**Increasing economic efficiency at enterprises producing electrical and household appliances in the Republic of Uzbekistan**

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**Abstract.** The article analyzes ways to increase the economic efficiency of Uzbekistan’s electrical and household appliance industry. Based on theoretical approaches, international experience, and national context, practical recommendations on clustering, modernization, human capital development, and export promotion have been developed.

**INTRODUCTION**

In recent years, the Republic of Uzbekistan has been implementing large-scale economic reforms aimed at deep industrial modernization, localization of value-added chains, and the development of competitive national manufacturing. Within this context, the electrical and household appliance industry—including the production of electric stoves, refrigerators, washing machines, air conditioners, and other types of household electrical and electronic equipment—is emerging as one of the strategic sectors of the national economy.

The efficient operation of enterprises in this industry not only expands opportunities for import substitution in the domestic market, but also contributes to overall macroeconomic stability by increasing exports of competitive products to foreign markets (Porter, 1990).

By the end of 2024, the total volume of industrial production in Uzbekistan reached 885.8 trillion soums, reflecting a 6.8 percent increase compared to 2023 (UzStat, 2025). This trend further intensifies the demand for sustainable growth across industrial sectors, particularly in the segment of electrical engineering products. In the “Uzbekistan–2030” Strategy adopted by the government, doubling production volumes in the electrical engineering sector and tripling exports have been identified as priority objectives (Presidential Decree, 2023).

At the same time, a number of pressing challenges are shaping the sector’s development agenda, including intensified competition in the domestic market, the gradual reduction of imports, the need to ensure an optimal balance between quality and price, the digitalization of supply chains, and the transition to energy-efficient technologies. Under such conditions, ensuring the economic efficiency of enterprises producing electrical and household appliances is directly linked to the rational use of internal resources, the improvement of strategic management decision-making, and the introduction of effective mechanisms for technology utilization.

**LITERATURE REVIEW**

Economic efficiency is a complex economic category that is widely regarded in international academic literature as a decisive factor in the strategic development of economic systems, the rational use of resources, and the achievement of competitiveness. It is analyzed not only through quantitative calculations and financial outcomes, but also on the basis of methodological and conceptual criteria.

First, Rusyn (2024) interprets economic efficiency from ontological and epistemological perspectives, emphasizing its close connection with philosophical concepts such as existence, essence, time, and movement. According to the author, efficiency represents not merely an outcome, but also a methodological foundation for decision-making. From this standpoint, integrating efficiency into systemic and strategic management models is essential.

Shodmonovna et al. (2021) define economic efficiency as a core objective of enterprise activity. The authors assess it through the ratio of resource costs to results, while placing particular emphasis on the interaction between economic and social factors. This approach allows for a comprehensive understanding of efficiency in the context of enterprises producing electrical and household appliances.

A more refined analytical classification is provided by the *Encyclopedia of Public Administration* (2020), which conceptualizes economic efficiency in technical, allocative, and dynamic dimensions. This classification may serve as a methodological basis for analyzing various functions and stages of production in the electrical and household appliance industry.

Famulski (2017) considers economic efficiency as a legal category. He argues that maintaining a balance between efficiency and fairness within legal frameworks is essential, as both are key values in the evaluation of public and economic decisions. This approach is particularly relevant for analyzing regulatory mechanisms affecting the operations of electrical engineering enterprises.

Taking sector-specific characteristics into account, Chetroiu and Călin (2013) measure economic efficiency in agriculture through the ratio of costs to output volumes. In this model, optimal resource utilization and the achievement of maximum results with minimal costs are identified as primary objectives. This theoretical foundation can also be applied to the electrical and household appliance industry when organizing efficient production processes.

Costea (2012) places particular emphasis on the economic efficiency of investments, highlighting their role in stimulating scientific and technological progress and regarding them as a driving force of economic growth. Given the high capital intensity and continuous technological upgrading in the electrical and household appliance manufacturing sector, the assessment of investment efficiency becomes a critical issue.

Finally, Krakhina (2024) examines economic efficiency from a systemic perspective, emphasizing the need to consider its quantitative and qualitative dimensions, the time factor, and resource constraints. According to the author, an objective and in-depth assessment of efficiency should be based not solely on individual indicators, but on comprehensive and integrated analysis.

Based on the reviewed studies, the concept of “economic efficiency” is interpreted from multiple perspectives; however, the common understanding is that it reflects the performance outcomes of enterprise activity and the degree of rational resource utilization. Accurate assessment of efficiency requires consideration not only of financial indicators, but also of qualitative factors, time, and resource limitations. This necessitates a complex, multidimensional analytical approach to enterprise performance. Consequently, identifying and analyzing the key factors influencing economic efficiency in electrical and household appliance manufacturing enterprises is of significant importance.

