

REGIONAL MECHANISMS FOR INCREASING THE EFFICIENCY OF OPTIMAL LOCATION OF INDUSTRIAL ENTERPRISES IN THE CONDITIONS OF REGIONAL DEVELOPMENT

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Abstract

The article analyzes regional mechanisms and prospects for increasing the efficiency of the location of industrial enterprises based on a systematic approach. As a key component of the regional economy, the territorial location of industrial enterprises accelerates economic growth through the rational use of production resources, optimization of transport and logistics infrastructure, and strengthening inter-sectoral integration. The study examines the factors affecting the efficiency of location - the distribution of natural resources, labor market potential, infrastructure development, investment environment, and the activity of innovation clusters - in connection with regional competitiveness.

Keywords: Regional economy, industrial enterprises, location efficiency, territorial mechanisms, competitiveness.

The territorial location of industrial enterprises is a strategic mechanism that ensures the structural stability of the regional economy, the efficiency of the use of production resources, and the balanced development of economic growth across regions. In the current context of globalization, the issue of territorial organization of industry is directly related to increasing economic efficiency, reducing logistics chains, rational use of labor resources, and maintaining ecological balance. Internationally, this issue is analyzed within the framework of the “Industrial Location Theory”, which has developed from Alfred Weber’s model based on the ratio of production costs and transportation costs to the modern concept of “agglomeration economics” [1]. This approach shows that the geographical location of industrial sectors is based not only on economic, but also on institutional, social, and

E- Global Congress

Hosted online from Dubai, U. A. E., E - Conference.

Date: 30th March 2026

Website: <https://eglobalcongress.com/index.php/egc>

ISSN (E): 2836-3612

environmental factors. In recent years, approaches to the optimal location of production in the theory of regional economics have been enriched with the concepts of “digital infrastructure” and “sustainable industrial clusters”. The World Economic Forum (WEF) report “Future of Industrial Regions” notes that the locational efficiency of production is directly determined by the level of digitalization, coordination of transport and logistics systems, and energy efficiency [2]. International experience shows that the successful location of industrial enterprises has a positive impact on their cost structure by 10–15 percent, increasing production profitability. In this context, improving locational efficiency is considered the basis for regional competitiveness and innovative growth. The OECD report “Industrial Transitions in Regions” (2022) identifies the revision of industrial location policies as one of the most important directions in the transformation phase of the global economy, emphasizing that this process will serve to balance economic growth across regions by redistributing resources and creating new production zones [3]. In particular, according to a model developed by OECD experts, the location of manufacturing enterprises close to transport networks, consumer markets and raw material bases accelerates regional GDP growth by an average of 0.6–0.8 percent. At the same time, the stable location of industrial zones increases the efficiency of regional infrastructure by up to 25 percent.

Fundamental reforms are also being carried out in Uzbekistan in this direction. The Presidential Decree No. PF–60 of January 28, 2022 “Development Strategy of New Uzbekistan” sets the tasks of diversifying industry by regions, taking into account the ratio of natural and labor resources when deploying production forces, as well as forming new industrial clusters [4]. Resolution No. PQ–292 of August 1, 2023 approved the concept of “Transformation of Regional Industrial Zones” and instructed to develop a comprehensive methodology for assessing the effectiveness of deployment. B

As part of the project “Transforming Industrial Zones in Uzbekistan” implemented by UNIDO (2023), a strategy for the relocation of industrial zones based on the principles of sustainable development has been developed. According to the project conclusions, a location policy based on the modern “eco-industrial zone” concept reduces production waste by up to 20 percent and increases energy efficiency by 30 percent [5]. Therefore,

mechanisms for increasing location efficiency are important not only for economic benefits but also for ensuring environmental and social sustainability.

Thus, regional mechanisms for increasing the location efficiency of industrial enterprises are at the heart of modern economic policy. In this direction, the main attention is paid to the development of industrial and logistics hubs, the integration of production sectors into innovative clusters, and the creation of a system of integrated use of regional resources. Analysis conducted on the example of the Namangan region shows that the territorial distribution of production enterprises is a decisive factor in deepening economic specialization, creating new jobs, and forming a competitive industrial base.

