development in Russian depressed regions

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Abstract. The transition of the economy to sustainable development in certain regions is currently conditioned by the evolutionary development of the entire global economic system as a whole. Therefore, for regions that want to strengthen their potential and positions at the global or national level, the concept of sustainable development is uncontested. It should also be noted that in the theory and methodology of regional economy, there has recently been a significant convergence of the terms “sustainable development” and “ESG development”. As a result, these concepts are considered synonyms. In this regard, the definition of actions aimed at accelerating the implementation of sustainable development (ESG) at the regional level is an urgent and practically significant task. Of particular relevance and importance is accelerating the implementation of sustainable development in depressed regions where there is an unsatisfactory dynamics of socio-economic development, a decrease in economic, labor and other components of strategic regional potential. Currently, the “depressed” regions in the Russian Federation are Altai Territory; Volgograd region; Ivanovo region; Kirov region; Oryol region; Smolensk region; Pskov region; the Chuvash Republic; Ulyanovsk region; Kurgan region. The purpose of the study is to conduct a comparative analysis of the current state and dynamics of factors of sustainable development in Russian depressed regions. The results of the study can be used by state and municipal authorities of depressed regions to develop and implement solutions to bring their economies out of a depressed state, as well as by state and municipal authorities of other regions to develop and implement solutions to prevent crisis and depressed states.

1 Introduction

The modern concept of sustainable development originated on the basis of the Club of Rome and allowed considering the interrelationship of three key aspects of development: economic, social, and environmental. Edward Barbier, one of the founders of this approach, notes that ecological, economic, and social systems are three systems which are considered

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key to any development [1]. According to Edward Barbier, sustainable development can be achieved only if the balance of all the three directions, which strengthen each other, is maintained.

ESG was first mentioned in 2005 at the conference “Who Cares Wins” in the report “Investing for Long-Term Value” [2]. According to this report, the concept of sustainable development combines three key components: environmental, social, and governance.

Such foreign authors as E. Le Roy, P. Teilhard de Chardin, G. Atkinson, G. Daly, R. Costanza, E. Millington, D. Pierce, R. Turner, K. Williams, E. Barbier, A. Wagner, D. Sachs, T. Dillick, K. Hockerts, R. Steuerer, D. Elkington, M. Kramer, A. Carroll, M. Porter and others have significantly contributed to the formation, study and development of the theory of sustainable development, its essence, principles and forms of its implementation.

In particular, E. Le Roy and P. Teilhard de Chardin focus mainly on environmental aspects, as well as rational environmental management [3, 4]. The researchers prioritize issues of ecology and environmental protection, contrast the environmental sphere with the social and economic spheres and characterize them as a threat.

G. Atkinson, G. Daly, R. Costanza, E. Millington, D. Pierce, R. Turner, K. Williams investigated the concept of weak and strong stability. In particular, G. Daly and R. Costanza in “Natural Capital and Sustainable Development” interpret sustainable development as a “concept without growth.” According to G. Daly and R. Costanza, when sustainable development is concerned, it is important to take into account the limitations of natural resources and the contribution of intangible values [5].

E. Barbier [6], A. Wagner and D. Sachs developed a three-pronged concept of sustainability. In particular, D. Sachs, an American economist, added the governance aspect to the three traditionally distinguished basic elements of sustainability. According to D. Sachs, the governance aspect included plays an important role in sustainable development [7].

T. Dilik, K. Hockerts, R. Steuerer, D. Elkington describe the concept of corporate sustainability. Proponents of this approach focus on sustainable development from a corporate perspective [8]. When developing the concept, the scientists analyze and take into account risks and benefits offered by commercial enterprises. The peculiarity of this approach is that, unlike previous approaches, it moves to the micro-level of the economy when the concept of sustainable development was traditionally considered at state and regional levels.

M. Kramer, A. Carroll, M. Porter propose to use the cluster approach in achieving sustainable development goals. M. Porter and M. Kramer believe that only “clusters” or geographically concentrated groups of interacting commercial organizations and organizations related to their activities can ensure sustainable development in practice. Clustering is aimed at increasing the competitive advantages of enterprises belonging to the cluster, as well as at distributing benefits among all cluster participants and those interested in its development. The cluster approach is aimed at solving the problem of sustainable development both at meso- and micro-levels, and to some extent contributes to developing the principles of corporate sustainability [9].

Research on sustainable development significantly advanced in 2006 after the UN Principles for Responsible Investment were adopted. They defined responsible investing as a strategy which ensures that environmental, social, and governance aspects are taken into account when making management and investment decisions.

Under modern conditions, the search for approaches and mechanisms for implementing sustainable development on the territory of problem regions is of particular interest. It should be noted that quite a lot of research has been devoted to the development of such regions. In this regard, the following scientists and specialists can be noted: E. B.

Veprikova and A. A. Kislenok [10], A. G. Granberg [11], A. K. Ibraeva, D. M. Akisheva and K. S. Adilbaev [12]; B. D. Babaev, N. V. Borovkova, E. E. Nikolaeva and others [13]; I. V. Panshin [14]; P. M. Mansurov and G. I. Mansurova [15]; A. A. Khomyakova. and A. G. Kaigorodov [16]; B. D. Babaev and D. B. Babaev [17]; V. Kislitsyna [18,20], K. Chernyshev [18]; N. K. Savelyeva, A. A. Sozinova, V. M. Karaulov [19] and others [21].

The literature review makes it possible to distinguish two categories of problem areas – depressed and underdeveloped regions.

