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METHOD OF INTEGRATED ASSESSMENT OF THE LEVEL OF ECONOMIC POTENTIAL OF A CROSS-BORDER REGION

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Abstract

The article presents a methodology for assessing the level of economic potential developed by the author. The author uses a multidimensional assessment of economic potential based on the provision of the cross-border region with economic, social, infrastructural, innovative, digital resources, as well as taking into account transit, institutional provision. The methodology is based on the author's interpretation of the concept of "economic potential of a cross-border region" and includes the definition of five levels of potential of a cross-border region. Particular attention is paid to the objectivity of the initial data, as well as comparisons of economic potential in dynamics based on a multidimensional average value. The author's methodology for an integrated assessment of the level of economic potential of a cross-border region has a practical focus. The purpose of the analysis is to determine the level of development of the economic potential of a cross-border region in order to determine the direction of balanced, sustainable development based on a typological comprehensive assessment of regional economic potential and generalization of its results.

The subject of the study is the influence of cross-border factors on the socio-economic development of a region. The purpose of the study is to develop and test a methodology for an integrated assessment of the level of economic potential and its impact on the socio-economic development of a cross-border region. Research methods – economic and statistical, analysis, synthesis, inductive, deductive, comparison, system, expert assessments, etc.

In modern conditions, the formation of convenient and effective methods and tools for measuring balanced, sustainable socio-economic development, allowing for an unambiguous interpretation of the results obtained, is of high value from both a research and a management point of view. The advantages of the integrated indicator proposed by the author include the ability to cover all the main potentials in the structure of the economic.

Keywords: transborder region, economic potential of a transborder region, strategy, assessment methodology, structure of economic potential, integral assessment of economic potential.

МЕТОДИКА ИНТЕГРИРОВАННОЙ ОЦЕНКИ УРОВНЯ ЭКОНОМИЧЕСКОГО ПОТЕНЦИАЛА ТРАНСГРАНИЧНОГО РЕГИОНА

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Реферат

В статье представлена разработанная автором методика оценки уровня экономического потенциала. Автор использует многомерную оценку экономического потенциала на основе обеспеченности трансграничного региона экономическими, социальными, инфраструктурными, инновационными, цифровыми ресурсами, а также с учетом транзитной, институциональной обеспеченности. Методика основывается на авторской трактовке понятия «экономический потенциал трансграничного региона» и включает определение пяти уровней потенциала трансграничного региона. Особое внимание уделяется объективности исходных данных, а также сравнениям экономического потенциала в динамике на основе многомерной средней величины. Авторская методика интегрированной оценки уровня экономического потенциала трансграничного региона имеет практическую направленность. Целью анализа является определение уровня развития экономического потенциала трансграничного региона для определения направления сбалансированного, устойчивого развития на основе типологической комплексной оценки регионального экономического потенциала и обобщения ее результатов.

Предметом исследования является влияние трансграничных факторов на социально-экономическое развитие региона. Целью исследования является разработка и апробация методики интегрированной оценки уровня экономического потенциала и его влияния на социально-экономическое развитие трансграничного региона. Методы исследований – экономико-статистический, анализа, синтеза, индуктивный, дедуктивный, сравнения, системный, экспертных оценок и др.

В современных условиях формирование удобных и эффективных методов и инструментов измерения сбалансированного, устойчивого социально-экономического развития, позволяющих дать однозначную трактовку полученных результатов, представляет высокую ценность как с исследовательской, так и с управленческой точки зрения. К преимуществам предлагаемого автором интегрального показателя относится возможность охвата им всех основных потенциалов в структуре экономического.

Ключевые слова: трансграничный регион, экономический потенциал трансграничного региона, стратегия, методика оценки, структура экономического потенциала, интегральная оценка экономического потенциала.

Introduction

The socio-economic development of a regional system is influenced by basic factors (transport and geographic, natural resources, climate) and superstructure factors (economic, administrative, institutional), as well as specific factors that determine the vector of development depending on the conditions of the region's functioning. Of great practical importance for planning and forecasting the socio-economic development of regions with cross-border relations is the comprehensive consideration of all groups of factors. It is especially important to take into account the factors that determine the directions of cross-border development of terri-

ories: transit, infrastructure, institutional, integration [1], since a scientifically based solution to the problem, a reduction in the asymmetry of territorial development with preventive management reduces negative consequences.

Myasnikovich rightly notes: «The transition from an integrated development agenda to isolated development, the growth of state, corporate and private debt exacerbates crisis processes...» [2]. «One of the effective paths to development is the deepening of regional integration» [2], the form of which is cross-border cooperation [3].

