

Progressive Advance in Supply Chain Management of Regional Socio-Economic Development: Conceptual Framework and Evaluation Mechanism

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Abstract- At present, a large number of methodologies have been developed aimed at assessing and forecasting the potential of the socio-economic development of certain regions. It should be noted that human and social capabilities as the key elements of regional development are currently the least studied issues. Therefore, in this work, along with economic factors, considerable attention is paid to the assessment of human potential and the social component of the workforce. Unlike political, economic and investment factors, these elements are subject to changes in the short-run, and are engines of regional development and the most promising of its components. The purpose of the study is to develop a mechanism for assessing the level of regional development and identifying factors affecting this process. The implementation of this procedure in practice is especially significant when planning and adjusting activities related to regional management. Deepening and developing previous studies, in this paper we synthesize known approaches to assessing regional socio-economic development, offer our own set of criteria for evaluating advancements and test the developed approach as exemplified by the regions of the Central Federal District in Russia. The scientific novelty of the study is that to assess the regional socio-economic development we propose evaluation of the level of advancement. To do this, all the indicators included in the model are considered dynamically and are evaluated by the corresponding indices. Such an approach will make it possible to assess the prospects for the development of the factor under study and make timely adjustments to the regional policy. The objects of research in this paper are the regions of the Central Federal District in Russia. The subjects of the study are the factors that cause advancements in regional economic development. The following research methods are used: retrospective analysis, statistical observation method, correlation analysis, principles and methods of system analysis and, computational procedures based on the use of financial mathematics and financial management tools.

Keywords- regional economy, Supply chain management, socio-economic system, progressive advance in development, assessment factors, human potential, social indicators.

1. Introduction

The economy of the region is characterized by a set of factors affecting it. Under the influence of these factors, the regional social-economic system must have an ability to maintain durability and develop. Durability implies stability, and development implies progressive advance. It is the progressive advance of the social-economic system that is the basis of our study, as it characterizes the progress, using innovations, empowerment, and the most complete satisfaction of needs. Thus, we consider the effective development of the regional economy from the point of its progressive advance. In this case, there is a need to create a set of indicators that can be used to assess the progress of the development of the regional social-economic system. Summarizing the opinions of researchers, we can say that the main indicators can be: the growth of profitability, the growth of output, increase in the welfare of people living in a particular area, and improvement of their standard of living. To achieve this goal in this research, we study the concept of “progressive advance of the region” and determine the factor indicators, with which it seems appropriate to assess the index of progressive advance of social-economic development of the regions.

2. Literature review

To begin with, we will consider the very concept of progressive advance in development, and then proceed to the factors that shape this concept. While studying the basic theoretical assumptions,

we found that currently there is no uniform methodology, a common understanding of the term “incremental socio-economic development”, even considering the terms “sustainable” and “stable”. Moreover, in scientific research this concept with reference to regional socio-economic development is not considered. At the same time, by region we understand territorial formation on a national scale, which has its own specificity, in contrast to macro-formations. “Advancement” in a broad sense describes the increase, the improvement of the values of indicators. In the studies of a number of authors, this term is used to assess the land use efficiency [1], to study the risks as applied to territorial development [2]. Researchers often consider this phenomenon in relation to a specific problem or a particular object [3, 4, 5, 6]. The theory of progressive advance has not yet been developed, but its assumption is the existing and fairly widespread concept of sustainable development, the foundations of which were laid back in the 70’s of the 20th century. The English term “sustainable development” is translated to Russian as “ustoychivoye razvitiye” (“sustainable development”), but this concept characterizes a wider range of ideas: “supported,” “continuous.” Therefore, it would be a mistake to consider our understanding of economic development, which boils down to advanced, incremental, absolutely new. We only expand the boundaries of the study, transferring this term from the national and macroeconomic understanding to a narrower one regional development. In view of this, in this study, we will develop a model for assessing the incremental regional socio-economic development. A significant contribution to the creation of conditions for the incremental development of economic systems is made by the Europe 2020 strategy, elaborated in 2010, two years after the onset of the worst financial crisis in Europe. This document focuses on providing employment opportunities for the population, increasing investment in R & D, reducing emissions to the environment, increasing the number of young

