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Article

Border Took Trade And Industry Zones Regional Economic Efficiency To Evaluate Related Scientific And Methodological Approaches Improvement

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Abstract: In the article border took trade and industry The scientific and methodological approaches to assessing the regional economic efficiency of zones are analyzed. The study proposes to divide the assessment object into layers of activity within the zone, territorial impact and cross-border trade-integration impact. As a scientific innovation, a regional-integration model consisting of six blocks efficiency index is based on.

Keywords: border region, trade and industrial zone, regional efficiency, regional integration index, assessment methodology, cross-border trade

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Introduction

When it comes to the economy of border regions, usually their proximity to foreign markets is first of all mentioned. However, practice shows that the location near the border itself does not guarantee exports, industrial cooperation or an increase in the income of the population. If such a territory does not have sufficient roads, customs, warehouses, certification, local raw materials, a qualified workforce and management, then the geographical advantage will not translate into real economic results. Therefore, it is scientifically insufficient to limit oneself to simple reporting indicators when assessing border trade and industrial zones.[1][2]

Today, two perspectives coexist in the international literature on special economic zones and place-based policies. On the one hand, some studies argue that special zones can have a positive impact on industrialization, employment and exports. On the other hand, recent empirical work shows that tax or customs privileges alone are not enough, but that the zone is also related to the economy of the surrounding area, firm-level efficiency and governance quality (Görg and Mulyukova; Rothenberg, Wang and Chari,). The issue of evaluation is therefore not limited to the question of "is there a zone or not"; the main question is to determine what value the zone adds to regional development.[3][4]

In the context of Uzbekistan, this issue is even more important. The country's geoeconomic location in Central Asia, bordering five countries, neighboring markets that differ in various directions, and regional potential require a tailored approach to assessing border trade and industrial zones. In such conditions, indicators such as investment volume, number of residents, or export volume only give an initial idea. They cannot fully reveal the zone's connection with local producers, its spillover effect on surrounding regions, the quality of governance, and its contribution to cross-border trade flows.[5][6]

Early approaches in the scientific literature on special economic zones relied on outcome indicators such as attracting more investment, increasing exports, and creating employment. Alansary and Al-Ansari systematically review the literature on free zones and highlight the lack of uniform interpretation of the concept and the need to identify its structural features. This conclusion is important in distinguishing border trade and industrial zones from general special economic zones: in such zones, trade, production, and cross-border communication should be assessed simultaneously.[7]

Recent studies have shown the need to move from simple description to causality in evaluation. Tafese, Lay and Tran use satellite imagery to study the real-world expansion of special economic zones and local labor market outcomes in the Vietnamese experience. This approach highlights the importance of measuring actual economic activity levels, rather than just legal status, in evaluation. Gallé et al. use geographic data and firm registers in India to assess the impact of special zones on employment and structural change. This suggests that the impact of a zone may not be confined to its walls but may spill over into surrounding areas.

However, the literature does not conclude that special zones always produce positive results. Görg and Mulyukova show that the impact of special economic zones on firm performance in India is not always clearly positive. Rothenberg, Wang, and Chari (2025) argue that tax incentives alone do not increase firm entry and output in the case of integrated economic development zones in Indonesia. Therefore, the main criteria for evaluating border trade and industrial zones should be the real economic transformation and the degree of local relevance, rather than the presence of incentives.[8]

Sustainability and governance issues also deserve special attention. Dinh et al. examine the relationship between special economic zones and sustainable development in Chinese provinces through a data-driven analysis, showing the need to consider environmental and social impacts alongside economic growth. Di Ruocco and D'Auria propose an approach to assessing the public impact of special zones. This view argues that frontier zones should be analyzed not only in terms of production and exports, but also in terms of local populations, governance quality, and territorial stability.