Achieving the goal of developing a transboundary region depends on the existing economic potential and the transboundary influence of adjacent territories. Based on the multitasking nature of potential research, it can be argued about the influence of the polysemantic nature of this category, revealing its multicomponent structure. The problem of completeness of coverage of a multicomponent structure due to the limited statistical indicators can be solved by experts, when experts select groups of parameters, methods of their combination and further processing. The economic potential of a region can be considered as a set of material and technical base, expressed by available resources, opportunities and conditions for involving it in economic turnover, capable of ensuring a certain level of development of the region. When considering it in relation to a transboundary region, it can be argued that "the economic potential of a transboundary region is a set of resources and opportunities that determine the ability of the region to implement transboundary cooperation, which can be maximally used by subjects of the regional economy in order to stimulate economic growth and development within territorial boundaries" [1].

This raises the issue of the need to create an objective, easy-to-use and comprehensive approach to assessing the economic potential of regions. Such an approach could become an effective tool for comparing available resources and identifying opportunities for economic growth, as well as for developing and implementing various aspects of territorial policy. Economic potential is a key resource for the development of a region, which in turn contributes to its social well-being [4]. Summarizing the opinions of scientists [5–8] and identifying structural elements, we can note that the structure of economic potential remains a subject of discussion in the scientific community; there is no consensus on its constituent elements. The authors [9–12] note that systematization of the structural elements of the resource potential of a region and approaches to its definition is significant, since transboundary regions are subject to the transmission of «exogenous impulses for the national economy, both positive in the form of special investment and foreign trade opportunities, and negative – in the form of the spread of global financial and economic problems to the domestic, national economy» [12].

In this paper, economic development is presented as a process that is constantly changing. To effectively manage this process, it is necessary to formalize it. Therefore, it is necessary to create mathematical tools that allow a comprehensive assessment of the economic potential, the level of which will correspond as much as possible to the current state of economic development.

Methodology for assessing the level of economic potential of a trans-border region

The methodology must comply with the conditions of availability and accuracy of the initial data, take into account the complexity of the indicators, the dynamic development of the region, and also ensure the simplicity of calculations and the informativeness of the results obtained.

Let us present a methodology for assessing the level of economic potential of a cross-border region.

1. Definition of the object, subject, purpose and objectives of the study. The object will be a transboundary region of the macro level (transboundary economic development corridor/country), in some cases a transboundary region of the meso level (administrative-territorial unit of the regional level).

The subject of analysis is monitoring the total economic activity of business entities in the region, its results and methods for assessing effectiveness.

The purpose of the analysis is to determine the level of development of the economic potential of a cross-border region in order to determine the direction of balanced, sustainable development based on a typological comprehensive assessment of regional economic potential and generalization of its results.

The official database of the National Statistical Committee is used when calculating the indicators. This allows for the formation of a sufficient time series to characterize the processes. In the study, the time series is determined by the period necessary to achieve "goals, priorities, objectives, indicators and parameters of socio-economic development for a certain time period" [13].

2. Selection of a system of indicators for assessing the economic potential of a transboundary region. The indicators are grouped by subpotentials:

- 1) economic potential;
 - a) development indicators;
 - b) production and financial indicators;
 - c) consumer indicators;
 - d) labor indicators;
- 2) social potential;
 - a) inclusiveness;
 - b) demographic indicators;
 - c) social infrastructure;
- 3) infrastructure potential;
- 4) innovative potential;
- 5) integration potential;
- 6) transit potential;
- 7) potential for digital development;
- 8) institutional potential;
 - a) level of business development;
 - b) level of management development;
 - c) level of social development.

3. The calculation of structural elements characterizing the level of potential of a certain sphere of development of the socio-economic system is made on the basis of the arithmetic mean. The aggregated arithmetic mean in our case is used for intermediate calculations, which will allow us to level out the error of the integral value [14].

Depending on the duration of the period of studying the state of the object, the calculation of the complex indicator of the level of the corresponding subpotential is determined by one of the options:

- a) at a certain point in time:

$$R_i = \frac{\sum X_{ji}}{n}, \quad (1)$$

where R_i is the value of the complex indicator of the level of the i -th subpotential of the economic potential of the transboundary region;

X_{ji} – the value of the j -th indicator of the i -th subpotential;

n is the number of indicators in the subpotential.

b) for a certain time interval. In this case, the calculation of the i -th level

The subpotential is produced by the method of normalization (reduction to the scale [0, 1]) of the initial indicators based on the determination of deviations of the actual values of the j -th indicator from the maximum and minimum values of the indicator or from the optimal (normative) values.

$$R_i = \left(\sum_{j=1}^n \frac{X_{\max j} - X_{ji}}{X_{\max j} - X_{\min j}} + \sum_{j=1}^n \frac{X_{ji} - X_{\min j}}{X_{\max j} - X_{\min j}} \right) / n, \quad (2)$$

where R_i – the value of the complex indicator of the i -th level subpotential of the economic potential of a transborder region, characterizing a separate sphere of socio-economic development;

X_{ji} – the value of the j -th indicator of the i -th subpotential;

$X_{\max j}$ – maximum value of the j -th indicator of the i -th subpotential;

$X_{\min j}$ is the minimum value of the j -th indicator of the i -th subpotential;

n is the number of indicators in the subpotential.