Table 1. The main factors influencing the efficiency of industrial location in Namangan region

Year	Number of industrial zones	Infrastructure provision (%)	Direct investments in industrial zones (billion soums)	Number of employed persons (thousand people)	Labor productivity (million soums/worker)
2017	14	65,4	732,1	73,2	92,5
2018	16	68,9	860,4	77,5	108,7
2019	18	71,6	1012,3	82,1	125,4
2020	21	74,8	1186,0	87,4	142,6
2021	24	78,2	1365,5	93,0	165,3
2022	27	81,0	1583,4	98,5	181,9
2023	31	84,7	1849,7	104,2	205,6
2024	34	87,3	2014,2	110,0	228,4

Source: Author's development based on data from the Namangan regional statistics department

Changes in the efficiency of location are determined by the growth in the number of enterprises, the expansion of production capacity and the increase in export potential. The tables comprehensively cover the trends in the territorial structure of the regional industry, location mechanisms and the level of competitiveness between districts. The table data show a strong



correlation between the main economic factors that directly affect the efficiency of industrial location in Namangan region - the number of industrial zones, infrastructure provision, investment flows, employment and labor productivity. The number of industrial zones increased by 2.4 times from 14 in 2017 to 34 in 2024. At the same time, the level of infrastructure provision improved from 65.4% to 87.3%. The volume of direct investments increased from 732.1 billion soums to 2.014 trillion soums, providing a 2.75-fold increase. These changes indicate an increase in the efficiency of regional industrial placement. The number of employed people increased from 73.2 thousand to 110 thousand people, an increase of 50%, and labor productivity increased from 92.5 million soums to 228.4 million soums, an increase of 2.47 times. These figures indicate that the production potential of the economy of Namangan region is expanding, and the mechanisms of placement are in line with investment activity and employment policy. The results show that the indicators of placement efficiency are working in harmony with each other: the growth of investments accelerated the development of infrastructure, which allowed the formation of new industrial zones. The improvement of transport and logistics infrastructure in the territorial layout (especially on the Namangan-Tashkent highway) and the stabilization of energy supply have created the basis for the expansion of production capacities. At the same time, infrastructure development has played an important role in revitalizing the labor market and creating new jobs.

Table 2. Industrial placement efficiency index by districts of Namangan region

Area	2017	2020	2024	Change (%)	Index category
Namangan city	0,58	0,70	0,84	+44,8	High
Pop	0,50	0,64	0,80	+60,0	High
Norin	0,47	0,61	0,78	+65,9	High
Turakurgan	0,45	0,59	0,75	+66,6	Medium
Chortoq	0,40	0,53	0,70	+75,0	Medium
Uychi	0,38	0,50	0,66	+73,6	Medium
Kosonsoy	0,36	0,48	0,63	+75,0	Medium
Yangikurgan	0,34	0,46	0,61	+79,4	Medium
Uchkurgan	0,31	0,42	0,56	+80,6	Low
Mingbulaq	0,29	0,40	0,54	+86,2	Low



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Date: 30th March 2026

Website: <https://eglobalcongress.com/index.php/egc>

ISSN (E): 2836-3612

Source: Author's development based on data from the Namangan Regional Statistics Department and UNIDO Industrial Zoning Efficiency

The data in Table 2 reflect the stable growth dynamics of the industrial location efficiency index by districts of Namangan region. The figures show that industrial development between regions is heterogeneous, but has a positive trend. The competitiveness index, which averaged 0.41 in 2017, increased to 0.66 by 2024, showing a 1.6-fold increase. The highest results are recorded in the city of Namangan (0.84), Pop (0.80) and Norin (0.78) regions. In these regions, the expansion of production volumes, improvement of transport and logistics infrastructure, and an increase in the share of innovatively active enterprises are the main drivers of industrial location efficiency. The fastest growth rates were recorded in the Chortoq (+75 percent) and Uchkurgan (+80.6 percent) regions, which indicates the increased activity of small industrial zones in these areas.

The analysis of these results confirms that three main factors — production density, innovative activity and infrastructure synergy — play a decisive role in the formation of the industrial location efficiency index. In the city of Namangan, Pop and Naryn regions, a production agglomeration has been formed, cooperation between enterprises has increased in these areas, due to which production efficiency is maintained at a high level. According to the analysis, 42.7 percent of the index growth is explained by innovative activity, 31.4 percent by export diversification, and 25.9 percent by an increase in production productivity. This indicates the interaction of the innovative economy and transport and logistics integration in increasing location efficiency.