people with higher education, and reducing the level of poverty [7]. The sustainable development goals for the period up to 2030, designated by the United Nations in 2015, contain 17 directions [8]. The United Nations, in particular, state that sustainable economic growth will require societies to create conditions that allow people to have high-quality jobs that stimulate the economy. This goal is designated as number 8. The criteria for assessing the effectiveness of achieving this goal are the increase in labor productivity with simultaneous unemployment reduction. At the same time, sustainable development is considered together with the incremental one [9]. Item 11 includes the goal of sustainable urban development. We expand it to the level of regional development. In accordance with the “Concept of the Long-Term Social and Economic Development of the Russian Federation until 2020”, the priority is human potential development, including increasing the competitiveness of human resources and improving the quality of the social environment and living conditions (Concept of the Long-Term Social and Economic Development of the Russian Federation until 2020, 2018). We systematized the analyzed sources; their main features are presented in Figure 1. Based on the essence and closeness of the concepts of “stability”, “sustainability”, “progress”, in relation to this study we understand incremental regional development as the improvement of socio-economic indicators of its development, implying a change in the values of these indicators (criteria) in a more favorable for the whole socio-economic system direction. In previous studies, we found that regional socio-economic capabilities can be assessed in terms of economic indicators, social indicators, and level of human development. These three sets of indicators are considered as the main ones in scientific research and in the official documents mentioned above and aimed at sustainable development. It is these three elements that we have identified as priorities in the planning and evaluation of regional development strategies.

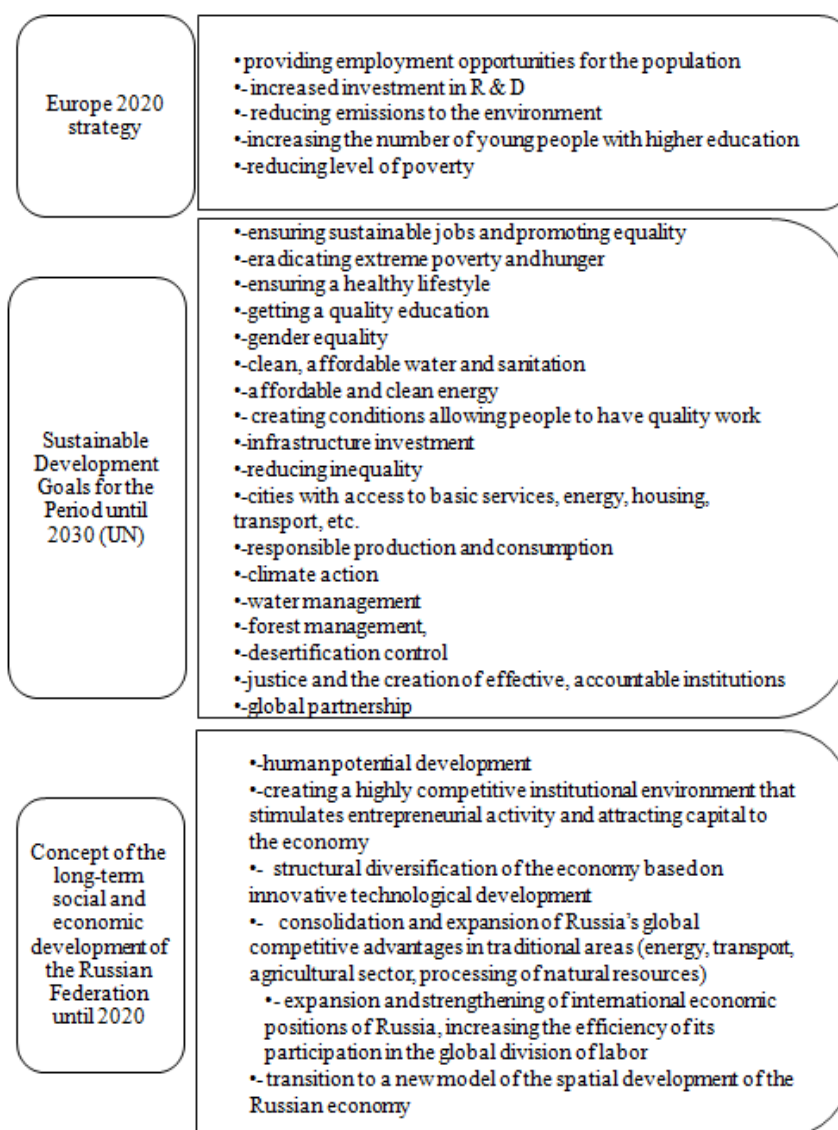


Figure 1. Features of the key documents in the field of ensuring the incremental economic development [compiled by the authors]

