Transformation of the Sustainability Concept in the Socioeconomic System and Labor Market

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Transformation of the Sustainability Concept in the Socioeconomic System and Labor Market

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Abstract: The study aims to test the hypothesis and evaluate the social security of the Russian Federation's subjects, highlighting the importance of identifying and addressing critical challenges in the social domain. The authors employed N.V. Kocheryagin's methodology and used comparative analysis, synthesis, standardization, integral method, and cause-and-effect relationships analysis as the main scientific methods. The study encompasses all subjects of the Russian Federation from 2016 to 2022. The result of the study is the analysis of directions for achieving the set goals in post-pandemic conditions. Applying the assessment methodology, the researchers identified the region's social security level, social sphere risk zones, and subject type based on the social development level. The regions were then categorized into appropriate groups, with leaders and outsiders recognized. A correlation analysis was conducted to examine the relationship between the security level and the labour market tension coefficient, reflecting the stability of labour resource supply and demand. The study demonstrates that regional social security levels can be classified according to risk levels and social development types. This classification is relevant given the negative impact of economic processes on the social sphere.

Keywords: sustainable development, Socioeconomic system, social security, Risk zones, Security threats, Labor market.

1. Introduction

In the face of today's unpredictable global economic climate, nations are grappling with the challenge of maintaining economic stability and security. A secure state can effectively implement strategies to enhance the social sector, education, and economy without external interference while providing its citizens with housing, food, and employment opportunities [1-2]. Given the contemporary instability, the Russian Federation, with its numerous subjects, strives to create national policies that account for the socioeconomic development of its territories. The state's economic security hinges on addressing potential threats to regional economic stability, with social security as a critical element. Economic crises over the past decade have left a considerable mark on the state's social fabric [3]. The existing research gap emphasizes the necessity of evaluating regional social security to establish sustainable development goals within the socioeconomic system.

Consequently, studies focusing on the social security of Russian subjects are of utmost importance. A vital component of the social sector is the labour market, where the tension coefficient serves as a valuable metric for assessing regional labour supply and demand. In many countries, the COVID-19 outbreak occurred during the period covered by the study. During this time, most, if not all, European countries have taken several measures to support the private sector, ranging from postponing the deadline for filing tax returns and ending with the suspension or complete abolition of specific tax duties [4].

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The authors suggest that regional social security levels can be categorized based on risk levels and social development types and that a correlation exists between these classifications and the labour market tension coefficient. The primary objective of this research is to examine this hypothesis and evaluate the social security of the Russian Federation's subjects. By pinpointing the most pressing issues in the social sector, the authors contribute to refining state and regional policies to mitigate destabilizing factors. This, in turn, supports the sustainable and stable development of the socioeconomic system and its components.

2. Literature Review

Social security is a component of economic security [5-7]. Alieva [1] describes social security as a functional component of the region's economic security. In the article, she emphasizes that the main threats to economic security can be in the economic and social spheres.

The author also lists threats to the region's economic security according to functional components—the population's social security problem in a crisis. The article considers the main economic threats of a social nature [12-13]. Ryazanova et al. [14] conclude that the most acceptable approach to spheres of economic security is to allocate such areas as production, financial, scientific and technical, social, investment, and demographic. As for ensuring the region's economic security, Konovalov [15] identified such components of economic security at the regional level as demographic, food, environmental, financial, social, and industrial. Theoretical and methodological approaches to determining the social security of the region are considered by Hale [16]. Kharazishvili et al. [17] revealed the theoretical features of social security. They describe it as «the state of society, including all its main areas of production, which ensures that the nominal level of social conditions and social benefits is provided, society in general and each citizen separately are protected from internal and external threats, a minimum risk to the life and development of the individual is guaranteed. Hyden [18] interprets social security as a set of measures to protect the interests of the country and the people in the social sphere, the development of the social structure and relations in society, the life support system and socialization of people, the way of life by the needs of progress, current and future generations. Beck [19] correlates social security with the state of «security, which is characterized by the absence of dangers and threats to the vital interests of the individual and society in the social sphere. These authors draw attention to the fact that in modern science, there are no indicators for assessing the level of social security of the region and the state, confirming the study's relevance.

