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AN INTEGRATED APPROACH TO ENSURING THE EFFICIENCY OF PLACEMENT AND MANAGEMENT OF SMALL INDUSTRIAL ZONES (A CASE STUDY OF THE KHOREZM REGION)

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Abstract:

This article examines the issues of improving the efficiency of placement and management of small industrial zones using the Khorezm region as a case study. The research analyzes the key factors affecting the performance of small industrial zones, including territorial economic potential, local resources, market infrastructure, and the institutional environment, based on an integrated approach. An integrated model for assessing the efficiency of placement and operation of small industrial zones is developed, with weighting coefficients determined through expert evaluation methods. In addition, mechanisms for digitalizing the selection of investment projects and the allocation of production areas and land plots are proposed. The research findings contribute to increasing the transparency of managerial decision-making, reducing the impact of the human factor, and accelerating regional socio-economic development.

Keywords: small industrial zones, integrated approach, territorial economic potential, infrastructure, institutional environment, management efficiency.

INTRODUCTION

In recent years, small industrial zones (hereinafter referred to as SIZs) have emerged as an important institution of regional economic development, playing a significant role in supporting entrepreneurship, creating new jobs, and expanding production capacity. Practical experience shows that insufficient consideration of regional potential during the placement and establishment of SIZs, a low level of infrastructure readiness, and the high influence of the human factor in managerial decision-making lead to a decline in their operational efficiency.

In his annual Address to the Oliy Majlis and the people of Uzbekistan, the President of the Republic of Uzbekistan, Sh. Mirziyoyev, emphasized that in order to further enhance industrial capacity in 84 districts and cities, 100 technoparks, small industrial zones, territorial clusters, and logistics centers will be established, and that 1.6 trillion soums will be allocated to provide free economic zones and small industrial zones with the necessary infrastructure. He also underlined the crucial role of free economic zones and small industrial zones in the further development of the national economy[1].

In particular, a number of problems persist, including the predominance of subjective approaches in the selection of investment projects and the allocation of production sites and land plots, as well as the lack of open and transparent decision-making mechanisms in cases where only a single applicant participates in repeated selection processes. Consequently, there is a growing need to develop scientifically grounded, integrated, and digitalized approaches to enhance the efficiency of SIZ placement and management.

The purpose of this article is to develop an integrated assessment model aimed at improving the efficiency of the placement and establishment of small industrial zones, to enhance the processes of investment project selection and land allocation through digitalization, and to substantiate forecast indicators for the development of small industrial zones in the Khorezm region up to 2030.

Foreign and domestic academic studies have examined the development of industrial zones in close connection with regional economics, the institutional environment, and infrastructure development. International experience

[1]Addresses of the President of the Republic of Uzbekistan to the Oliy Majlis and the People of Uzbekistan https://www.president.uz/uz/lists/viyew/5774, president.uz/uz/lists/viyew/2221

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emphasizes that the success of industrial zones primarily depends on regional economic potential, market infrastructure, institutional stability, and government support mechanisms.

Domestic studies, in turn, identify the improvement of the regulatory and legal framework, the enhancement of the investment climate, and the level of infrastructure provision as key factors in the management of small industrial zones. At the same time, most existing works are predominantly descriptive in nature, and integrated models aimed at comprehensive and quantitative assessment of the efficiency of SIZ placement and management remain insufficiently developed.

This article seeks to address this research gap by providing an integrated assessment of the key factors influencing the efficiency of small industrial zones and by demonstrating the potential to limit the human factor through the digitalization of managerial decision-making processes.

METHODOLOGY.

During the research process, methods of economic and statistical analysis, expert assessment, normalization, and integration were applied. In assessing the efficiency of small industrial zones (SIZs), the following key factors were selected: regional economic potential (REP), local resources (LR), market infrastructure (MI), and the institutional environment (IE).