3. Materials and Methods

3.1. Research methods

The socio-economic regional potential is an important component of the assessment and planning of business entities' activities [10, 11]. In previous studies, we found that the regional potential is made

up of a large number of factors, among which we focused mainly on investment [12, 13], financial [14], human ones [15]. Conventionally presented in Figure 1, directions for assessing the sustainability of economic development can be represented as four groups of factors (Figure 2).

Directions of assessing the progressive regional development			
Human potential	Social indices	Economic indices	Ecological indices

Figure 2. Directions of assessing the “incremental” regional development of the territories [compiled by the authors]

With regard to our research and taking into account the goals set in it, we consider it expedient to pay attention to the first three blocks, since they are the

focus of attention of economists-theorists and practitioners [16, 11]. A region is a narrower notion in comparison with the national economy. However,

it has its own characteristics, and specific indicators can be used to evaluate it. The human potential of the region has a factor structure. Summarizing

researchers' views, we presented it in Figure 3.

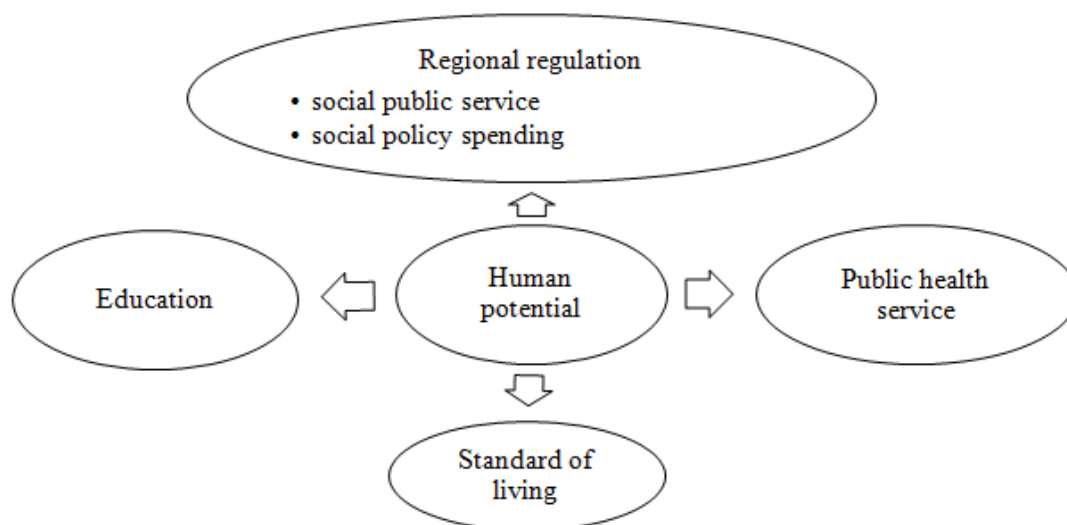


Figure 3. Factor model of human potential structure [compiled by the authors]

In accordance with the Decree of the President of the Russian Federation of 21.08.2012 No. 1199 “On the Assessment of Performance Efficiency of Executive Authorities of the Federal Subjects of the Russian Federation,” the indicators of performance efficiency of executive authorities of the Federal Subjects of the Russian Federation include social indicators mainly and five of the twelve are economic. Among the economic indicators of the assessment are the volume of investments in fixed capital (excluding budget funds), the turnover of products (services) produced by small enterprises, the amount of tax and non-tax revenues of the consolidated budget of a subject of the Russian Federation, the average unemployment rate for the year, real disposable money incomes of the population. This methodology is aimed solely at assessing government bodies' activities. And since the efficiency of regional development is ensured, including by the authorities' efforts, this approach, in our opinion, can be applied to the analysis of the development of regional actors. With that, this approach cannot be considered objective and systemic. Hence, in this research, we studied the points of view of various scientists, including foreign ones, on the composition of indicators for estimating the socio-economic capabilities of a region (territory). The main goal of the regional socio-economic development is to improve the quality of life of its population. In this regard, we include two indicators into the concept of the study: the growth of income of the population and increase of people's level of education. A significant role in assessing the socio-economic regional potential is played by human potential assessment. It is known that the