Franzoni [20] uses a set of indicators that describe the level of social security. The indicators are differentiated into five groups that reproduce the state of demography, healthcare, education, labour market, and living standards in the region. They emphasize that threats to economic security can emerge from both economic and social realms. Various scholars have explored different aspects of social security, such as the functional components of regional economic security, social threats in times of crisis, and specific spheres of economic security.

3. Materials and Method

Scientific studies, including those in which there are methods for assessing a region's social security level, propose typologies of regions depending on the results obtained. The classification of regions according to the level of socioeconomic development and internal potential subdivides the subjects into leading regions, resource- and infrastructure-developed regions, and potentially promising and underdeveloped regions. While there is yet to be a unified approach to evaluating social security in contemporary research, numerous authors have proposed definitions and methodologies for assessing regional social security. Despite the need for more consensus on single indicators for assessing social security, various researchers have proposed methods for evaluating the levels of social security in regions.

In light of the diverse methodologies and typologies presented by different scholars, this study employs the Kocheryagina [21] technique to assess the social security of regions. In doing so, we acknowledge that many methods have yet to gain widespread acceptance in the scientific community. Consequently, our study contributes to the ongoing dialogue and exploration of social security assessment in the context of regional economic stability and security. To determine the level of social security, the researchers employed the linear scaling method. This approach was chosen because it can convert social indicators with varying dimensions into a normalized form, facilitating comparisons. It is important to note that linear scaling was applied separately for each year, enabling the researchers to track the relative social security levels of the subjects within the country for about one. If the dynamics of the indicator must increase to increase the level of security, then we use the following formula in Equation (1).

\[
\hat{X} = \frac{X - X_{\text{min}}}{X_{\text{max}} - X_{\text{min}}}
\]
In the opposite case (decrease in the indicator), the following formula is used:

\[ \hat{X} = 1 - \frac{X - X_{\text{min}}}{X_{\text{max}} - X_{\text{min}}} \]  

(2)

In the model, all normalized indicators of regional social security vary from 0 to 1. To assess the level of regional social security, we need a scale of assessments of the integral indicators of the region's security.

1. The zone of stability (the situation does not imply the presence of threats)
2. The zone of moderate risk (there are insignificant threats);
3. The zone of significant risk (there are some threats, the neutralization of which is impossible in the short term);
4. The zone of critical risk (development of crisis processes in the social sphere, it is necessary to make strategic decisions to move into a safer zone gradually);
5. The catastrophic risk zone (the most dangerous zone, there is a real threat to social security, and immediate intervention of regional or state authorities is required).

The linear scaling method offers a standardized measurement scale, which is handy when dealing with diverse social indicators. By applying this technique annually, the researchers could effectively capture and analyze changes in social security levels over time, providing a comprehensive understanding of regional trends and disparities.

The study also analyzes the coefficient of tension in the labour market, which is determined by the ratio of the average annual number of unemployed (according to the ILO methodology) and the average annual number of vacancies declared by employers to the employment service bodies.

4. Results and Discussion

Using published statistics, the authors assessed the level of social security of the constituent entities of the Russian Federation during 2016-2020. Since each year has been analyzed, dwelling more on each study period is necessary. When assessing the level of social security in the region, it is essential to group according to the criterion under study. It allows building interval series of the level of safety to correlate with the level of risk to the social sphere. At the initial stage, it was necessary to determine the number of groups with the help of a mathematical method using the Sturgess formula [19], where N is the number of population units, that is, 85 subjects:

\[ n = 1 + 3.322 \times \log \log N \]  

(3)

Thus, each study period should have seven groups, the boundaries of which can be represented as an interval determined through the ratio of the range of variation and the number of identified groups. In 2016, the interval was 0.057, and the boundaries of the intervals of the resulting trait are presented in Table 1. However, during the study, it was found that when constructing equal intervals for the trait under study, groups containing little or no single unit (subject) are formed. In this case, increasing the grouping intervals (unequal intervals) becomes necessary.