Based on the expert assessment method, a survey was conducted involving 29 business entities operating in the Khorezm region. The impact of each factor on SIZ efficiency was evaluated on a 10-point scale. In addition, a correlation analysis was carried out across 22 SIZs operating in the Khorezm region (Table 1). On the basis of the identified relationships between the factors and the integrated efficiency indicators, weighting coefficients were determined and an integrated assessment model was developed:

$I_{SIZ} = 0.35 \times REP + 0.23 \times LR + 0.17 \times MI + 0.25 \times IE$

where:

I_{SIZ} — integrated indicator of the efficiency of establishment and management of SIZs;

REP — regional economic potential (based on labor market conditions, logistics, and proximity to markets for SIZs located in regional centers, such as Urgench city);

LR — potential of local resources (total land area, usable land area suitable for project placement, and available vacant land area (ha));

MI — level of market infrastructure development (electric power, natural gas, drinking water, wastewater systems, and road conditions, assessed as not provided, partially provided, fully provided, or not required);

IE — stability of the institutional environment (organizational framework, availability of a master plan, and the share of inefficient SIZs).

The results of the integrated assessment are explained by the level of economic activity in the region, the investment climate, and the stability of the management system.

Table 1

Results of the Integrated Assessment of the Efficiency of Placement and Establishment of Small Industrial Zones in the Khorezm Region[2]

№	Name of the SIZ	REP	LR	MI	IE	Integrated index (I_{SIZ})
1	"Avtokhizmat" SIZ (Urgench City)	1	0,42	1	1	**0,87**
2	"Urganchtransgaz" SIZ (Urgench City)	1	0,55	1	1	**0,89**
3	"Pivo Zavodi" SIZ (Urgench District)	0,85	0,63	1	1	**0,86**
4	"Pitnak QUSH" SIZ (Tuproqqal'a District)	0,8	0,48	0,95	1	0,82
5	"Shovot Podshipnik" SIZ (Shovot District)	0,8	0,46	1	1	0,83
6	"ZAUNGUR" SIZ (Khiva District)	0,8	0,71	1	1	**0,88**
7	"Arablar" SIZ (Qo'shko'pir District)	0,8	0,69	1	1	**0,87**
8	"Do'stlik" SIZ (Yangiariq District)	0,8	0,52	1	1	0,84

[2]Compiled by the author based on data from the Ministry of Investments, Industry and Trade of the Republic of Uzbekistan. https://www.mift.uz/stat.php.

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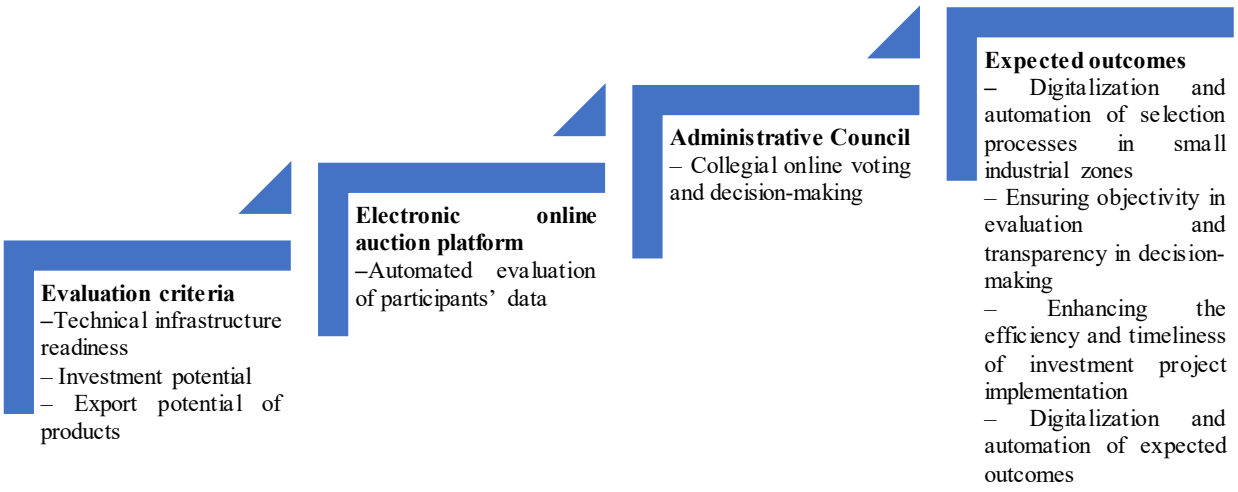
9	"Qiyot" SIZ (Shovot District)	0,8	0,41	1	1	0,82
10	"Mangitlar" SIZ (Yangibozor District)	0,8	0,3	1	1	0,79
11	"Pichoqchi" SIZ (Hazorasp District)	0,8	0,65	1	1	**0,86**
12	"Gulshan-2" SIZ (Khiva City)	0,9	0,58	1	1	**0,87**
13	"Gurlan" SIZ (Gurlan District)	0,8	0,74	1	1	**0,88**
14	"Gulshan" SIZ (Bog'ot District)	0,8	0,49	0,7	1	0,77
15	"Aloqaliko'l" SIZ (Hazorasp District)	0,8	0,82	1	1	**0,9**
16	"Yovg'ir" SIZ (Qo'shko'pir District)	0,8	0,57	1	1	0,85
17	"Khazorasp Don" SIZ (Hazorasp District)	0,8	0,28	0,65	1	0,72
18	"Yuqori Boshqir" SIZ (Yangibozor District)	0,8	0,34	0,75	1	0,75
19	"Mebelsozlik" SIZ (Khonqa District)	0,8	0,79	0,85	1	**0,87**
20	"Obod Qurilish" SIZ (Tuproqqal'a District)	0,8	0,6	0,7	1	0,79
21	"Farmsanoat" SIZ (Urgench City)	1	0,38	0,2	1	0,66
22	"Charm Sanoat" SIZ (Hazorasp District)	0,8	0,45	0,15	1	**0,62**