category of “human potential” does not have a generally accepted interpretation and a unified assessment methodology. The Human Development Index (HDI), developed by the UNDP, is well-known for assessing human potential. It characterizes three components: citizens' health and longevity, access to the education system, gross national income per capita [17]. It is important to note that this integral indicator is widely used for countries' development and comparison, but in relation to the assessment of regional (territorial) grouping, considering the regional authorities having impact on economic system, it has certain limitations. It is unlikely that there will be regions that differ significantly among themselves in the indicators included in the index, since they have a long-term character of formation, and within the framework of one country in a common legal field are unlikely to be significantly different. Applying the methodology for assessing the human development index for a region, a narrower territorial entity compared to that of federal importance, it should be noted that this indicator is long dated, since its components change much less frequently than once a year [18,19]. And to assess regional development, it is important to observe shorter intervals than long-term development. In this regard, a more in-depth approach to the analysis of the human potential of regional development is required to assess the incremental development. Indicators considered at the national and international levels, such as those defined by the Commission on Human Rights, can be applied to the regional economy. But they should be supplemented with a regional component for the regional development,

therefore, in the concept of the incremental socio-economic regional development elaborated by us, we consider it necessary to single out the directions

(Figure 4).

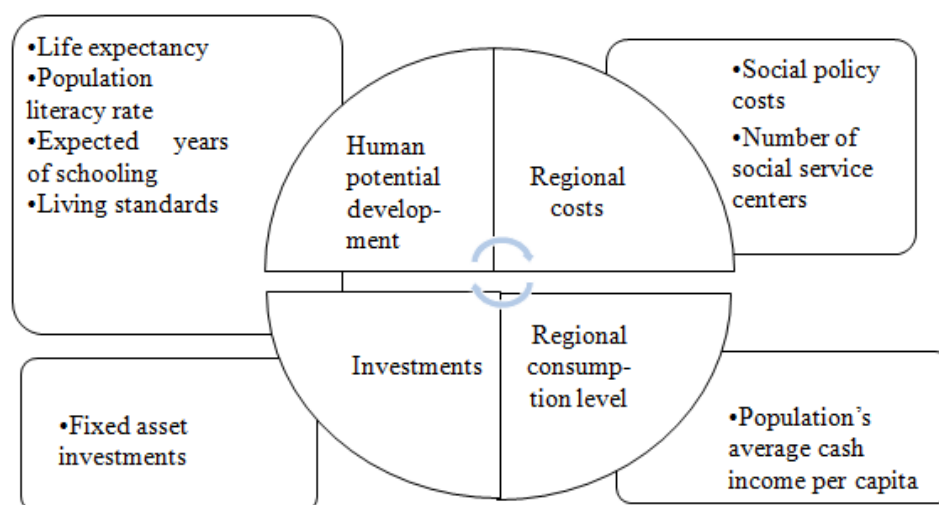


Figure 4. Factors for assessing the progressive advance of regional socio-economic development [compiled by the authors]

Incremental regional socio-economic development provides for an assessment of the dynamics of changes in indicators over a number of periods. And only on the basis of their evaluation in retrospect, it is possible to correct an adequate management policy in regional education [20, 21]. Per capita income characterizes the level of consumption in the region. Investments are a significant factor reflecting the development potential of the regional economy. Regional and municipal costs, which are also an element of the gross regional product, can be expressed as indicators reflecting the regional costs for social policy and the number of social service centers. The remaining factors reflect the human development index and can be considered additional in the context of our research, as they reflect the long-term regional development. It should be noted that many researchers consider human potential as an element of regional development in terms of quantitative evaluation of social, demographic, educational level of advancement, trying to combine all these features as a single integral indicator, but the

specificity of the element of regional development under consideration is such that it is erroneous to focus only on mentioned characteristic. Due to this, we add economic indicators to the human potential assessment model of the socioeconomic regional development.

3.2. Algorithm for assessing the progressive advance in regional development

Exploring the dynamics of the development of the proposed evaluation criteria, it is possible to evaluate the efficiency of regional management. Efficiency can be characterized in terms of the incremental development of the system as a whole. In this regard, we attribute an important role to the dynamic assessment of indicators. The progressive advance in the development will be estimated by the growth rate of the indicators selected for evaluation. The algorithm of the proposed model for assessing the progressive advance in regional development is shown in Figure 5.

