

Article

The Performance of The Railway Transport Manufacturing Industry in Uzbekistan

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Abstract: Railway transport manufacturing is a strategic sector in Uzbekistan's economy, contributing to industrial growth and national connectivity. Despite modernization efforts, its GDP share remains low at 9.1%, trailing behind other transport modes, with limited integration into global supply chains. There is insufficient analysis of the sector's production capacity dynamics and its impact on industrial performance within the ongoing economic reforms. This study evaluates the production and economic performance of Uzbekistan's railway transport manufacturing industry, identifying constraints and opportunities to enhance its contribution to national development. Analysis of 2020–2025 official statistics reveals underutilized production capacity, outdated technology, and inconsistent capacity utilization across key enterprises, despite growth spurts in certain years. The manufacturing sector dominates industrial output, but railway manufacturing remains marginal. The research integrates sectoral performance metrics with policy-oriented recommendations, focusing on interregional integration, technological modernization, logistics optimization, skilled workforce development, localization, and energy efficiency. Addressing structural and operational gaps through coordinated reforms, targeted investments, and public–private partnerships could elevate railway manufacturing as a key driver of industrial diversification, reduce import dependency, and strengthen Uzbekistan's economic resilience.

Keywords: railway transport manufacturing, production capacity, industrial development, Uzbekistan, technological modernization, logistics optimization, localization, skilled workforce, energy efficiency, economic reforms.

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1. Introduction

In the context of deep economic reforms currently being implemented in Uzbekistan, the role of various modes of transport and the enterprises that service them is of paramount importance. These sectors occupy a leading position within both the production sphere and the social infrastructure of the country. Among them, railway transport stands out as a critical factor in the formation of state and regional structures and plays a decisive role in the development of both domestic and international market relations [1].

The primary objective of the transport system is to ensure the timely, high-quality, and uninterrupted satisfaction of the transport needs of the population and economic entities, while maintaining the overall efficiency and sustainability of the system. Transport is an indispensable and essential component of social life. As productive forces evolve and

societal structures transform, transport technologies are constantly updated and improved [2].

Being an integral part of the social and material production system, the transport sector ensures the movement of goods and passengers from one location to another. It also facilitates communication and exchange between regions and districts, enterprises, and sectors of the national economy. In terms of its functions, transport can be divided into industrial transport, which serves internal production needs, and public service transport, which is used for general services and connectivity within the country.

Literature Review

The issue of transport sector efficiency and production capacity has been widely studied by scholars across various countries. One of the key focuses in the international academic literature is the strategic use of resources to meet public and economic needs through effective transport infrastructure.

I.V. Solomnikov emphasizes the importance of utilizing transport resources efficiently to satisfy the growing needs of the population. According to his research, the optimal use of these resources directly influences the accessibility and quality of transport services provided to the public [3].

W. Rothengatter highlights the correlation between transport infrastructure and production capacity. His findings suggest that the degree of development and integration between these two sectors plays a crucial role in determining the overall growth of the industrial economy .

Y. Efremov explores the importance of optimal allocation of transport capacity. He argues that such allocation significantly contributes to resource-saving strategies within the transport sector, ultimately enhancing operational sustainability .

F. Rodrigue approaches the issue from a geographical perspective, noting that alignment between geographic infrastructure and production capacity increases transport efficiency. His studies show that spatial compatibility is a critical component for reducing logistical bottlenecks [4].

A. Chelintsev examines the specific role of locomotive depots in the broader context of production capacity. He concludes that the ability of these facilities to carry out technical maintenance and modernization is essential to the sustainability and operational readiness of the railway transport system .

R. Vickerman views transport capacity as a structural driver of regional growth. His research reveals that transport infrastructure not only supports existing economic activity but also catalyzes structural development by connecting remote regions to growth centers. O. Bortnik studies the dynamic management of railway capacity, suggesting that a flexible and responsive approach to capacity planning enables optimized train schedules and cost management. His work underlines the need for dynamic systems in improving both economic and technical performance in the railway sector [5].

Collectively, these studies highlight that transport production capacity is not only a technical measure but also a strategic component of economic planning. Effective capacity management, infrastructure alignment, and integration with industrial growth are seen as universal success factors across different countries.