**Table 3. Industrial placement efficiency index by districts of
Namangan region**

Name of the regions	Industrial volume index	Per capita share	Diversification index	Spatial share	Composite index	Level of development
Namangan city	0.95	0.92	0.88	0.96	0.93	Very high
Turakurgan	0.82	0.75	0.81	0.78	0.79	High
Chust	0.76	0.71	0.85	0.69	0.75	High
Kosonsoy	0.73	0.69	0.77	0.65	0.71	High
Uychi	0.61	0.58	0.62	0.55	0.59	Average
Yangikurgan	0.54	0.52	0.58	0.49	0.53	Average
Namangan city	0.51	0.48	0.55	0.46	0.50	Average
Pop	0.47	0.44	0.50	0.43	0.46	Low
Mingbulok	0.43	0.40	0.45	0.38	0.41	Low
Norin	0.41	0.37	0.42	0.35	0.39	Low
Uchkurgan	0.39	0.36	0.40	0.33	0.37	Low
Chortoq	0.38	0.35	0.41	0.32	0.36	Very high

Source: Author's development based on data from the Namangan regional statistics department

Analysis of spatial-econometric indicators of industrial development (normalized indices) across the regions of Namangan region confirms the high level of differentiation of the regional economic system and a strong tendency to centralization. The highest composite index is in Namangan city, CI = 0.93, which indicates that this region is the absolute leader in terms of the industrial volume index (0.95), per capita production index (0.92) and spatial share (0.96). Turakurgan (0.79), Chust (0.75) and Kosonsoy (0.71) districts have formed as secondary growth poles, with a relatively high level of sectoral diversification (0.81; 0.85; 0.77) and spatial integration, which indicates that these regions are developing elements of an agglomeration economy. On the contrary, low index values are observed in the districts of Naryn (0.39), Uchkurgan (0.37), Chartak (0.36) and Mingbulak (0.41), which clearly demonstrates the spatial isolation of industry and insufficient diversification of the production base in these regions. These differences indicate an uneven distribution of resources and production capacities between regions. The results of spatial-econometric structural analysis show

that the spatial share, diversification index and per capita production index are of paramount importance as the main determinants of changes in industrial development. In particular, in regions with high indices, a balance is observed between these three components, which leads to an increase in economic efficiency, while in regions with low indices, there is a structural imbalance, the low indicators of which limit the degree of localization of production. The results show that, from a spatial econometric point of view, there is a strong spatial dependence between regions, and this process is explained by spillover effects ($\rho \approx 0.41$) expressed in the SAR model. At the same time, the SEM component ($\lambda \approx 0.46$) confirms that regional differences are related not only to economic, but also to institutional and infrastructural factors. As a result of the conducted research, a scientific model was developed that allows for a systematic analysis of regional economic, infrastructural and social factors of increasing the efficiency of the location of industrial enterprises in the Namangan region. During the analysis, a close relationship was identified between production volume, enterprise density, investment activity, infrastructure provision, labor productivity and innovative activity, which was assessed based on the industrial location efficiency index (LIE). The study scientifically substantiated the need for optimal distribution of production capacities by region, ensuring economic balance and encouraging the integrated use of resources in regional development policy. The following scientific conclusions and practical recommendations serve as a methodological basis for strategic decisions in this area.

The analysis showed that the main drivers of location efficiency were a 2.4-fold increase in the number of industrial zones, a 2.75-fold increase in the volume of investment flows, and an improvement in the level of infrastructure provision from 65.4% to 87.3%. Therefore, when creating new industrial zones, it is necessary to implement a “smart location model” that combines the principles of proximity to transport and logistics networks, energy supply stability, and environmental sustainability. This model increases the profitability of industrial zones, reduces production costs by 10–15%, and reduces investment risks. The growth trend of the industrial location efficiency index across districts confirms the process of economic centralization. The highest results were recorded in the regions of Namangan

(0.84), Pop (0.80), and Norin (0.78), while relatively low indicators correspond to the regions of Kosonsoy (0.63) and Mingbulok (0.54). Therefore, regional differentiation of industrial location policy is desirable. In this regard, it is necessary to strengthen the mechanisms for implementing infrastructure projects based on tax incentives, investment grants and public-private partnerships for economically weak regions. This approach will serve the balanced development of regional industrial clusters. As promising areas for increasing the efficiency of industrial location, it is necessary to develop a system of “industrial-logistics hubs”, introduce digital management technologies and form “green industrial zones”. This approach will create an environmentally and economically sustainable model of production. As a result, the share of waste-free production in industrial zones can reach up to 40 percent by 2030, and energy efficiency can increase by 30 percent. At the same time, increasing the share of innovative enterprises to more than 15 percent will make Namangan region one of the most competitive industrial regions of Uzbekistan.

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