Note: The integrated index is calculated within the range of 0–1, where an increase in the value indicates a higher level of efficiency in the placement and establishment of the small industrial zone.

Table 1 below presents the integrated efficiency indicators of 22 SIZs operating in the Khorezm region. The table shows that SIZs located in Urgench city and nearby areas demonstrate higher values of the integrated index. In particular, the "Urganchtransgaz", "Aloqaliko'l", "Zaungur", "Gurlan" and "Mebelsozlik" SIZs exhibit high efficiency levels, which can be attributed to relatively well-developed infrastructure provision, effective use of land resources, and a more stable institutional environment.

At the same time, SIZs such as "Farmsanoat," "Charm sanoat," and "Xazorasp Don" show lower integrated index values. This is mainly associated with insufficient infrastructure provision and a low level of efficient utilization of local resources in these zones. According to the integrated assessment, the majority of SIZs in the Khorezm region fall into the medium and high efficiency categories.

Figure 1. Evaluation system based on sectoral specialization and regional resource potential under the proposed mechanism



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In addition, for cases in which a single applicant participates in a repeated selection process within small industrial zones, a comprehensive assessment of the investment application based on sectoral specialization and regional resource potential criteria is substantiated. The full digitalization of the collegial decision-making process of the Administrative Council, together with its integration with the electronic online auction institution, provides a quantitative basis for reducing both the duration of project selection procedures ($30 \leq M_{LT} \leq 40\%$) and the influence of the human factor in land allocation processes ($T_{IO} \leq 60\%$).

For repeated selection procedures involving a single applicant, a digitalized comprehensive assessment and decision-making model for SIZs is proposed. Within this model, investment applications are submitted via an electronic platform, and projects are automatically evaluated according to sectoral specialization and regional resource potential criteria. The resulting integrated index is then presented to members of the Administrative Council in electronic form.