Underdeveloped regions, when compared with other regions both now and in the past, consistently demonstrate a lower level of socio-economic development, lack of significant contribution and impact on the national economy. As a rule, such regions focus on agriculture and raw materials, have a low standard of living, underdeveloped infrastructure in key areas, insufficient quantity and quality of available labor resources. In the Russian Federation, the regions of the North Caucasus and Southern Siberia can be classified as underdeveloped regions.

Depressed regions, unlike underdeveloped regions, in the past significantly influenced the national economy, but subsequently faced an economic downturn for various reasons. It should be noted that the prolonged depressed state of the region's economy may lead to the fact that the region will be considered underdeveloped.

Studying domestic and foreign theory and practice in the field of development of problem regions showed that there are currently no generally accepted criteria for determining the depression of a territory. In particular, the European Union identifies several criteria for identifying problematic depressed regions that demonstrate crisis conditions for their development. One of these criteria is a low level of gross domestic product per capita. Regions in the European Union which have gross domestic product below 75% of the European Union average are considered less developed and problematic. Another criterion for identifying problematic depressed regions is a high level of unemployment. A region with an unemployment rate above the European Union average will also be classified as problematic. Besides, poorly developed infrastructure and lack of investment in regional development are criteria for identifying problematic depressed regions in the European Union. Regions with a low level of development of digital, energy and transport infrastructure will be considered problematic. The list of criteria for identifying problematic depressed regions in the European Union also covers the demographic aspects of regional development. Thus, the criteria under consideration include: the ageing rate of the population living in the region; the rate of outflow of population, in particular, of young people; lower (compared to the average value for the European Union) birth rate in the region. A region can also be classified as problematic if its economic condition depends on one or more industries experiencing a decline in their development. Classification of a region as problematic can also be due to its geographical remoteness from sales markets and major economic centers. The listed criteria are usually used by the European Commission to identify problematic depressed regions and provide them with priority support, as well as direct investments from the structural funds of the European Union into their economies.

In the United States of America, a specific list of criteria is also used to classify regions as depressed. These criteria include a high unemployment rate. Regions with a two-year unemployment rate that exceeds the national average by one percentage point are considered depressed. Another criterion for classifying regions as depressed is a low income level. If the income level of the population in a region is below 80% of the national average, the region is considered depressed. One more criterion for classifying a region as depressed in the United States of America is a high poverty rate. Regions that have experienced a significant population decline can also be considered depressed. The closure of large enterprises; significant labor and capital outflow are among the criteria for

classifying regions as depressed and allow identifying those that should receive targeted government support and preferences to stimulate economic growth and improve living standards.

In the Russian Federation, the state of depression at the regional level was encountered in the mid-1990s. By this time, previously prosperous subjects of the Russian Federation began to experience a steady decline in the level of social and economic development, and a return to the previous state of their social and economic sphere in a short time proved impossible. The state of depression became a new challenge for state policy, requiring the development of an appropriate regulatory and legal framework and measures to overcome the depression of individual territories.

In 1997 and 2000, parliamentary hearings were held in the State Duma of the Russian Federation, which focused on the problems of identifying and supporting depressed territories. Based on the results of these parliamentary hearings, a decision was made to enshrine at the legislative level: 1) the definition of the concept of "depressed territory"; 2) the goals and principles of providing state support to territories with such status; 3) the types and content of mechanisms for providing state support to depressed territories; 4) the criteria and principles by which the list of depressed territories in the Russian Federation should be formed. According to the draft Federal Law No. 91010-3 "On the Fundamentals of Federal Support for Depressed Territories of the Russian Federation", adopted in the second reading on March 12, 2003, the concept of a depressed territory is based on the presence of an economy with a highly homogeneous structure, which, as a result of an acute crisis in a key industry (or key industries), found itself in a state of deep economic decline. According to the draft of this Federal Law, the following are proposed as criteria for classifying territories as depressed: location within the boundaries of one or more adjacent administrative units; similar industry structure; level of development, state of fixed assets and other characteristics of the economy of the depressed territory in all administrative units (districts, cities) that are part of it; a triple or more drop in production in the key sectors of the economy of this territory over the past 12 years; the presence of no more than two main sectors of the economy, each of which demonstrated a triple or more drop in production over the past 12 years; a significant (more than 25%) lag behind the average Russian indicators over the past 3 years in terms of unemployment (as a percentage of the economically active population) and the ratio of cash income to the subsistence minimum of the population. Some experts believe that the existing indicators are clearly insufficient for a full assessment and recognition of a region as depressed. Therefore, they recommend considering an additional list of criteria. In their opinion, this list should include: a general drop in production volumes; a decline in individual industries, including socially significant ones; a decrease in population income; deterioration of the environmental situation; reduction in the number of people living in the region; reduction in the number of economically active people and a number of others. All these indicators can be grouped into several key blocks: employment and unemployment, quality and standard of living, scale and dynamics of production. The lack of unified criteria for determining the depressiveness of the territory explains the variety of interpretations of the concept of a "depressed" region.

E. B. Veprikova and A. A. Kislenok propose to consider the territory depressed or problem if it is characterized by: "lag in development compared to the average values for the country or the average values for a group of similar territories; steady stagnation /degradation of the dynamics of the values of socio-economic development indicators; limited resources for self-resolution of the problem situation" [10]. The authors note that if there is only a part of the features mentioned above, it indicates a possible risk of depression in the region and requires corrective management actions by the authorities.

