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ENHANCING THE EFFICIENCY OF NATIONAL, REGIONAL, URBAN, AND INDUSTRIAL TRANSPORT SYSTEMS THROUGH MODERN TRANSPORT LOGISTICS: CHALLENGES AND PROSPECTS FOR SUSTAINABLE DEVELOPMENT

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Abstract. Transport systems and logistics have become fundamental pillars of sustainable economic growth, regional integration, and global competitiveness. The rapid expansion of international trade, digital transformation, and industrial development has significantly increased the demand for efficient transport infrastructure and intelligent logistics management. This study examines the role of national, regional, urban, and industrial transport systems in supporting economic development while emphasizing the importance of transport logistics in improving operational efficiency, reducing transportation costs, and promoting sustainable mobility.

The research analyzes the structure and functions of transport systems from a multidisciplinary perspective by integrating economic, technological, and environmental considerations. Particular attention is devoted to multimodal transportation, logistics hubs, digital supply chain management, intelligent transportation systems (ITS), and emerging technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), blockchain, and Geographic Information Systems (GIS). These technologies are transforming conventional logistics processes into highly integrated and data-driven transport networks.

Furthermore, the paper investigates the current challenges faced by developing countries, with particular emphasis on Uzbekistan, where ongoing transport reforms aim to strengthen regional connectivity and increase the country's role as a strategic logistics hub linking Europe, Asia, and the Middle East. The study demonstrates that investment in transport infrastructure, digital logistics, and international transport corridors contributes significantly to economic productivity, trade facilitation, and sustainable regional development.

The findings indicate that effective transport logistics is not merely a supporting service but a strategic economic instrument capable of increasing national competitiveness, improving supply chain resilience, and promoting environmental sustainability. The study concludes by proposing policy recommendations for governments, logistics operators, and industrial enterprises to enhance transport system performance through innovation, digitalization, and integrated logistics management.

Keywords: Transport systems, Transport logistics, Sustainable development, regional transport, Urban transportation, Industrial logistics, Multimodal transport, Intelligent transportation systems, Digital logistics, Supply chain management.

1. Introduction

Transportation has always been one of the most significant driving forces behind economic development and social progress. Since ancient times, the movement of people and goods has shaped civilizations, facilitated trade, and strengthened international cooperation. In the twenty-first century, transport systems have become increasingly sophisticated due to globalization, technological innovation, and the rapid growth of international supply chains.

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Modern economies rely heavily on efficient transport networks to ensure the continuous movement of raw materials, intermediate goods, and finished products. Without effective transport logistics, manufacturing industries experience production delays, retail markets face supply shortages, and international trade becomes significantly more expensive. Consequently, transport systems should no longer be viewed merely as physical infrastructure but rather as integrated economic systems connecting producers, consumers, governments, and international markets.

Globalization has dramatically increased freight volumes during the past three decades. International production networks now involve multiple countries, requiring reliable transport corridors capable of supporting high levels of trade efficiency. As a result, governments worldwide continue investing billions of dollars in highways, railways, airports, inland logistics centers, maritime ports, and digital logistics technologies.

Digital transformation has fundamentally changed transport logistics. Traditional logistics operations based primarily on manual planning are gradually being replaced by intelligent transport management systems that use real-time information, predictive analytics, and artificial intelligence. Modern logistics companies employ cloud computing, satellite navigation, blockchain technology, autonomous vehicles, warehouse automation, and Internet of Things (IoT) devices to improve efficiency and reduce operational costs.

Another important challenge influencing transport development is environmental sustainability. The transportation sector remains one of the largest contributors to greenhouse gas emissions worldwide. Therefore, governments increasingly prioritize green logistics strategies, electric mobility, energy-efficient transportation modes, and sustainable urban transport planning. The transition toward environmentally friendly logistics has become a major objective of international organizations and national development programs.

Developing countries face unique challenges in transport infrastructure development. Limited financial resources, outdated infrastructure, inefficient customs procedures, and insufficient logistics coordination often reduce economic competitiveness. Nevertheless, strategic investments in transport corridors and logistics centers can significantly improve regional integration and attract foreign direct investment.

Uzbekistan represents an important example of these transformations. Located in the heart of Central Asia, the country occupies a strategic geographical position connecting China, South Asia, the Middle East, Russia, and Europe. Recent government reforms have focused on modernizing railway infrastructure, expanding highway networks, improving border logistics, and developing multimodal transport corridors. These reforms aim to transform Uzbekistan into a regional logistics hub capable of facilitating international trade while strengthening domestic economic growth.

Despite substantial progress, several challenges remain. Freight transportation costs remain relatively high compared to international benchmarks. Border-crossing procedures require further simplification, logistics digitalization remains uneven across regions, and urban freight management continues to face operational inefficiencies. Addressing these challenges requires comprehensive transport policies supported by scientific research and evidence-based planning.

This paper therefore seeks to analyze transport systems from national, regional, urban, and industrial perspectives while evaluating the role of transport logistics in improving economic efficiency and sustainable development. Unlike studies focusing exclusively on one transport mode, this research adopts an integrated systems approach that considers infrastructure, logistics, technology, environmental sustainability, and institutional reforms as interconnected elements of modern transport development.

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The objectives of this research are to examine the theoretical foundations of transport logistics, analyze the interaction between transport systems and regional economic development, identify the impact of digital technologies on logistics performance, evaluate the current state of transport infrastructure in Uzbekistan, and formulate practical recommendations for enhancing national transport competitiveness under conditions of globalization and digital transformation.