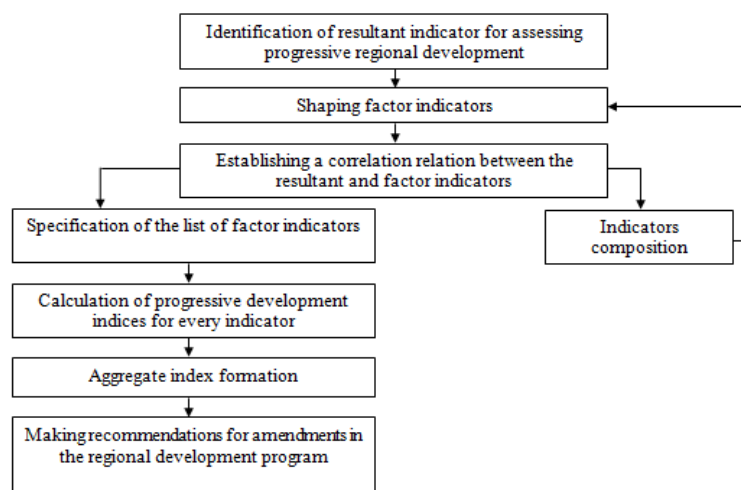


Figure 5. The algorithm for assessing the progressive advance in regional development [compiled by the authors]

It is viable to express the progressive advance in regional development with an integral indicator, which should generalize the factors affecting this development. Therefore, at the initial stage of implementation of the proposed methodology, it is required to determine the resultant indicator for assessing the progressive advance in the regional development. As regards the Russian statistical reporting, considering the object of study (regional economy), this may be the gross regional product (GRP) index. Indicators such as gross domestic product, gross fixed capital formation, reflect the level of development of the national economy. And we deal with the regional development. We will assess the progressive advance as a criterion of efficiency in the methodology proposed by us, using this indicator. The second stage of the implementation of the methodology shown in Figure 5 assumes the formation of factor indicators affecting the resultant criterion. With regard to the study of the progressive advance of the regional socio-economic capabilities, the factor indicators we selected are presented in Figure 4. However, not all selected criteria can have a direct relationship with the resultant indicator, therefore, the 3d stage should be dedicated to correlation analysis establishing the relationship between the selected factor and resultant indicators. Based on the correlation analysis results, a decision is made to specify the composition of the indicators required for the analysis. At the 5th stage, the indices of incremental development in the context of each of the selected factor indicators should be calculated (formula 1).

$$I_F = \frac{Z_1 + Z_2 + Z_3 + \dots + Z_n}{Z_0 + Z_1 + Z_2 + \dots + Z_{n-1}} \quad (1)$$

where $Z_1, Z_2, Z_3, Z_n, Z_{n-1}$ – values of factor index in monetary terms in periods 1, 2, 3, ... n.

We offer to assess the composite index of incremental development using formula 2.

Human Development Index:

$$I_I = \sqrt[n]{I_{F1} \times I_{F2} \times \dots \times I_{Fn}} \quad (2)$$

where I_I – integral index of regional socio-economic development.

On consideration of the calculation of this index, at the last stage of assessing the progressive advance of the regional socio-economic development, proposals are made for adjusting the regional policy.

4. Results

Testing of the suggested methodology was carried out based on statistical data on the socio-economic development of the regions of the Central Federal District in Russia. As a resultant indicator reflecting the level of progressive advance of the regional economy, we have chosen the GRP index (as a percentage of the previous period) (Figure 6). This indicator is calculated on the basis of official data of the RF Federal State Statistics Service in comparable prices.