2. Materials and Methods

In this study, a quantitative approach was employed to analyze the dynamics of the production capacity of the research object – “Uzbekistan Railways” JSC. The data sources included the official database of the State Committee of the Republic of Uzbekistan on Statistics (Stat.uz), the official statistical platforms of “Uzbekistan Railways,” as well as open data from railway transport manufacturing enterprises. The key indicators comprised the enterprise’s production capacity, the quantity and types of products manufactured, and changes in production volume (used as an indicator). The methods of analysis included descriptive statistics (growth rates), dynamic comparative analysis (covering the period from 2020 to 2025), and graphical analysis. The study relied primarily on secondary data obtained from open statistical databases and published international reports [6].

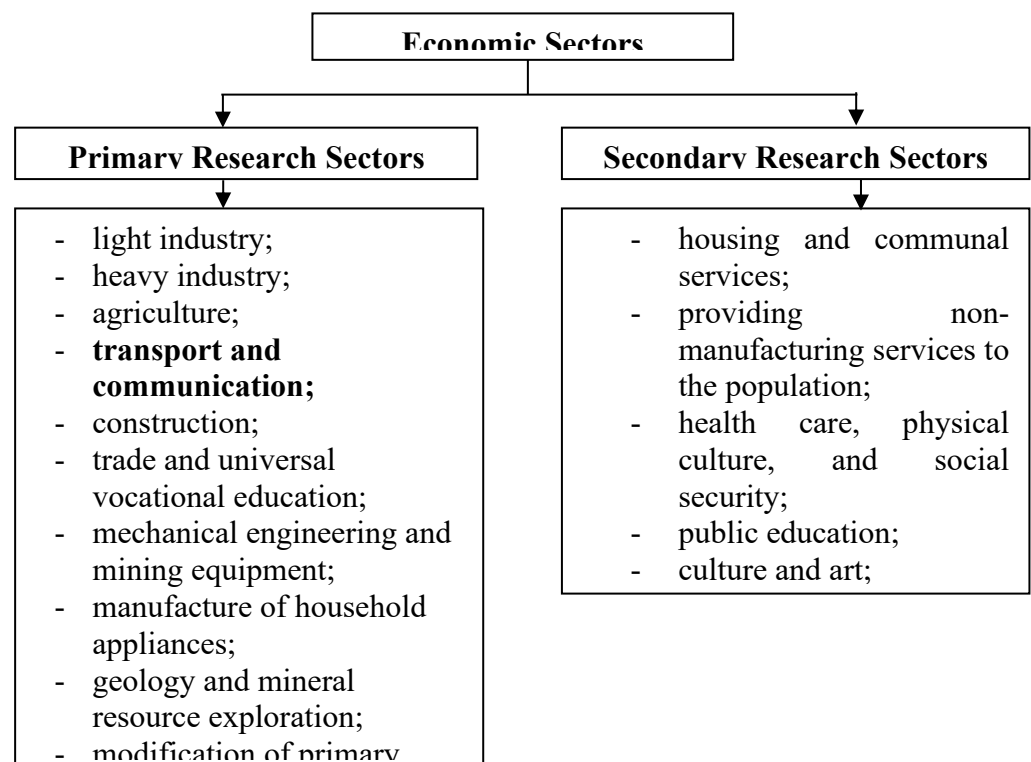
3. Results and Discussion

When considering the role of transport production activity in economic sectors, it functions both as an independent branch of the economy and as a material production sector that continues the process of creating commodity value within the sphere of circulation.

The theory of industrial organization offers significant opportunities for defining the structure and boundaries of the transport sector. According to this theory, the concept of industry unites enterprises that share similar production technologies. The notion of a sector is closely linked to the market and groups together organizations that produce substitutable products from the perspective of consumers. This theory places great importance on identifying the boundaries between sectors and markets [7].