The first part of the numerator of the formula is used to evaluate direct indicators, an increase in which has a positive value, the second part is used to evaluate inverse indicators, an increase in which has a negative effect.

4. Calculation of the integral indicator.

The calculation of the integral indicator is based on the method of aggregation by the geometric mean. The use of this method will help to take into account the interrelations between resources and will allow to characterize the territory as a system with a comprehensive content of the main economic resources. This is especially relevant for the analysis of complex systems, where many factors interact. The formalized expression of the comprehensive assessment of the economic potential of a transboundary region is the value of the integral indicator:

$$I_R = \sqrt[m]{\prod_{i=1}^m R_i}, \quad (3)$$

I_R – an integral indicator of the level of economic potential of a trans-border region

m – quantity subpotentials.

The implementation of stages 5 and 6 involves the aggregation of time series, namely, collapsed aggregation. Carrying out aggregation (systematization, classification, consolidation, analysis) allows heterogeneous systems consisting of two or more different homogeneous areas to be combined "into a single whole with the aim of obtaining a holistic systematized data array – an aggregate" [15]. The process of transforming a large array of data into a more compact form allows us to identify general patterns, trends, or structural characteristics [16].

In our case, the aggregation of statistical information at stage 5 occurs horizontally – chronological/temporal/dynamic analysis, and at stage 6 vertically – structural analysis, which determines the structure of the final integral indicators, identifying the influence of each position of the information base on the aggregate as a whole.

Thus, the combined use of aggregation methods provides a more complete picture of socio-economic processes, allowing us to support the formation of a regional development strategy aimed at achieving target indicators.

Thus, the methodology for assessing and analyzing the economic potential of a cross-border region is based on the implementation of the following successive stages:

- formation of a system of initial indicators with their subsequent unification into enlarged thematic groups (subpotentials);
- calculation of private indicators (sub-indices) reflecting the state of sub-potentials;

- identification of incentives and constraints for balanced and sustainable development of a cross-border region;

- assessment of the consolidated integral indicator of economic potential, obtained on the basis of the "convolution" of private sub-indices, with subsequent determination of the type of economic development of the cross-border region.

The advantages of the integrated indicator proposed by the author include the ability to cover all the main potentials in the economic structure.

5. Determining the level of development of economic potential.

The final stage of the assessment will be the interpretation of the comprehensive assessment of the economic development of the cross-border region. For a correct understanding of the results, it is necessary to establish threshold values for the level of economic potential, which will vary from 0 to 1 [17].

Thus, at the final stage, it is planned to obtain the values of the aggregated indicator of the level of economic potential of the regions, which will make it possible to determine the direction of development of the cross-border zone, conduct a comparative analysis of the achieved results of economic progress, and promptly identify changes and shifts occurring over time.

The level of economic potential corresponds to a certain interval of change in the value of the interval boundary indicator (Table 1).

6. Development of measures to ensure effective development of the cross-border region.

Table 1 – Levels economic potential of the transboundary region

Level potential	Interval I _R values	Interpretation of the integrated assessment of the level of development of the EP
Short	0.1–0.28	Unstable, unbalanced state of the region, pre-crisis state
Below average	0.29–0.46	Partial balance, parity between the subsystems of the region is violated. Asymmetric development is observed
Average	0.47–0.64	Sustainable / with some signs of unsustainable development, There are signs of asymmetric development
High	0.65–0.82	Continuous development of the region's subsystems, taking into account their coordinated interaction, providing a synergistic effect to ensure the dynamic stability of the region
Very tall	0.83–1	Balanced, sustainable, dynamic development, efficient use of resources and opportunities

Determining the level of economic potential is immanent to the strategy of economic development of the transboundary territory. Finding incentives and restrictions for the development of the region is carried out on the basis of an analysis of the values of individual subpotentials R_j, their indicators. If the analysis showed the lowest/highest value for some of them, then the region has limitations/advantages for this factor. The results of the analysis can be used to develop development directions that support the development of mechanisms, identify development reserves, and use the competitive advantages of the territory.

Conclusion

It is important to use new opportunities for institutionalization of interstate relations within the framework of integration associations to stimulate economic development [18]. Ensuring cross-border cooperation of meso/macro cross-border regions, as noted by Davydenko L.N. in [19], is possible when building infrastructure, namely technical and technological, resource, institutional and organizational. Supporting and stimulating investment, innovation activities, and the development of small and medium-sized businesses requires the creation of acceptable macroeconomic conditions by regional government bodies [20].

The assessment of socio-economic subsystems of a trans-border region is also informative from the point of view of analyzing the impact of trans-border interactions on the regional economy. Dynamics of infrastructure, integration, transit, institutional sub-potentials determined by the vector of transboundary processes.

The proposed methodology consists in developing an integral index that allows assessing the socio-economic potential of a territory at a systemic meso /macro level. Based on the totality of the data obtained, the level of economic potential of a transboundary region is determined, differentiated into groups in accordance with the level of subpotentials accumulated on its territory.

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