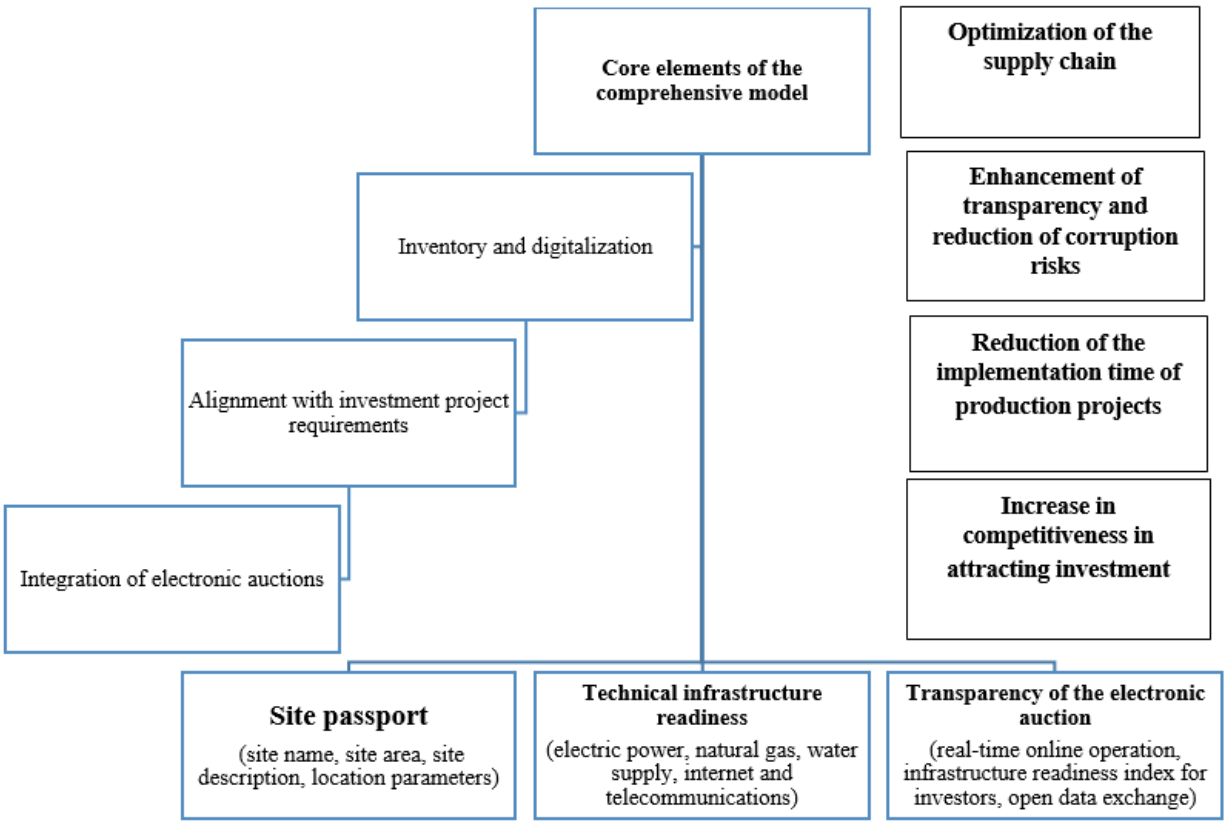
The decision-making process of the Administrative Council is carried out through an electronic collegial voting mechanism, with each decision formalized by a digital protocol. Integration of this mechanism with the electronic online auction institution ensures transparency and accountability throughout the decision-making process.

As a result of the proposed management model, it becomes possible to reduce the duration of investment project selection by 30–40% and to limit the influence of the human factor in the allocation of land plots and production areas to a level not exceeding 60%.

From a management perspective, integrating these processes within a comprehensive model can significantly enhance overall management efficiency.

The implementation of a comprehensive model that integrates site allocation in SIZs with technical infrastructure readiness and the transparency of electronic auctions improves the investment climate, increases management efficiency, ensures transparency and accountability, shortens the implementation period of production projects, and contributes to regional economic growth.

Figure 2. Comprehensive model for integrating technical infrastructure and the electronic auction system in small industrial zones



As shown in Table 2 below, prior to digitalization the process of reviewing investment projects took 50–65 days. Under the proposed digital model, due to the automation of document circulation, evaluation, and decision-making stages, the total duration can be reduced to 30–40 days. On this basis, it becomes possible to maintain the reduction

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rate of the selection period within the range of 30–40% ($30 \leq M_{LT} \leq 40\%$).

Table 2
Comparative analysis of investment project review processes in repeated selection procedures before and after digitalization[3]

№	Process stages	Current practice (days)	Proposed model (days)	Reduction rate (%)
1	Document submission and registration	8–10	2–3	65–70
2	Verification by sectoral specialization	10–12	5–6	45–50
3	Assessment of compatibility with regional resources	10–15	5–6	50–60
4	Administrative Council deliberation	12–15	8–9	30–35
5	Formalization of the decision	5–8	3–4	40–45
Total		**50–65**	**30–40**	**30–40**

As shown in Table 3 below, 50% of the investment project evaluation process corresponds to automated stages, while the collegial deliberation and voting of the Administrative Council are carried out with human participation, accounting for 60% of the overall process. For this reason, the influence of the human factor in the lot allocation process is limited to a level not exceeding 60% ($T_{IO} \leq 60\%$).