According to A. G. Granberg [11], the depressed region is characterized by the fact that in the past this territory had great potential resources, and currently it is

characterized by low values of socio-economic indicators. Such values are the result of various economic downturns, military operations in the region, the impact of anthropogenic and natural disasters, and large-scale social and political conflicts.

P. M. Mansurov and G. I. Mansurova believe that currently depressed territories should include only those territories “where the rates of decline in production, a decrease in living standards, an increase in negative trends in employment, demography, the state of social infrastructure, etc. are higher than both national and macro-regional rates” [15].

A. A. Khomyakova and A. G. Kaigorodov define a depressed region as “a territory whose economy has significantly worsened compared to its previous state and has not grown for a long time” [16].

B. D. Babaev and D. B. Babaev [17] propose to expand the list of characteristics of a depressed region considered in modern research (low socio-economic indicators of the region’s condition (as a rule, relative to the average Russian or district indicators), the inability to overcome stagnation on their own and the need for state support) with another one: “the reduced quality of resources – natural, economic, social, and mental – in the regions.”

The above-mentioned researchers interpret the concept of a depressed region in different ways, but they all agree that a depressed region does not have its own opportunities to get out of the current state and needs help from outside, or rather from the state.

Taking into account the opinion of the above-mentioned scientists and the essential content of the concept of depression as “a stage of cyclical economic development characterized by a decline in production compared to the previous period, unemployment and other negative trends” [16], it is proposed to consider a depressed region as a problem territory that for a long period cannot independently restore positions lost relative to its previous state. When depressed regions are concerned, they may have relatively higher rates compared to other regions. This is due to the fact that the state of depression is based on the deterioration of the region’s previous achievements. Currently, depressed regions in the Russian Federation are [18,20] Altai Territory, Volgograd Region, Ivanovo Region, Kirov Region, Kurgan Region, Oryol Region, Pskov Region, Smolensk Region, Ulyanovsk Region, and the Chuvash Republic. According to statistics, the list of depressed regions has remained unchanged for several years.

The results of scientific research [16] show that despite the stagnation in the economy, production and social sphere of such regions, these territories may have significant potential for sustainable development. In this context, studying the state of sustainable development factors (ESG factors) of depressed regions, identifying similarities and differences in the direction and intensity of change in ESG factors, as well as the relationship of ESG factors with investment potential in such regions, is relevant and practically significant for the economy of any country. Identifying similarities and differences in the dynamics of ESG factors, as well as their relationship with investment potential, will allow regional authorities to find the optimal balance between financial support and the creation of conditions for the growth of economic, budgetary and tax potential, while observing all environmental requirements and standards. Such an integrated approach can become the key to unlocking the hidden potential of depressed territories and their successful revival.

The study is aimed at a comparative analysis of ESG indicators in Russian regions that are experiencing an economic slowdown and are depressed. The study will test the hypothesis: if there is a relationship between ESG factors and the investment potential of such depressed areas. The results of the work will allow a better understanding of how environmental, social and management aspects affect the attractiveness of investments in depressed regions.

To achieve this goal, data from the ESG rating of the subjects of the Russian Federation for 2018 - 2021 provided by the RAEX rating agency and data from the investment attractiveness rating of Russian regions for 2020 compiled by the RAEX rating agency were used.

The scientific novelty of this study is to establish similarities and differences in the current state and dynamics of the ESG factors, as well as to establish the correlation between the ESG factors and the investment potential of depressed regions. This, in turn, provides the basis for implementing socio-economic development strategy in depressed regions, which, as a result, will accelerate the implementation of the concept of sustainable development, stimulate the inflow of investments that will restore strategic potential and ensure changing these regions' depressed state in the future.

2 Materials and Methods

To conduct a comparative analysis of the current state and dynamics of the ESG factors in Russian depressed regions, data from the ESG rating of the subjects of the Russian Federation for 2018-2021 provided by the RAEX rating agency [24,25,26,27] were used.

The methodology for assessing the ESG factors of the subjects of the Russian Federation developed by the RAEX rating agency [22] allows studying trends and directions of sustainable development factors, as well as to make a conclusion about the implementation of the ESG agenda at the regional level. In the annual ESG ranking of Russian regions compiled by RAEX, regions are compared according to the level of ESG risk management. The environmental and social spheres of the regions are assessed based on the comparison of the level of risk and the effectiveness of measures to reduce it. The governance sphere was assessed taking into account the availability of key tools aimed at improving the quality of public administration and transparency. The ranking is based on average values where regional estimates in three areas (environmental, social, and governance) are considered with equal weight.

The environmental sphere (E-factor) stands for the environmental agenda and considers the environmental impact and environmental protection and can be assessed using the indicator "Emissions of pollutants from stationary sources into the atmosphere per capita." In contrast to this indicator, there is an indicator "The share of captured and neutralized pollutants in the total amount of pollutants from stationary sources" (see Table 1). These factors can be implemented in various directions, such as the use of a set of circular economy technologies, including those based on smart production and smart consumption, as well as environmental education and enlightenment.