Figure 1 illustrates the position of transport within the system of economic sectors, dividing them into Primary Research Sectors and Secondary Research Sectors. The Primary Research Sectors include industries directly involved in material production and infrastructure, such as light and heavy industry, agriculture, transport and communication, construction, trade and vocational education, mechanical engineering and mining equipment manufacturing, household appliance production, geology and mineral exploration, and the modification of primary research linked with industrial production. These sectors also cover production improvement activities, geology, geodesy, hydrometeorological services, and material production. The Secondary Research Sectors focus on non-manufacturing services, encompassing housing and communal services, public and social services, healthcare, physical culture, social security, public education, culture and arts, science and scientific services, finance, credit, insurance, pension provision, management, and social organizations. This classification highlights transport as a core element within primary sectors, emphasizing its vital role in economic and social development [8].

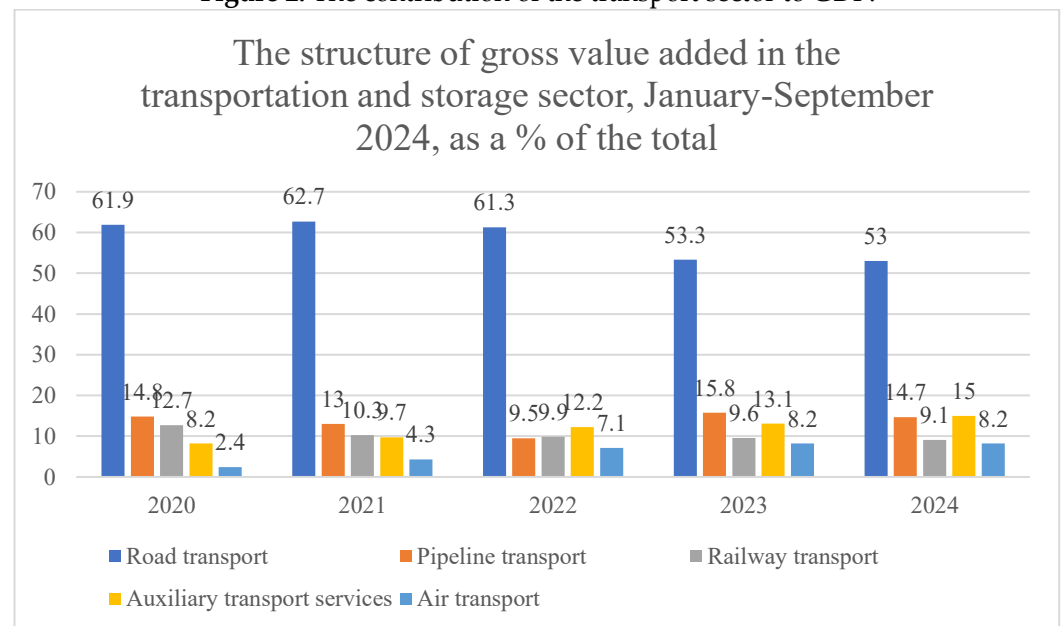
Figure 1. The position of transport within the system of economic sectors.



One of the key and integral components of the transport sector is the railway transport system. The railway transport system holds strategic importance within the national transport network and plays a vital role in the country's economy, logistics, and social integration. This mode of transport ensures efficiency, safety, and reliability in both freight and passenger transportation, while also contributing to the enhancement of the country's

international transit potential. Moreover, railway transport forms the core of the national transport sector and occupies a leading position within the unified transport system [9]. Figure 2 illustrates the contribution of the transport sector to GDP, showing the structure of gross value added in the transportation and storage sector for January–September of the years 2020 to 2024, expressed as a percentage of the total. The chart categorizes contributions by road transport, pipeline transport, railway transport, auxiliary transport services, and air transport. Across the observed period, road transport consistently holds the largest share, ranging from 53.0% to 62.7%, highlighting its dominant role in the sector. Pipeline transport maintains a steady contribution between 13.0% and 15.8%, while railway transport shows smaller shares between 8.2% and 12.2%. Auxiliary transport services contribute between 9.1% and 15.0%, and air transport remains the smallest contributor, ranging from 2.4% to 8.2%. In 2024, the sector's total share of GDP in Uzbekistan reached 5.3%, with road transport alone accounting for more than half of the gross value added, emphasizing its strategic importance in the national economy [10].

Figure 2. The contribution of the transport sector to GDP.



According to the results of January to September 2024, the share of the transportation and storage sector in the gross domestic product (GDP) of the Republic of Uzbekistan amounted to 5.3%. Within the structure of the gross value added of this sector, the largest portion was attributed to road transport, which accounted for 53.0%. In comparison, the share of pipeline transport was 14.7%, railway transport 9.1%, auxiliary transport activities 15.0%, and air transport 8.2%.