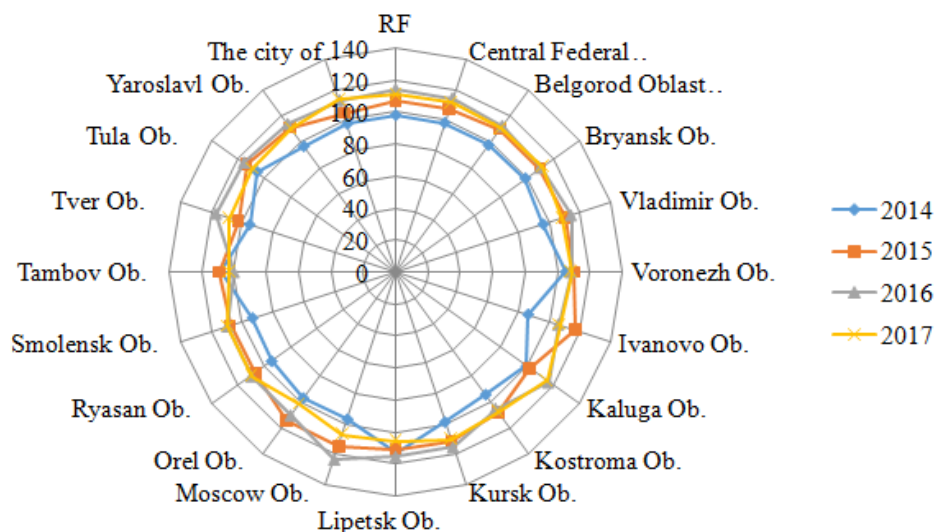


Figure 6. Volume Index of GRP [compiled by the authors]

Considering the factor indicators proposed in the model, we conducted a correlation analysis reflecting the degree of their influence on the GRP. As a result, conclusions were obtained that the socio-economic activities of the regions of the Central Federal District of Russia are most affected by such indicators as: fixed capital investments, social policy spending in the total volume of regional budget funds and the

number of social service centers (Table 1). The first indicator refers to economic factors, the second and third ones – to social factors.

Table 1. Results of the correlation analysis of the degree of interaction of socio-economic factors in regional development

	F1	F2	F3	F4	F5	F6
F1	1					
F2	0.220	1				
F3	0.424	0.966	1			
F4	0.107	0.993	0.934	1		
F5	-0.752	0.013	-0.153	0.103	1	
F6	0.533	0.151	0.280	0.078	-0.282	1
GRP	0.308	0.994	0.989	0.976	-0.058	0.209

Legend:

- F1 – Per capita income
- F2 – Fixed capital investments
- F3 – Social policy spending
- F4 – Number of social service centers
- F5 – Unemployment rate
- F6 – Number of high school students

At the next stage of testing the methodology, we calculated the index of the incremental regional development in the RF Central Federal District in the context of the selected factor indicators F2, F3, F4 (Table 2).

Table 2. Special indices of the incremental regional development in the context of the selected factor indicators

Region	I INVESTMENT	I SPENDING	I CENTRES
RF	98.7	103.8	98.3
Belgorod Oblast (O.)	95.5	109.6	107.0
Bryansk O.	98.4	122.6	97.0
Vladimir O.	99.7	103.1	96.5
Voronezh O.	104.3	103.6	76.7
Ivanovo O.	93.4	120.5	94.9
Kaluga O.	91.6	114.8	95.6
Kostroma O.	95.3	100.4	100.0
Kursk O.	102.5	104.6	94.5
Lipetsk O.	103.2	120.0	94.4
Moscow O.	99.9	110.4	89.1
Orel O.	96.6	105.1	100.0
Ryasan O.	94.9	105.2	91.4
Smolensk O.	96.2	103.9	94.3
Tambov O.	101.0	102.5	98.7
Tver O.	100.4	102.1	96.0
Tula O.	102.2	103.3	83.3
Yaroslavl O.	93.0	106.9	101.3
The city of Moscow	104.6	100.6	100.0

Legend:

I INVESTMENT— Fixed capital investment index;

I SPENDING – Social policy spending in the total volume of regional consolidated budget funds;

I CENTRES – Number of social service centers.

According to the results of the calculations through formula (2), we developed an aggregate index for assessing the incremental regional development in the RF Central Federal District (Figure 7).