Table 1. List of environmental risks (E-factor) indicators of ESG rating of subjects of the Russian Federation compiled by RAEX rating agency

Indicators	
"Negative"	"Positive"
"Volume of pollutant emissions from stationary sources into the atmosphere per capita"	"The share of air pollutants that are captured and neutralized (in the total amount of air pollutants emitted by stationary sources)"
This indicator reflects the environmental burden on the environment associated with production activities.	This indicator demonstrates the effectiveness of the applied environmental technologies and measures.
"The amount of harmful substances emitted into the atmosphere by motor"	"The share of passenger cars, trucks, and buses that can use natural gas as motor fuel (by constituent entities of the Russian Federation)."

transport per person" This indicator reflects the environmental burden on the environment associated with the operation of motor transport.	This indicator reflects the degree of use of environmentally friendly fuels in the transport sector.
"Discharge of polluted wastewater into surface water bodies per capita" This indicator reflects the volume of polluted wastewater discharged into water bodies per capita on average. The indicator characterizes the environmental load on water resources.	"Volume of water (recycled and consistently used) per person" This indicator characterizes the efficiency of water use and the rationality of water resources use.
"Annual amount of waste generated during production activities and consumption per person" This indicator shows the average amount of waste generated as a result of economic activity and human life per person during the year. The indicator reflects the level of waste generation in the region.	"The share of waste that was used and neutralized in the process of production activities and consumption (in the total volume of generated waste)" This indicator demonstrates the level of waste processing and disposal.
"Volume of taken off municipal solid waste per year per person" This indicator characterizes the average amount of municipal solid waste that was collected and taken off from the territory during the year per capita. The indicator gives an idea of the organization of the municipal waste management system	"The share of municipal solid waste taken off to waste treatment facilities out of the total volume of municipal waste that was taken off" This indicator reflects the efficiency of the municipal solid waste management system.

Source: Compiled by the authors based on RAEX [22]

The social sphere (S-factor) determines social criteria which reflect the degree of focus on the development of human capital, equal opportunities. To assess the degree of focus on the development of human capital and ensuring equal opportunities, the following indicators are used: “Natural growth rate”, “Demographic burden”, “Share of the population with incomes below the subsistence level” (see Table 2). Social factors should be taken into account when developing the education system, social capital, social inclusion practices and others.

Table 2. List of social risks (S-factor) indicators of ESG rating of subjects of the Russian Federation compiled by RAEX rating agency

Indicators	
“Negative”	“Positive”
"Percentage of population earning less than the minimum wage"	"Average expenditure of the consolidated regional budget on social policy per capita, taking into account the cost of living"
"Percentage of students attending	"Average expenditure of the consolidated regional budget on education per capita, taking

school in the second and third shifts"	into account the cost of living"
"Average number of children who died before the age of one (over three years)"	"Average expenditure of the consolidated regional budget on health care per capita, taking into account the cost of living"
"Number of registered crimes classified as serious and especially serious, per 100,000 people for the reporting period"	"Average expenditure of the consolidated regional budget on security per capita, taking into account the cost of living"
C"Percentage change in the average population over the past 10 years"	"Total number of jobs created by groups of organizations where there was an increase in the average number of employees and by organizations that are newly formed, per thousand people of the permanent population"

Source: Compiled by the authors based on RAEX [22]

The governance sphere (G-factor) characterizes information transparency, accountability, and compliance with standards. The following indicators can be used to access this factor (see Table.3): anti-corruption commission, disclosed information about the income of administration employees, etc. The governance factors should be taken into account while developing civil society, strengthening social ties and forming and using a risk management system by state and municipal authorities.

Table 3. List of governance quality (G-factor) indicators of ESG rating of subjects of the Russian Federation compiled by RAEX rating agency

Indicators
"Level of investment attractiveness and business support, including investment attractiveness rating, availability of special economic zones and industrial parks which have certification"
"Level of "transparency" of regional authorities and implemented anti-corruption procedures, including the structure and quality of the website, openness and public availability of job postings, information from the anti-corruption commission and its activities, openness and public availability of information about income "
"Quality level of budget management and regulatory impact"
"Expenditures on general government issues of the regional consolidated budget in relation to the gross regional product"

Source: Compiled by the authors based on RAEX [22]

The methodology under consideration differs in that, for each negative indicator, it includes a corresponding positive indicator that reflects the ability to overcome or neutralize existing risks. For example, to assess the indicators of the ecological subsystem, it is possible to compare the level of pollutant emissions with the share of captured and neutralized substances. A positive point is that emissions in general are reduced, the current level of emissions with an increase in the share of captured substances, or an increase in the share of emissions with a faster decrease in pollution levels is maintained. If there is an imbalance in the evaluation process, the interaction of subsystems within the ESG model is inconsistent. However, when assessing public administration, “negative indicator-neutralizing indicator” is not applied since the assessment is based on evaluating the quality of public administration.

To analyze the correlation between the ESG factors and the investment potential of Russian depressed regions, data from the investment attractiveness rating of Russian

regions developed by the RAEX rating agency for 2020 were used. The methodology for assessing the investment attractiveness of Russian regions, developed by the RAEX rating agency [23] makes it possible to obtain information about the current state of the investment potential of various regions and its constituent elements. According to the RAEX methodology, the investment potential of the region is determined based on nine key factors [23]:

- 1) natural resource reserves in the region (the volume of basic natural resources available for use);
- 2) labor market (its size and the educational level of the population);
- 3) production activity (aggregate result of economic activities of entities in the region);
- 4) consumer demand (level of overall purchasing power of the population);
- 5) infrastructure of the region (existing transport network and the level of infrastructure development in the region);
- 6) innovation (number of workers employed in scientific research, the amount of investment directed towards scientific research, the level of innovative activity of economic entities);
- 7) institutional conditions (development of financial and insurance institutions; presence of favorable conditions for the development of small and medium-sized businesses, as well as individual entrepreneurs and foreign enterprises);
- 8) financial resources ("conditional volume of money supply" in the region)
- 9) tourism (presence of attractions, the level of development of tourist infrastructure and tourist flow).