The 9.1% share of railway transport in GDP is considered relatively low. Therefore, one of the objectives of this research is to propose scientifically grounded recommendations to increase the contribution of railway transport to national GDP and to support the implementation of reforms outlined in normative and legal acts initiated by the President aimed at transforming the sector.

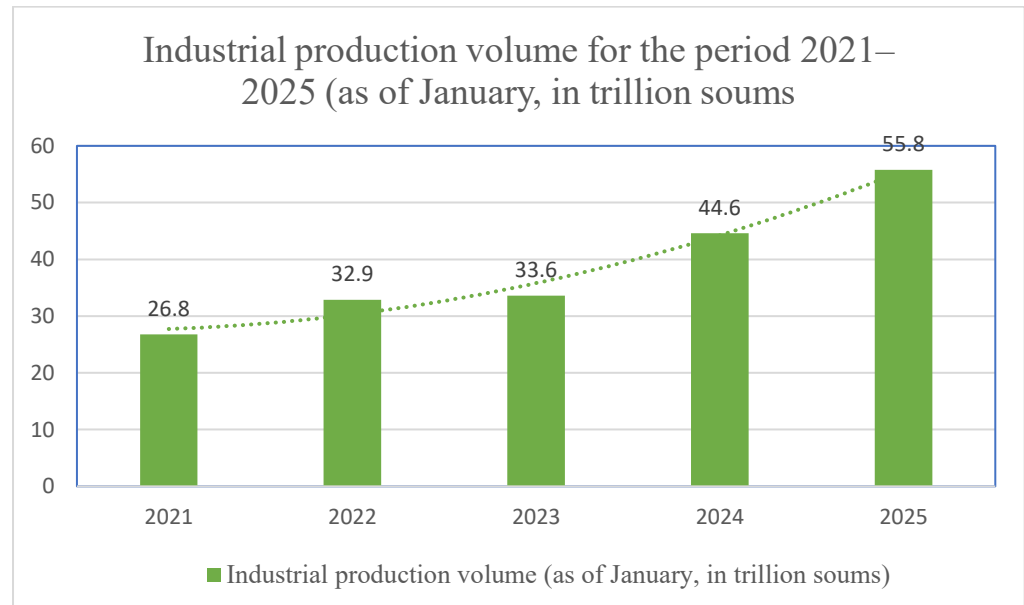
Unlike other sectors of the economy, the transport sector represents an essential and inseparable condition of productive activity. While some industries may develop to a certain extent even without raw material resources, economic and social development without a comprehensive transport system, particularly without its core infrastructure, is hardly imaginable [11].

The existence of active transport flows in the country depends on the availability of modern infrastructure and advanced technologies, which in turn enable the full development of the transport system. As emphasized, railway transport plays a crucial role not only in meeting social demands but also in supporting the national economy. Ensuring the stability and continuity of railway transport operations is directly linked to

the efficiency of the enterprises functioning within the sector and to the production capacity of these enterprises.

Several railway transport enterprises contribute to the country's industrial development through their existing production volumes. However, the overall performance indicators of Uzbekistan's railway transport manufacturing sector remain considerably low. The statistical data on national industrial production presented in Figure 3 further illustrates this trend [12].

Figure 3. Industrial production volume of the Republic of Uzbekistan for the years 2021–2025.



According to preliminary data, in January 2025, industrial enterprises of the Republic produced industrial goods worth 55.8 trillion soums. Compared to January 2024, the physical volume index of industrial production reached 104.3%. At the same time, the volume of industrial production also showed notable changes. In January 2025, the industrial output growth rate amounted to 102.2%.