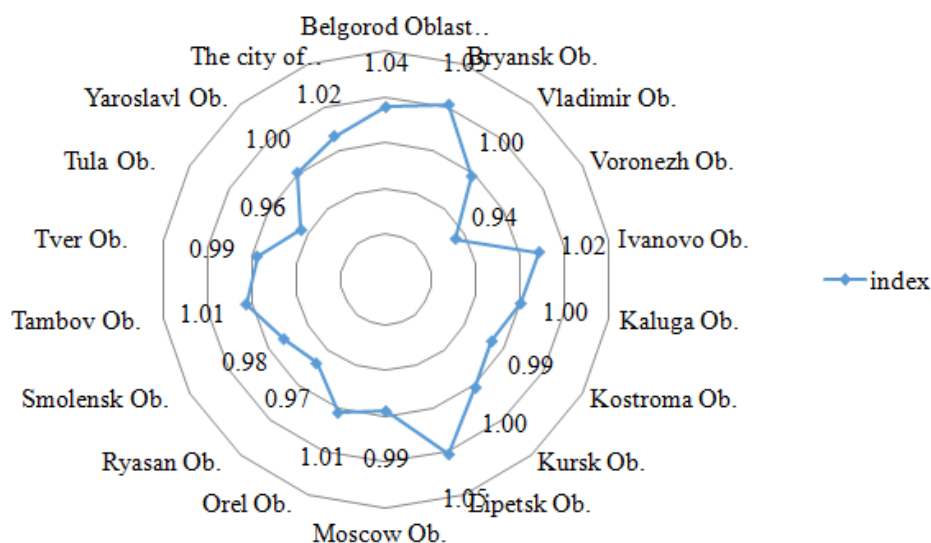


Figure 7. Assessing index of incremental regional development [compiled by the authors]

The figure clearly shows the level of incremental development of each of the analyzed regions. We see that regions are developing unevenly, and the Voronezh, Tula, and Ryazan Oblasts in the RF Central Federal District require special attention as for their level of social development. Regression analysis allows assessing the impact of each of the indicators on the regional development. Thus, the upgrade in the incremental regional development can

be achieved by varying the value of the identified factor indicators. This methodology will allow regional authorities to form a more objective, viable policy of socio-economic development in a region. An algorithm developed by us for making managerial decisions based on the proposed integral indicator of the incremental regional development is presented in Figure 8.

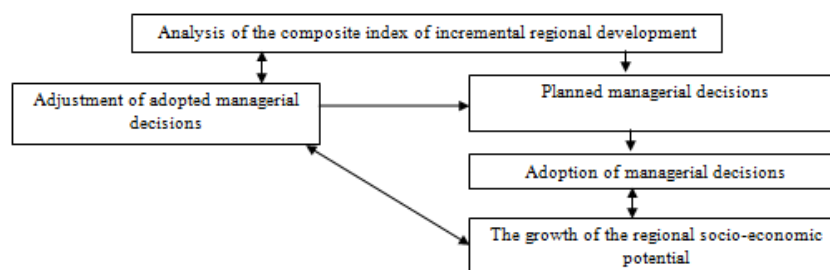


Figure 8. The algorithm for making managerial decisions based on the methodology for assessing incremental regional development [compiled by the authors]

The proposed algorithm links the planned activities of regional authorities and the methodology developed in this paper for assessing progressive advance in regional socio-economic development. We can see that in case the relevant indicator analysis is involved in it, this will not only allow developing appropriate activities, but also adjust areas of work implemented so far. In the aggregate, the realization of the proposed concept is aimed at improving the efficiency of regional management and the functioning of the system as a whole.

5. Discussion

The proposed concept of assessing the progressive advance in regional socio-economic development and the progressive advance index calculation model developed on its basis are grounded on establishing the resultant indicator and identifying factor indicators. However, in practice, depending on the purpose of the study, not only the GRP indicator can be taken as the resultant one, but factor indicators can differ significantly depending on the correlation analysis results. Carrying out the proposed algorithm for assessing advancement, a researcher can develop his own relationship between indicators and suggest ways to improve the regional development. However, indicators of the progressive advance assessment should correspond to those directions for evaluation that are proposed and argued in this work.

6. Conclusion

The proposed approach to assessing the socio-economic development of the region will allow:

1. To form forecasts of the regional development, simulating various values of factor indicators.
2. To assess regional authority performance.
3. To develop an effective regional policy.

At the same time, the elaborated concept of assessing the development progression has a number of limitations. Estimated indicators should be measurable, comparable and have a numerical

expression for a number of periods. As for our research, we assessed the data for 2013-2017. It should be borne in mind that the proposed methodology includes a set of indicators reflecting the short-term results of regional activities (GRP, investment, social spending, number of social service centers), and can be used in strategic planning when adding long-term indicators to the model.

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