**ANALYSIS AND DISCUSSION OF RESULTS**

The conducted theoretical analysis and review of international experience confirm that achieving high performance in this sector cannot be limited to one-dimensional reforms, but instead requires a multifactorial and integrated approach. Today, economic efficiency is assessed not only through financial indicators, but also through the combined and interrelated effects of technological advancement, human capital capacity, market conditions, and institutional frameworks. In the course of the analysis, theoretical approaches were compared with practical developments, resulting in context-specific conclusions tailored to the conditions of Uzbekistan.

By the end of 2024, the domestic market for household electrical appliances in Uzbekistan reached a volume of USD 1.5 billion, representing a 9.4 percent increase compared to 2023. At the same time, over the past four years, export volumes in the sector rose from USD 437 million to USD 1.5 billion, reflecting a 3.5-fold increase. However, imports under the HS-85 commodity group amounted to USD 1.58 billion, indicating that at least half of domestic demand is still met by foreign products. In terms of production dynamics, in 2024 the country manufactured 1.2 million refrigerators, 0.9 million washing machines, and 0.45 million air conditioners, recording growth rates in the range of 7–11 percent. Localization levels also demonstrate positive trends; for example, in the case of Artel, localization reached 55 percent for refrigerators and 48 percent for washing machines (IndexBox, 2025).

At the same time, significant challenges persist in the area of energy efficiency, which is strategically important for the sector. According to data from the International Energy Agency, in 2023 Uzbekistan’s industrial energy intensity stood at 1.11 megajoules per 2015 USD (PPP). Despite an annual reduction of around 2 percent, this indicator remains substantially higher than in developed economies. Consequently, in order to strengthen import substitution, enhance export potential, and achieve a sustainable foreign trade balance, technological upgrading, deeper localization, and the effective adoption of energy-saving solutions have become pressing priorities.

Global experience offers a wide range of practical policy directions for ensuring efficiency in the electrical and household appliance industry. Evidence from developing economies shows that export-oriented strategies, technological modernization, incentives for localization, and workforce development serve as the core foundations of successful growth.

In South Korea, the export-oriented industrial development policy adopted in the 1970s led to the formation of the Gumi electronics cluster. Through state financial support and the active involvement of the private sector in research and development, companies such as Samsung and LG achieved leading positions in global markets. In this process, a strong emphasis on industrial digitalization and “green” technologies enabled these firms to gain sustainable competitive advantages.

In Turkey, the Organized Industrial Zone (OIZ) model facilitated infrastructure centralization, favorable energy and tax conditions, and the utilization of cluster effects, enabling household appliance manufacturers to export millions of products to European markets. The government has allocated substantial financial resources over the next five years to support the development of digital industry. Similarly, in Vietnam, state-provided tax incentives and the establishment of workforce training centers successfully attracted investment from multinational corporations. Cooperation between education and industry resulted in an effective system for training skilled specialists.

In India, the “Make in India” and Production-Linked Incentive (PLI) programs have focused on stimulating domestic manufacturing and enhancing international competitiveness, leading to a significant increase in localization levels. In Malaysia, the Penang Free Industrial Zone has evolved into an innovation-driven manufacturing hub, with clusters based on advanced technologies. Cooperation between universities and manufacturers plays a critical role in ensuring quality and innovation in this ecosystem.

Overall, these cases demonstrate that ensuring economic efficiency depends on the alignment of export-oriented policies, technological modernization, the development of local human capital, and strong institutional support.

For Uzbekistan, one of the most pressing tasks is the establishment of technoparks based on the Organized Industrial Zone (OIZ) model. Such industrial zones integrate innovation centers—including research institutions, start-ups, and small technology firms—within a dedicated area, thereby enhancing cluster efficiency. They also support development and exports through specialized financial instruments (such as export credits and subsidies), international certification of local suppliers, workforce training via dual education and STEM programs, the introduction of energy-efficient technologies, and the strengthening of public–private partnership mechanisms. Through this comprehensive approach, the country can achieve long-term and sustainable economic efficiency.

More specifically, an OIZ represents a specially designated industrial area developed to promote manufacturing, equipped with ready infrastructure and a system of targeted incentives. Its primary objective is to concentrate manufacturing enterprises in one location, foster cooperation and cluster effects among them, and simplify business operations in order to enhance economic efficiency.

This raises an important question: do similar industrial zones already exist in Uzbekistan, and can free economic zones (FEZs) or small industrial zones (SIZs) be considered as fulfilling comparable functions?