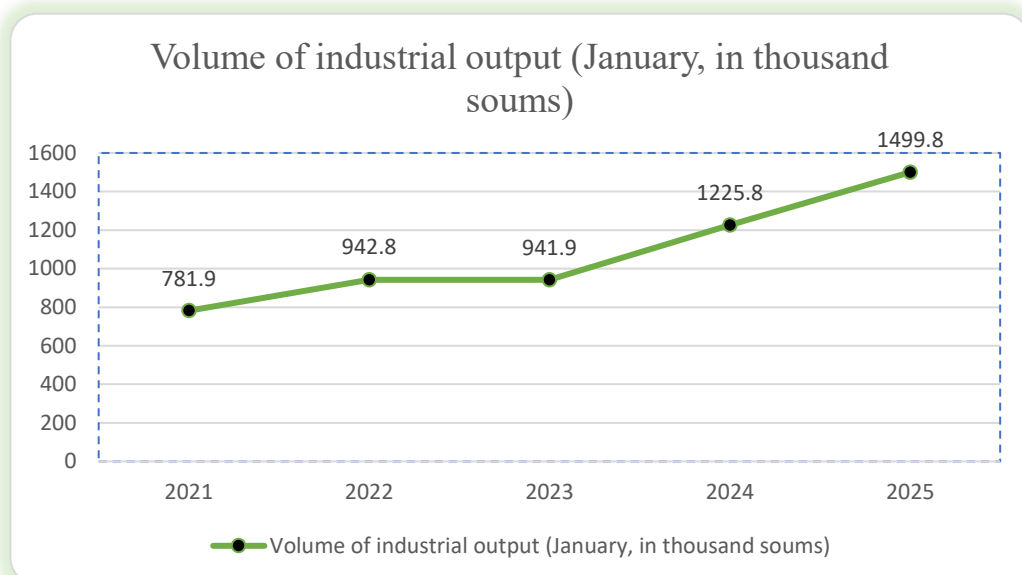
Looking at the period from 2021 to 2025, the following rates were recorded: 96.9% in 2021, 106.4% in 2022, followed by a sharp decline to 88.3% in 2023. However, in 2024, the figure recovered with a 114.1% increase.

Additionally, the largest share in the structure of industrial production belongs to the manufacturing sector, which accounted for 44.1 trillion soums, representing 79.1% of total industrial output [13].

Despite relatively lower figures, the railway transport manufacturing sector also contributes to the total volume of industrial production in the country. Therefore, increasing the production capacity of enterprises specialized in serving and producing for the railway transport sector remains one of the critical and unresolved issues that demand attention.

Figure 4 illustrates the volume of industrial production in the Republic of Uzbekistan for January of each year from 2021 to 2025, measured in thousand soums. The data shows a steady upward trend in industrial output over the period. In 2021, the volume was 781.9 thousand soums, rising to 942.8 thousand soums in 2022, with a slight decrease to 941.9 thousand soums in 2023. This was followed by a significant increase to 1,225.8 thousand soums in 2024 and is projected to reach 1,499.8 thousand soums in 2025. The overall trend reflects sustained industrial growth, indicating improvements in production capacity, efficiency, and economic performance within the sector. This growth trajectory highlights the expanding role of industrial production in the country's economic development[14].

Figure 4. Volume of industrial production in the Republic of Uzbekistan, 2021–2025.



The assessment of production and economic performance of railway transport enterprises is based on modern achievements in science and technology. This process includes the implementation of new approaches to production organization and the improvement of economic mechanisms that coordinate internal operations with external stakeholders. Transport manufacturing is an integral part of market relations, and its stable and efficient functioning is directly linked to the normal operation and development of the entire economic system, including the transport infrastructure, industrial enterprises, their associations, and integrated structures.

Furthermore, the efficient use of production potential in railway transport enterprises plays a crucial role in increasing overall industrial output and meeting national economic objectives. Despite significant reforms and modernization efforts, current data reveals a relatively low share of railway manufacturing in the country's total industrial production. This indicates the presence of structural and operational challenges, including underutilized production capacity, outdated technological infrastructure, and limited integration with global supply chains. Addressing these issues requires a strategic focus on expanding production lines, attracting foreign direct investment, and fostering public-private partnerships [15].

In addition, the disparity in capacity utilization across different enterprises such as the Joint Stock Company "O'ztemiryo'lmashta'mir", the Joint Stock Company "Tashkent Mechanical Plant", and the Joint Stock Company "Casting and Mechanical Plant" demonstrates the need for differentiated policy measures tailored to each entity's specific conditions. For instance, fluctuations in the capacity utilization rates of the Joint Stock Company "O'ztemiryo'lmashta'mir" suggest that external factors like energy dependence and logistical constraints significantly impact production stability. By contrast, steady growth in the utilization rates of the Joint Stock Company "Tashkent Mechanical Plant" and the Joint Stock Company "Casting and Mechanical Plant" signals the positive effects of consistent internal management and operational optimization.