<table>
<thead>
<tr>
<th>№</th>
<th>Grouping at equal intervals</th>
<th>Grouping at non-equal intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bottom line</td>
<td>Upper limit</td>
</tr>
<tr>
<td>1</td>
<td>0.268</td>
<td>0.325</td>
</tr>
<tr>
<td>2</td>
<td>0.326</td>
<td>0.382</td>
</tr>
<tr>
<td>3</td>
<td>0.383</td>
<td>0.439</td>
</tr>
<tr>
<td>4</td>
<td>0.440</td>
<td>0.496</td>
</tr>
<tr>
<td>5</td>
<td>0.497</td>
<td>0.553</td>
</tr>
<tr>
<td>6</td>
<td>0.554</td>
<td>0.610</td>
</tr>
<tr>
<td>7</td>
<td>0.611</td>
<td>0.667</td>
</tr>
</tbody>
</table>

So, due to the small content of groups 5-7, the authors decided to increase the grouping intervals and reduce the number of groups to 5. The conducted stage of the study made it possible to correlate the identified intervals of the integral indicator with the level of safety and socially oriented typology of regions Table 2.

<table>
<thead>
<tr>
<th>Indicator value</th>
<th>Gradation of security levels</th>
<th>Typology of regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.268-0.325</td>
<td>Catastrophic Risk Zone</td>
<td>The most backward</td>
</tr>
</tbody>
</table>
In 2016, among 85 constituent entities of Russia, the maximum level of security was in St. Petersburg (0.667), and the minimum was in the Jewish Autonomous Region (0.268). In St. Petersburg, the best values were recorded regarding the social sphere's cultural area and the number of doctors of all specialities. It is also necessary to note the high values in education (the number of students in universities per 10,000 people) and the population's standard of living (the ratio of income and the subsistence level, the population below the poverty line). Then comes Moscow in terms of the level of social security (the highest results of indicators among all regions in terms of the number of students in universities per 10,000 people and the number of sports facilities per 10,000 people) and the Chukotka Autonomous Okrug (the highest results of indicators - the employment level, the ratio of income of the population to the subsistence level, the number of places in hospitals per 10,000 people, the capacity of outpatient organizations, visits per shift per 10,000 people).

In the Jewish Autonomous Region, there are threats with a high level of risk in the field of culture and sports (low number of sports facilities, low popularity of museums and theatres) and demographics (high level of migration). Also, the Karachay-Cherkess Republic, the Republic of Crimea, the Republic of Ingushetia, the Kabardino-Balkarian Republic, the Republic of Dagestan, the Kurgan Region, the Republic of Tyva is in the zone of catastrophic risk. At the same time, the regions of the Southern Federal District predominate in this group, which indicates a lack of development and solving the problems of the social system in 2016.

The most significant number of regions in terms of social security is in the zone of significant risk and the average level of development of the social sphere. The number of developed regions in terms of social level is slightly less here. However, both groups comprise more than 70% of the study population. Therefore, the level of social security is recorded at an average level in the Russian Federation in general. Since the process of studying the level of social security of the constituent entities of the Russian Federation for subsequent periods is similar to the study of 2016, Table 3 summarizes the corresponding boundaries of the interval series for all periods of the study according to the typology. Using this table, we can also trace the dynamics of changes in the level of social security throughout Russia due to the values of the maximum and minimum levels.

<table>
<thead>
<tr>
<th>Typology of regions</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>The most backward</td>
<td>0.268-0.325</td>
<td>0.274-0.335</td>
<td>0.263-0.321</td>
<td>0.245-0.304</td>
<td>0.269-0.311</td>
</tr>
<tr>
<td>With a relatively low level</td>
<td>0.326-0.382</td>
<td>0.336-0.397</td>
<td>0.322-0.378</td>
<td>0.305-0.362</td>
<td>0.312-0.353</td>
</tr>
<tr>
<td>Medium</td>
<td>0.383-0.439</td>
<td>0.398-0.458</td>
<td>0.379-0.435</td>
<td>0.363-0.421</td>
<td>0.354-0.395</td>
</tr>
</tbody>
</table>