Each component of the investment potential is represented by its own group of indicators. The contribution of these components to the overall rating of investment potential is assessed using questionnaires from experts, potential investors, and representatives of the banking community. Data are aggregated in several stages. When calculating the index of each of the 9 types of investment potential of the region, the "minimax method" is used. When calculating the overall index of investment potential of each region, the weighted average sum of private investment potentials is calculated. Then all regions are ranked according to the size of the total investment potential. The region with the highest value of the overall innovation potential is ranked first.

The correlation between the ESG factors and the investment potential of Russian depressed regions was assessed using the Spearman's correlation coefficient, which is calculated as follows:

$$r_s = 1 - \frac{6 \sum d_i^2}{N(N^2 - 1)} \tag{1}$$

where r_s is the Spearman's rank correlation coefficient;
 d^2 is the square of the difference between the ranks;
 N is the number of regions that participated in the ranking.

3 Results

The results of the ESG ranking of Russian depressed regions are shown in the figure below (Fig. 1).

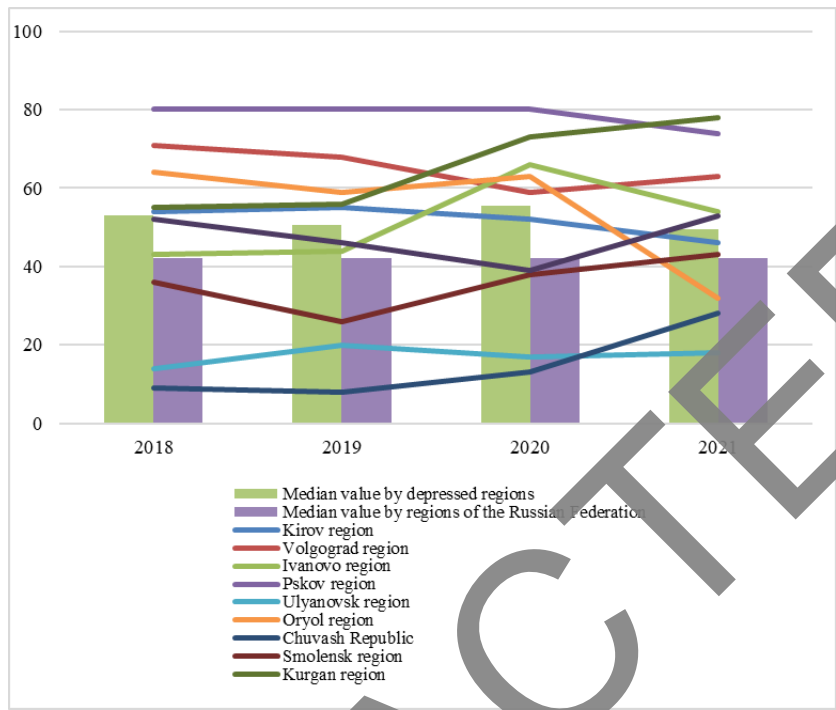


Fig. 1. Dynamics of ESG ranking of Russian depressed regions for 2018 – 2021
Source: Compiled by the authors based on RAEK [24,25,26,27]

The best value of the rank in the ESG rating is registered in two regions – the Chuvash Republic and Ulyanovsk region. In 2021, the Chuvash Republic took the 28th place in the ranking among all Russian regions, and Ulyanovsk region was ranked 18th. Pskov region has the worst rank value. In 2021, this region took the 74th place in the ranking among all Russian regions.

From 2018 to 2020, Pskov region was ranked worst among all the depressed regions, and the Chuvash Republic was the best. The difference in the positions of these depressed regions from 2018 to 2020 ranged from 67 to 72 points. Thus, it can be concluded that there is a significant difference in the positions of depressed regions in the ranking among all Russian regions.

In 2018-2021, the positive dynamics of the ESG rating values was established in 3 out of 10 depressed regions (30%). These are such regions as Oryol, Kirov, and Ivanovo regions. Negative dynamics of ESG rating values was registered in 3 depressed regions (30%). These are the Chuvash Republic, Kurgan, and Smolensk regions. Unstable dynamics of ESG rating values (both increase and decrease) was observed in the rest of the depressed regions (40%).

The values of the ESG rating above the median (calculated for all the Russian depressed regions) were observed in the following regions: the Chuvash Republic, Ulyanovsk, and Smolensk regions. This is 30% of the number of the Russian depressed regions. The share of depressed regions whose ESG rating values were lower than the median calculated for all the depressed regions was 70%.

Thus, it can be concluded that there is no similarity in the direction and intensity of changes in the ESG rating values among Russian depressed regions throughout the study period.