Improving production potential in this sector is not only economically beneficial but also strategically necessary. A robust and technologically advanced railway manufacturing industry supports national infrastructure development, reduces reliance on imports, and strengthens export potential. Moreover, it contributes to employment growth, regional industrialization, and overall macroeconomic resilience. Thus, enhancing the efficiency of railway production enterprises should be regarded as a priority within the broader framework of Uzbekistan's industrial and transport policy.

Analysis

The analysis of the current characteristics of Uzbekistan's railway transport manufacturing industry reveals both untapped potential and critical challenges that hinder its sustainable development. Six strategic directions have been identified as the foundation for enhancing production capacity and improving sectoral performance: interregional production integration, technological innovation, logistics optimization, skilled workforce development, localization based on domestic resources, and energy-efficient and environmentally adaptive production practices. Each direction plays a unique and complementary role in the broader context of industrial growth.

1. Interregional integration enables coordinated development among regional enterprises, facilitating the production of spare parts and rolling stock while fostering regional economic cooperation. However, limited coordination across regions undermines this potential, calling for a unified strategy to streamline cross-regional production chains.
2. Technological modernization, particularly through the adoption of digital and automated CNC systems, offers a path to global competitiveness. Yet, outdated equipment and financial constraints continue to hinder rapid progress. State-supported innovation grants and foreign investment partnerships are recommended to accelerate this transition.
3. Integrated logistics systems strengthen supply chains and improve alignment between production and transit operations, directly contributing to increased export capacity. Nonetheless, weaknesses in logistics infrastructure and poor coordination raise costs and delays. Strategic investments in logistics corridors and digital coordination platforms are essential to overcome these inefficiencies.
4. The development of a skilled and production-oriented workforce remains a cornerstone for long-term industrial success. Despite the existence of some specialized training programs, a lack of practical training and industry-aligned curricula persists. It is necessary to expand dual education systems and vocational partnerships between educational institutions and industrial enterprises.
5. Localizing production based on available domestic raw materials can significantly reduce import dependency and enhance economic sovereignty. However, insufficient technical infrastructure and a lack of modern machinery constrain effective localization. Government-backed industrial upgrading programs can address these gaps and increase domestic production capacity.

Finally, energy efficiency and environmental adaptation are critical for cost reduction and alignment with global sustainability trends. Current reliance on conventional energy sources and limited access to green technologies slow this progress. Prioritizing investments in energy-saving technologies and integrating renewable energy sources into manufacturing processes are vital steps forward.

4. Conclusion

A multidimensional and synchronized policy approach is essential for unlocking the full production potential of Uzbekistan's railway transport industry. Addressing infrastructure, technological, educational, and environmental gaps through coordinated reforms and investments will enable the sector to become a significant contributor to national industrial growth and economic resilience.

Uzbekistan's railway transport manufacturing industry possesses significant untapped potential but faces persistent structural, technological, and organizational challenges that hinder its sustainable growth. The analysis underscores six strategic directions as critical to advancing sector performance: enhancing interregional production integration, accelerating technological modernization, optimizing logistics systems, cultivating a skilled and industry-ready workforce, expanding localization through domestic resource utilization, and adopting energy-efficient, environmentally adaptive

production practices. Addressing these areas in a coordinated manner will strengthen production capacity, reduce import dependency, and increase the sector's contribution to GDP. Interregional cooperation can streamline supply chains and bolster spare parts and rolling stock manufacturing, while modernizing production technologies will improve competitiveness and align operations with global standards. Improved logistics will enhance export potential, and workforce development will ensure the availability of skilled labor to sustain industrial growth. Localization efforts will reinforce economic independence, and energy-efficient innovations will lower operational costs while supporting sustainability goals. Implementing these measures through targeted state policies, investment incentives, and public-private partnerships will position the railway manufacturing sector as a key driver of Uzbekistan's industrial development and economic resilience.

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