While Uzbekistan’s existing FEZs and SIZs share certain similarities with the OIZ concept, the full OIZ model has not yet been comprehensively implemented. Indeed, free economic zones and small industrial zones are currently operating in Uzbekistan, with the primary objectives of attracting investment, increasing production volumes, and expanding the share of export-oriented products. In this respect, they follow a development trajectory comparable to Turkey’s OIZs. However, there are several important differences between Turkey’s OIZ model and Uzbekistan’s FEZs and SIZs, which are summarized in Table 1.

The table presented above systematically illustrates the key institutional and operational differences between Free Economic Zones (FEZs) in Uzbekistan and Organized Industrial Zones (OIZs) in Turkey. This comparison clearly highlights the objectives, governance structures, level of infrastructural readiness, capacity to support innovation, degree of clustering, and cooperation mechanisms inherent in each model.

In particular, Turkey’s OIZs are designed to promote industrial development based on clustering principles, with infrastructure, workforce training systems, and integration with educational and research institutions planned in advance. These zones are managed by independent governing bodies, and effective participation mechanisms based on public–private partnerships have been established. This approach enables not only the attraction of investment, but also the organization of export-oriented, high value-added production.

**TABLE 1. Comparative analysis of free economic zones (FEZ) in Uzbekistan and organized industrial zones (OIZ) in Turkey**

|  |  |  |
| --- | --- | --- |
| **Direction** | **OIZ (Turkey)** | **FEZ (Uzbekistan)** |
| **A specific goal** | | |
| Main goal | Development of industry on a cluster basis, export production | Attracting foreign and local investment, promoting exports |
| Sorting | Systematic, centralized management (more than 300 OIZs across the country) | Zones of different formats: SEZ, small industrial zones, business clusters |
| **Level of infrastructure and readiness** | | |
| Infrastructure | Fully provided from the beginning: electricity, water, sewerage, logistics | In many cases, infrastructure is incomplete or provided late. |
| Technopark and education | Integration with STEM centers and universities | It exists in some areas, but not systematically. |
| **Tax and other benefits** | | |
| Benefits | Tax incentives, energy prices, export subsidies | There are tax and duty benefits, but consistency and predictability are problematic |
| Energy and raw materials | Guaranteed supply based on government price | In most cases, disruptions in raw materials and energy are observed |
| **Clustering and cooperation** | | |
| Cluster model | Businesses in the same industry are located (e.g. electronics) | In many zones there is cross-industry interference, the cluster model is low |
| Cooperation | Scientific research, education, logistics, and exports will be carried out together | Each enterprise works separately, cooperation within the zone is weak |
| **Management and monitoring** | | |
| Management | Independent governing boards, with private sector participation | In most cases, it is managed through state organizations |
| Performance evaluation | SEZs provide a large share of national exports | Some of the FEZs are not fully operational, and there are also unused areas. |

In contrast, Uzbekistan’s FEZs and small industrial zones (SIZs) are currently focused primarily on attracting investors through the provision of incentives and land resources, while clustering and inter-firm cooperation remain underdeveloped. In many cases, infrastructure is either incomplete or developed with delays, and close collaboration with educational institutions and technoparks often remains at the level of isolated initiatives. This situation, in particular, constrains the full realization of innovative production potential and export capacity.

From this perspective, the structural approach, systematic planning, and clustering concept embodied in the OIZ model can serve as a guiding benchmark for Uzbekistan’s industrial zone policy. To this end, it is essential to ensure the planned development of infrastructure within zones, actively encourage cooperation among enterprises, and strengthen mechanisms linking industry with education and science.

**CONCLUSION AND RECOMMENDATIONS**

The electrical and household appliance industry in Uzbekistan is gradually developing as one of the priority sectors of the national economy. The theoretical analysis and review of international experience presented in this study demonstrate that improving sectoral efficiency cannot be achieved solely through technological upgrading or financial support. Rather, it requires a comprehensive approach that ensures the coordinated development of human capital, industrial clustering, infrastructure, and institutional mechanisms.

In recent years, Uzbekistan has taken positive steps toward expanding exports, increasing domestic production, and introducing energy-efficient solutions. At the same time, several systemic challenges remain unresolved, including low levels of energy efficiency, dependence on imported raw materials, disruptions in supply chains, and an insufficiently developed clustering environment.

Therefore, to ensure long-term sustainability and competitiveness of the sector, it is essential for Uzbekistan to refine and implement a national development model grounded in international best practices, supported by clearly defined objectives and practical instruments. In particular, leveraging the experience of countries such as Turkey—especially in terms of industrial clustering, integration with technoparks, and the use of public–private partnership mechanisms—offers significant potential to elevate domestic industry to a new stage of development.

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