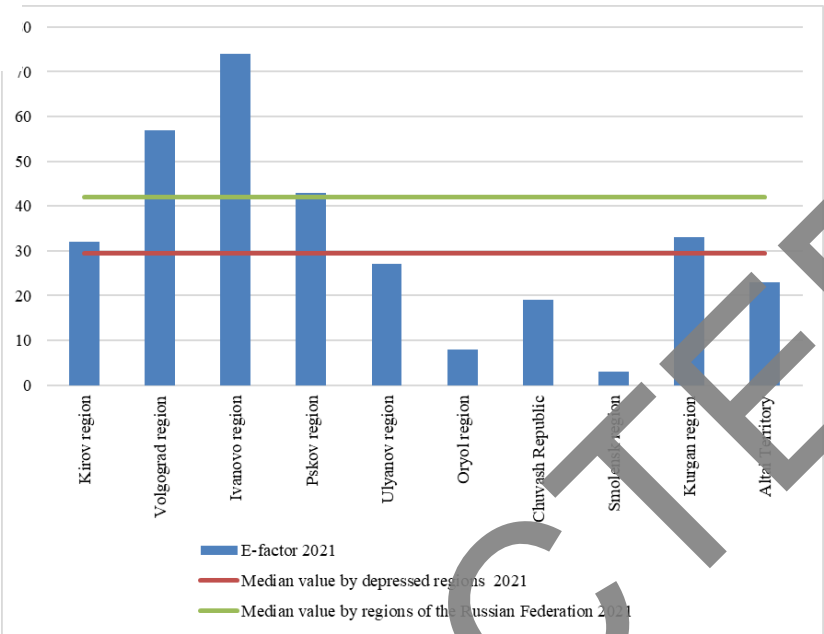


Fig. 2. Dynamics of E-factor ranks of ESG ranking of Russian depressed regions in 2021
Source: Compiled by the authors based on ELEY [27]

The comparative analysis of the values of the ESG rating of depressed regions in the environmental sphere for 2018 – 2021 showed that Smolensk region had the best E-factor values (Fig. 2). Smolensk region took the 3rd place in the ESG rating in 2021. The worst values were observed in Ivanovo region (69th place) and Volgograd region (67th place).

The comparative analysis of the values of the ESG rating of Russian depressed regions with the all-Russian median values in the environmental sphere reveals that among the regions with E-factor values (Fig. 2): 1) below the all-Russian median are Ivanovo, Volgograd, Pskov regions; 2) above the all-Russian median are Kirov, Ulyanovsk, Oryol regions, the Chuvash Republic, Smolensk, Kurgan Regions, Altai Territory.

Among the regions with E-factor values 1) below the median calculated for all the depressed regions are Kirov, Kurgan, Ivanovo, Volgograd, Pskov regions; 2) above the median calculated for all the depressed regions are Ulyanovsk, Oryol, Smolensk regions, the Chuvash Republic, Altai Territory (Fig. 2).

The compared values of the ESG rating of Russian depressed regions in the social sphere indicate that the best S-factor values compared to other depressed regions were registered in Ulyanovsk region (26th place) and the Chuvash Republic (35th place). The worst values were observed in Kurgan region (82nd place), Altai Territory (79th place) and Pskov region (74th place) (Fig.3).

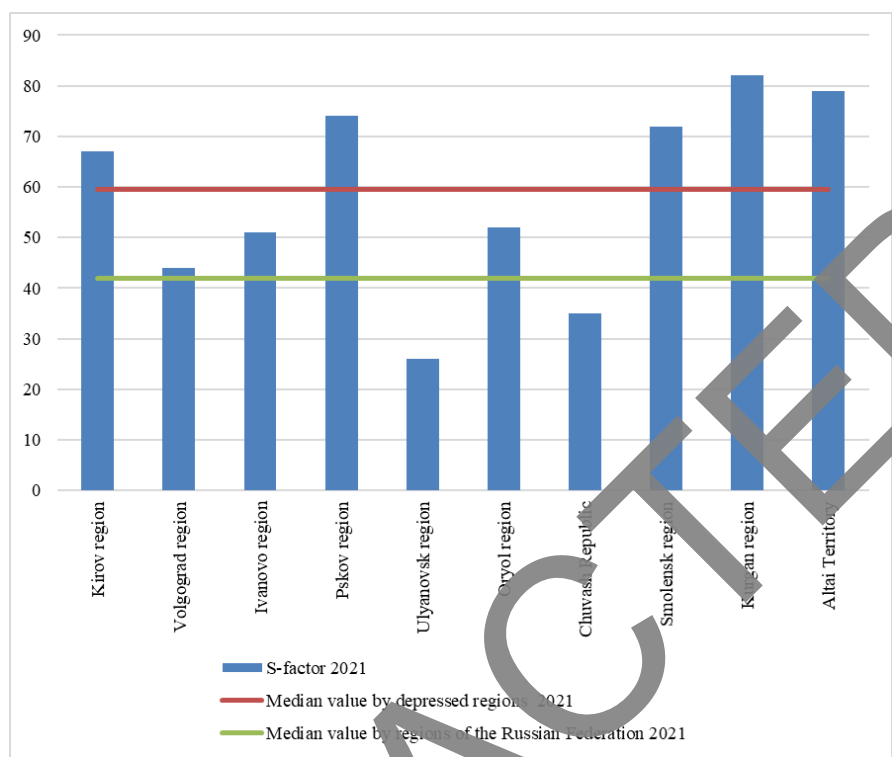


Fig. 3. Dynamics of S-factor ranks of ESG ranking of Russian depressed regions in 2021
Source: Compiled by the authors based on RAEX [27]

The comparative analysis of the S-factor values of the ESG rating of Russian depressed regions with the all-Russian median values revealed that among the regions with S-factor values 1) below the all-Russian median are Smolensk, Kurgan regions, Altai Territory, Kirov, Ivanovo, Volgograd, Pskov regions; 2) above the all-Russian median are Ulyanovsk region, the Chuvash Republic (Fig. 3).

The regions with S-factor values 1) below the median calculated for all the depressed regions are Kirov, Pskov, Smolensk, Kurgan regions, Altai Territory; 2) above the median calculated for all the depressed regions are Volgograd, Ivanovo, Ulyanovsk, Oryol regions, the Chuvash Republic (Fig. 3).

The analysis of the G-factor of the ESG-rating of Russian depressive regions showed that the best G-factor values among the depressed regions were observed in Ivanovo region (17th place) and Ulyanovsk region (29th place). The worst values were registered in Kurgan region (79th place), Pskov region (77th place), and Smolensk region (70th place) (Fig. 4).