Table 3
Structural analysis of the human factor influence in the allocation of lots and production areas[4]

№	Decision-making stages	Responsible entity	Level of influence (%)
1	Technical and economic assessment	Automated algorithm	25
2	Ranking by sectoral specialization	Automated system	15
3	Calculation of the composite index	Automated system	10
4	Administrative Council deliberation	Human (collegial)	30
5	Final decision-making	Human (voting)	30
Total			**100**

The development prospects of small industrial zones (SIZs) up to 2030 were assessed on the basis of scenario-based forecasting. In the forecasting process, key factors such as regional economic potential, infrastructure development, investment activity, and the stability of the institutional environment were taken into account in an integrated manner.

Based on an analysis of the performance of SIZs in the Khorezm region and the dynamics of key indicators for the period 2022–2024, a forward-looking forecast up to 2030 was developed. The forecasting process was carried out using scientifically grounded statistical analysis methods, including trend regression, extrapolation, and economic scenario approaches.

The results of the analysis indicate that over the next five years a steady increase in the number of SIZs is expected, along with improvements in the efficiency of land use, growth in investment volumes, and overall performance. In particular, the number of zones is projected to reach 23 in 2026 and increase to 27 by 2030. The total land area is expected to amount to 102.5 hectares in 2026 and expand to 117 hectares by 2030.

According to the forecast, the number of projects will reach 170 in 2026 and increase to 250 by 2030. At the same time, investment volumes are projected to amount to 500 billion soums in 2026 and to grow gradually to 800 billion soums by 2030. Production output is expected to increase correspondingly from 300 billion soums to 500 billion soums.

Table 4
Forecast indicators developed up to 2030

Years	Number of SIZs	Land area (ha)	Number of projects	Investment (billion sum)	Production output (billion sum)	Export (mln doll.$)	Employment
2026	23	102,5	170	500	300	0,60	600

[3]Source: compiled by the author.
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2027	24	106,0	190	580	350	0,75	700
2028	25	110,0	210	650	400	0,90	800
2029	26	113,5	230	720	450	1,05	900
2030	27	117,0	250	800	500	1,20	1000

In addition, export potential is expected to improve, increasing from USD 0.6 million in 2026 to USD 1.2 million by 2030. The number of new jobs created by small industrial zones is projected to rise from 600 in 2026 to 1,000 by 2030.

CONCLUSION

Overall, the application of an integrated assessment model to enhance the efficiency of managing the placement and establishment of small industrial zones (SIZs) has been scientifically substantiated. The model was refined by determining the relative influence of key factors—regional economic potential (REP = 0.35), local resources (LR = 0.23), market infrastructure (MI = 0.17), and the institutional environment (IE = 0.25). The analysis demonstrates that regional economic potential and the institutional environment are the primary determinants of SIZ efficiency, enabling the scientific identification of regional priorities in the placement of new industrial zones.

The study proposes a mechanism based on an electronic auction platform to assess the compatibility of investment projects with existing technical infrastructure in the allocation of production sites and land plots within SIZs. This approach allows infrastructure-ready sites to be prioritized for investors, reduces additional infrastructure costs, and shortens project launch timelines. As a result, the share of subjective decision-making in the allocation of land and production areas is shown to decrease significantly.

In addition, for cases where a single applicant participates in repeated selection procedures within SIZs, a comprehensive model was developed that evaluates investment applications based on sectoral specialization and regional resource potential, while fully digitalizing the decision-making process of the Administrative Council. Integration of this model with the electronic online auction institution enables a reduction in project selection timelines by 30–40% ($30 \leq M_{LT} \leq 40\%$) and limits the influence of the human factor in site allocation to no more than 60% ($T_{IO} \leq 60\%$).

Within the framework of the study, scenario-based forecasting and a comprehensive model grounded in sectoral specialization were employed to develop development projections for small industrial zones in the Khorezm region up to 2030. According to the forecasts, investment volumes are expected to increase from 500 billion soums to 800 billion soums, export volumes from USD 0.6 million to USD 1.2 million, and the number of newly created jobs from 600 to 1,000. These results confirm the high practical effectiveness of the proposed integrated approach in transforming small industrial zones into a key driver of regional economic development and ensuring their long-term sustainable growth.

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