Liu and Yao analyze cross-border special economic zones as a territorial mechanism that shapes network connections, not just an infrastructure space. This idea is especially important for cross-border trade and industrial zones, as their effectiveness is directly related to the neighboring country's market, customs procedures, transport corridors, and local production chains. Thus, the existing literature shows the need to integrate economic, social, territorial, institutional, and cross-border criteria in the assessment.[9][10]

Research methodology

Research methodology theoretical generalization, comparative analysis and multi-criteria assessment approach were used. Since the article aims to develop an assessment logic rather than empirical calculations, the main attention was paid to justifying the compatibility of the indicator system, the composition of the assessment object and the methods. In this regard, the approaches used in international scientific literature on cause-and-effect analysis, the impact of territorial dispersion, firm-level efficiency, institutional quality and sustainability assessment were compared with the conditions of the border regions of Uzbekistan.[11]

Evaluation object three The stratification is the methodological basis of the article. The first layer is economic activity within the zone. Here, indicators such as the number of residents, investment volume, production value, export volume, jobs and capacity utilization are studied. The second layer is the impact on the economy of the district or region where the zone is located. This layer is revealed through local business activity, the services market, employment, wages, budget revenues and the use of local raw materials. The third layer is the cross-border trade and integration impact, in which trade with neighboring countries, logistics costs, customs clearance times and joint production ties play a central role.[12]

As a scientific innovation, the territorial-integration efficiency index is proposed. The index consists of six blocks: economic performance, investment activity, trade-integration

efficiency, infrastructure and logistics, social impact, and governance-institutional environment. These blocks can be analyzed both separately and in a generalized form. The task of the index is not to replace real economic analysis, but to organize various indicators and create a methodological basis for comparative assessment across regions.

The simplified form of the index is expressed as follows: HISSI = w1E + w2I + w3T + w4L + w5S + w6G. Here E is economic performance, I is investment activity, T is trade-integration efficiency, L is infrastructure and logistics status, S is social impact, G is governance and institutional environment; w1...w6 denote the weight coefficients of each block. The indicators are normalized from 0 to 1, and the weights can be determined based on expert assessment, strategic prioritization or the equal weight method.[13]

The methodology avoids seeing one method as the absolute solution. Descriptive-dynamic analysis serves to identify the initial change, cross-regional comparative analysis to identify regional differences, difference-of-differences or artificial control methods to identify causal inferences, and spatial analysis to identify the impact spreading to surrounding areas. Therefore, the assessment should be carried out in stages, each method should answer its own question.

Table 1.

Border took trade and industry Zone assessment blocks

Block	Main indicators	Information sources	Role in research
Economic result	production volume, value added, number of residents	statistics, zone administration, enterprise reports	determining real activity within the zone
Investment activity	foreign and local investment, number of projects	investment bodies, regional programs	demonstrate the quality and effectiveness of capital raising
Trade-integration effect	export, trade with neighboring countries, customs time	customs, statistics, logistics data	open border feature
Infrastructure and logistics	road, railway, warehouse, terminal, electricity, internet	khokimiyats, infrastructure enterprises	assessment of zone operating conditions
Social impact	employment, wages, share of local personnel, population income	labor market and statistical data	demonstrate the impact on regional well-being
Management and institutions	single window, speed of permits, coordination, transparency	administrative data, questionnaires	determining the quality of management

Analysis and results discussion

The analysis shows that assessing the effectiveness of border trade and industrial zones solely through investment volume or export performance leads to a one-sided conclusion. For example, a zone may attract large investments, but if this investment is not linked to local suppliers, service providers and the labor market, regional development will be limited. Similarly, if the volume of exports increases but the local value added is low or exports are mainly formed by resale, such an outcome cannot be interpreted as a deep industrial effect.[14]

The proposed three-layer approach mitigates this problem. The intra-zone outcome shows the residents and production activities; the regional layer reveals the extent to which this outcome is absorbed into the local economy; and the transboundary layer shows how the zone facilitates connections with neighboring markets. It is when these three layers are assessed together that the border trade and industrial zone is seen not as a simple industrial area, but as a means of revitalizing regional economic ties.[15]

Six from the block consists of The territorial-integration efficiency index is scientifically and practically convenient. Its advantage is that it brings together indicators of different nature into one system. If economic performance and investment activity indicate the internal potential of the zone, then the trade-integration block reveals its border nature. The infrastructure-logistics block reflects the material conditions of the zone's activities,

and the social block reflects the results related to the interests of the local population. The management and institutional environment determine the quality of the work of all blocks.