The analysis of the G-factor values of the ESG rating of Russian depressed regions in comparison with the all-Russian median values established that among the regions where the G-factor values 1) below the all-Russian median are Volgograd, Pskov, Oryol regions, the Chuvash Republic, Smolensk, Kurgan regions, Altai Territory; 2) above the all-Russian median are Kirov, Ulyanovsk, Ivanovo regions (Fig. 4).

The regions with G-factor values of the ESG rating 1) below the median calculated for all the depressed regions are Volgograd, Pskov, Smolensk, Oryol, Kurgan regions; 2) above the median calculated for all the depressed regions are Kirov, Ivanovo, Ulyanovsk regions, Altai Territory, the Chuvash Republic (Fig. 4).

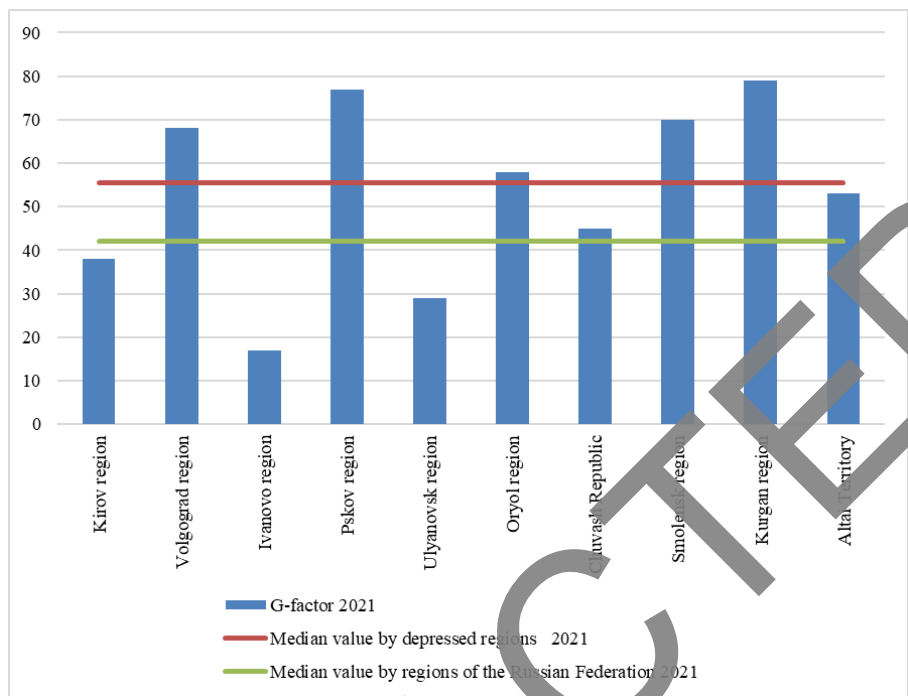


Fig. 4. Dynamics of G-factor ranks of ESG ranking of Russian depressed regions in 2021
Source: Compiled by the authors based on RAEX [27]

Thus, the best values of the ESG rating are observed in two Russian depressed regions – the Chuvash Republic and Ulyanovsk region. Kurgan, Pskov, and Volgograd regions have the worst ESG ratings.

To establish the correlation between the levels of development of the ESG factors and the investment potential in Russian depressed regions, we summarize the available data in the final table (Table 4).

Table 4. Ratio of ESG rating level to the level of investment potential of Russian depressed regions in 2020

Region	Region’s place in the RAEX ESG rating (I)	Region’s place in the RAEX investment attractiveness rating by investment potential (II)	Rank	
			d_1	d_2
Kirov region	52	61	5	7
Volgograd region	59	26	6	1
Ivanovo region	66	59	8	6
Pskov region	80	65	10	9
Ulyanovsk region	17	46	2	3
Oryol region	63	64	7	8
Chuvash Republic	13	55	1	5

Smolensk region	38	53	3	4
Kurgan region	73	72	9	10
Altai Territory	39	27	4	2

Source: Compiled by the authors based on RAEX [26,28]

The linear relationship between ratings I and II can be assessed using the data from Table 4. To do this, using the formula that was discussed above, we find the Spearman's rank correlation coefficient. As a result, we get $r_{I-II}=0.65$, which characterizes the relationship as direct and moderate.

To establish the correlation between the levels of development of the ESG factors and subpotentials, which, according to the methodology of the RAEX rating agency [23], are part of the investment potential of the region, the Spearman's rank correlation coefficient was used. The data on depressed regions required for such an assessment are presented in Tables 4 and 5.

Table 5. Ratio of ESG rating level to the level of subpotentials included in investment potential of Russian depressed regions in 2020

Region	Region's place in the RAEX ESG rating (I)	Region's place in the RAEX investment attractiveness rating by								
		investment potential	production potential	labor potential	natural potential	financial potential	institutional potential	infrastructure potential	tourist potential	consumer potential
		(II)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)
Kirov region	52	57	53	48	55	54	39	65	41	44
Volgograd region	59	33	22	18	34	25	22	52	38	20
Ivanovo region	66	38	56	53	81	62	46	34	46	56
Pskov region	80	66	70	70	76	72	54	16	32	69
Ulyanovsk region	17	20	48	41	54	55	44	37	62	49
Chuvash Republic	63	63	60	62	75	64	59	25	65	63
Chuvash Republic	73	47	58	36	80	53	49	24	50	58
Smolensk region	38	37	49	52	72	60	30	26	42	59
Kurgan region	73	70	72	68	42	67	67	54	77	67
Altai Territory	39	15	33	26	23	31	31	44	25	25