![Fig. 1: The level of social security of the constituent entities of the Russian Federation, 2016](image-url)
In 2017-2020, the highest level of safety was in St. Petersburg, Moscow, and the Chukotka Autonomous Okrug. Describing the social security of St. Petersburg, we came to the following conclusions:

1. During 2017-2019, the best indicators among the constituent entities of the Russian Federation were recorded in terms of attending museums and theatres and in the number of doctors of all specialities;

2. The number of university students per 10,000 people in 2019 was relatively high;

3. In 2020, the best indicators were among the subjects of the Russian Federation in terms of the number of students in universities per 10,000 people and in the number of doctors of all specialities;

4. The cultural life of St. Petersburg in 2020 was reduced due to the COVID-19 pandemic;

5. Threats to the social sphere arise in such areas as demography (2016-2020), sports (2016-2020), and the standard of living of the population (2020).

The lowest values were recorded for the entire study period in the Jewish Autonomous Region. The number of regions in the catastrophic risk zone varies from 5 to 10 subjects. The maximum number was found in 2017.

Examining the risk zones in terms of the level of social security for 2017-2020, we came to the following conclusions:

In 2017, more regions were in the zone of significant risk and the average level of development of the social sphere. Compared to 2016, subjects decreased almost two times in the zone of moderate risk. These dynamics indicate the predominance of subjects with an average level of development in the social sphere;

In 2018, the level of development of the social sphere of the subjects can also be characterized as medium, with a predominance of subjects in areas of significant and moderate risk. The most developed regions include six regions;

6 regions were in the stability zone in 2019. The level of development of the social sphere of the subjects can be characterized as medium, with a predominance of subjects in areas of significant (38) and moderate risk (21). Only four regions can be attributed to the group of the most backward regions, which is the lowest value for this zone during the study period; 2020 was the most “difficult” for social security (Fig. 2) due to the impact of the consequences of the COVID-19 pandemic. There are 36 subjects from Russia (42% of all subjects) in the zones of catastrophic and critical risks. The smallest regions belong to the stability zone (4 regions). Therefore, social security, in general, can be described as below average.

Fig. 2: The level of social security of the constituent entities of the Russian Federation, 2020

So, having assessed the social security level in the Russian Federation subjects, a correlation analysis of this indicator was made with the coefficient of tension in the labour market, the quantitative characteristics of which are presented in
In conclusion, our study underscores the importance of social security as a vital component of economic security and regional development. By understanding the disparities in social security levels across regions and the factors influencing these levels, policymakers can implement more effective strategies to promote overall well-being and economic stability in the Russian Federation.

6. Conclusion

In conclusion, the researchers have thoroughly assessed the level of social security across various regions within the Russian Federation and conducted a correlation analysis with the labour market tension coefficient. The study
discovered that regions with lower social security levels, particularly those in the Southern Federal District, are confronted with destabilizing factors that challenge the sustainable development of their regional labour systems. The correlation analysis revealed a weak yet consistent inverse relationship between the social security levels of the Russian Federation's regions and the labour market tension coefficient. This suggests that the tension coefficient tends to decline as social security levels rise. Although mutual influence has weakened over time, the inverse relationship persists.

The authors have effectively validated their propositions, demonstrating that statistical methods can be utilized to ascertain regional social security levels and associate them with risk zones. The significance of this study lies in its contribution to understanding regional social security as an integral component of economic security and its impact on achieving sustainable development goals within the socioeconomic system and labour market. By identifying both the level of social security and threats to the social sphere, the study provides valuable insights that can guide regional authorities to implement timely interventions when a region is in a critical or catastrophic risk zone. Furthermore, the findings highlight potential avenues for future research, such as establishing standard risk zone intervals within the social sphere and investigating other labour market characteristics that may have a more direct relationship with security levels.

**Conflicts of Interest Statement:**

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria, educational grants; participation in speakers' bureaus, membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent/licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

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**References**