An important aspect of this approach is the separate allocation of the trade-integration block. In many general methodologies, exports, investment and employment are taken as the main indicators. However, for the border trade-industrial zone, customs clearance time, trade with the neighboring market, transport corridors, logistics costs and the integration of local enterprises into the cross-border value chain are of particular importance. Therefore, the assessment model should not lose the specificity of the border region.

Another issue in discussing the results is data quality. In the context of Uzbekistan, official statistics provide general information on industry, exports, investment, employment, and regional output. However, to determine the activity of residents at the zone level, infrastructure capacity, customs clearance time, logistics costs, the share of local purchases, and entrepreneur satisfaction, administrative data and questionnaires are required. If the data are kept in isolation, the result of the integrated assessment will also be weakened.

Mechanical comparisons of regions also require caution. The border zone in the direction of Kazakhstan and the zone in the direction of Afghanistan do not perform the same functions. In one, industrial cooperation and access to a large market may prevail, while in the other, transit, risk management and processing services may prevail. Therefore, it is advisable to form a functional typology of the regions before the assessment. The criteria for the export-industrial, agro-industrial-processing, transit-logistics, services-trade and joint production directions will have different weights.

If the assessment results are not linked to management decisions, their practical value decreases. For example, if the trade-integration block is low, it is necessary to simplify customs procedures, strengthen export marketing and agreements with neighboring countries. If the infrastructure block is low, priority is given to warehouse, terminal, power supply or road projects. If the social block is low, measures are taken to improve vocational training, the share of local personnel and small business cooperation. Therefore, the index is not a final number, but a diagnostic tool for regional management.

Table 2.
Assessment methods and their scientific function

Method	Main question	Required information	Application result
Descriptive-dynamic analysis	What changed after the zone?	Investment, exports, employment over the years	The initial economic landscape is taking shape
Cross-regional comparative analysis	Which area has the highest score?	indicators of border and control areas	regional differences are determined
Difference of differences method	Did the zone cause the change?	panel data, zone activation date	a close conclusion is drawn
Spatial and diffusion impact analysis	Has the impact spread to surrounding areas?	distance, neighboring districts, traffic information	The effect of territorial spread is evaluated
Data coverage analysis	How efficiently are resources being used?	costs, production, social outcomes	relative efficiency is determined
Trade attraction model	What affects trade flows?	sales volume, distance, market capacity, threshold indicators	trade integration potential opens up

Conclusion

Reviews scientific and methodological approaches to assessing the regional economic efficiency of border trade and industrial zones. The analysis shows that, although the volume of investment, the number of residents or the volume of exports are important in assessing such zones, they are not sufficient in isolation. The extent to which the border

zone is integrated into the regional economy, whether it has connected local entrepreneurship to the value chain, whether it has facilitated trade relations with neighboring markets and whether it has had an impact on employment - these are the questions that should be at the center of the assessment.

The main scientific innovation of the study is to propose an approach to assessing the effectiveness of border trade and industrial zones based on a three-layer object and six-block territorial-integration index. This approach allows for a joint study of economic activity within the zone, spillover effects to surrounding regions, and cross-border trade and integration relations. It also distinguishes the border factor as a separate scientific criterion, unlike general special economic zone methodologies.

To apply this approach in the conditions of Uzbekistan, it is necessary to combine data sources, form a functional typology of territories, and link the assessment results with management decisions. Border regions are not the same; in each direction, the demand for neighboring markets, infrastructure, risks, local production, and the labor market are different. Therefore, the assessment should be carried out not in a uniform manner, but in a manner appropriate to the tasks of the territory.

The final conclusion is that the effective assessment of a border trade and industrial zone is not to confirm its existence, but to prove what value it adds to regional development. If the assessment model can answer this question, it will be not only a scientific analysis, but also a practical tool for improving regional policy. to the tool turns.

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