Source: Compiled by the authors based on RAEX [26,28]

Table 6. Data on ranks of ESG rating level and level of subpotentials included in investment potential of Russian depressed regions in 2020

Region	Rank									
	d_1	d_3	d_4	d_5	d_6	d_7	d_8	d_9	d_{10}	d_{11}
Kirov region	5	7	5	5	5	4	4	10	4	3
Volgograd region	6	3	1	1	2	1	1	8	3	1

Ivanovo region	8	5	6	7	10	7	6	5	6	5
Pskov region	10	9	9	10	8	10	8	1	2	10
Ulyanovsk region	2	2	3	4	4	5	5	6	8	4
Oryol region	7	8	8	8	7	8	9	3	9	8
Chuvash Republic	1	6	7	3	9	3	7	2	7	6
Smolensk region	3	4	4	6	6	6	2	4	5	7
Kurgan region	9	10	10	9	3	9	10	9	10	9
Altai Territory	4	1	2	2	1	2	3	7	1	2

Source: Compiled by the authors based on RAEX [26,28]

After calculating the Spearman’s rank correlation coefficient based on the data from tables 5 and 6, we get $r_{I-III} = 0.64$, $r_{I-IV} = 0.55$, $r_{I-V} = 0.71$, $r_{I-VI} = 0.42$, $r_{I-VII} = 0.67$, $r_{I-VIII} = 0.48$, $r_{I-IX} = 0.0182$, $r_{I-X} = -0.0182$, $r_{I-XI} = 0.47$. The results of calculating the Spearman’s rank correlation coefficient reveal a direct and strong relationship between the level of the ESG rating and the level of investment potential development according to labor subpotential. For the rest of the subpotentials, a significant correlation with the level of the ESG rating has not been established. Thus, a more active development of labor potential in Russian depressed regions will help accelerate achieving sustainable development, increase the effectiveness of this process, as well as increase the ESG rating of these regions at the federal level as a whole.

4 Discussion

The ranking of Russian depressed regions in the investment attractiveness rating allowed us to identify regions with the worst labor potential values (see Table 4). Among them are such Russian depressed regions as Pskov, Kurgan, and Oryol regions. Based on the results of the assessment of the correlation between the levels of development of the ESG factors and subpotentials of the investment potential in Russian depressed regions, it can be concluded that the development of labor potential should be among the priority areas ensuring sustainable socio-economic development of these regions.

Among the directions for the development of labor potential may be: state support for the development of small and medium-sized enterprises in the region; state support for enterprises that create new jobs in the region; creating and developing modern infrastructure facilities in the region that ensure research and entrepreneurial activities; implementing measures to strengthen health, improve the quality of life of the population in the region, and etc.

It is proposed to include the following measures for the development of labor potential:

- integrating industrial enterprises, scientific and educational organizations and institutions. This process may include joint research, development, training, technology transfer and innovation, as well as creating an infrastructure to support interaction between integration participants. This will contribute to improving the quality of education and scientific research, transferring knowledge and technologies from scientific organizations to industrial enterprises in the region, creating conditions for the effective use of regional resources, and developing the competencies and professional skills of specialists in the region;
- creating production and educational clusters, which will allow to adapt educational programs to the real needs of the industrial complex of the region, introduce innovations into the regional industry at a faster pace, receive adequate additional education and improve the skills of employees of regional industrial enterprises;

- regulating internal and external labor migration aimed at reducing the outflow of able-bodied population from the region. This measure will attract and retain qualified personnel in the region, as well as ensure equal opportunities for all participants in the labor market;
- creating favorable conditions in the region for families with children and large families by providing them with additional benefits, income support and social services, which will improve their financial position and quality of life, and in the long term will lead to a reduction in the migration outflow of the population from the region, an increase in the birth rate and an increase in the population, strengthening family values and traditions, and formation of a stable, favorable social environment in the region;
- support for innovative infrastructure facilities such as technoparks, business incubators, technology transfer centers, as well as support for educational and research institutions that implement innovations;
- designing and implementing sectoral programs for the development of industrial and agro-industrial complexes in the region;
- improving the quality of jobs for the local population, which includes increased occupational safety, improved working conditions, expanded opportunities for professional growth and training, increased wages, social guarantees and benefits provided;
- creating a unified data base by state authorities to account for specialists who have been trained and retrained in all areas of the region's economy;
- synchronizing activities of educational institutions by the state authorities to improve skills and retraining of employees in order to make them more competitive in the labor market;
- implementing health promotion measures, including development of healthcare infrastructure in the region (constructing new and modernizing existing medical institutions, updating medical equipment and introducing modern medical technologies; increasing the availability of high-quality medical care for all residents of the region), developing and implementing specialized preventive programs in the region (information campaigns to promote a healthy lifestyle, popularization of mass sports and physical activity among all age groups, etc.), developing sports infrastructure (construction of new sports facilities (stadiums, swimming pools, gyms), modernizing existing sports facilities, etc.

5 Conclusion

Thus, as a result of this study, similarities and differences among Russian depressed regions in the current state and dynamics of the ESG factors were identified, and a direct and strong correlation between the levels of development of the ESG factors and labor potential in these regions was established. This will increase the effectiveness of measures to accelerate the process of implementing the concept of sustainable development (ESG) in depressed regions, taking into account their specifics and peculiarities, and will also help to develop and implement their own mechanisms for developing labor potential in these regions.

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