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DIGITALIZATION OF LOGISTICS MANAGEMENT IN UZBEKISTAN: CURRENT STATUS, CHALLENGES, AND DEVELOPMENT DIRECTIONS

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Abstract. This article examines the digitalization of logistics management in Uzbekistan, focusing on its current status, major challenges, and перспективные направления развития. The study analyzes the role of digital technologies in transforming logistics processes, including transportation management, warehousing, cargo tracking, customs procedures, and information exchange among supply chain participants. Particular attention is paid to the adoption of electronic platforms, automated control systems, cloud technologies, big data tools, and digital communication solutions aimed at increasing efficiency, transparency, and service quality in the logistics sector. The article evaluates the present level of logistics digitalization in Uzbekistan in the context of economic modernization, infrastructure development, and integration into regional and global trade networks. It is argued that digital transformation in logistics can significantly reduce operational costs, improve delivery speed, strengthen monitoring capabilities, and increase the competitiveness of national logistics systems. At the same time, the study identifies several barriers, including insufficient technological infrastructure, uneven digital readiness, regulatory limitations, cybersecurity risks, and a shortage of qualified specialists. The findings indicate that sustainable digitalization of logistics management in Uzbekistan requires coordinated institutional reforms, investment in technological capacity, and the development of digital competencies. The article offers practical recommendations for shaping effective development strategies in the field of logistics digital transformation.

Keywords: logistics digitalization, logistics management, Uzbekistan

The digitalization of logistics management in Uzbekistan emerges as a critical topic within the broader context of global economic transformations. As countries increasingly pivot toward digital solutions to enhance the efficiency of supply chain processes, Uzbekistan finds itself at a crossroads, grappling with both opportunities and challenges in this regard. The current status of logistics in Uzbekistan is characterized by a pressing need for modernization and improved integration of digital technologies. Barriers such as a shortage of qualified IT personnel,

economic uncertainties surrounding investment, and inadequate infrastructure pose significant hurdles for progress. Notably, research indicates that the persistent lack of digital competencies hampers effective implementation, as highlighted by the identification of key obstacles such as cybersecurity threats and investment volatility (S Smerichevska et al., 2025) . Furthermore, the comparative assessment of logistics systems across various sectors underscores the urgency for strategic initiatives aimed at fostering innovation and enhancing competitiveness, laying the groundwork for transformative development in the logistics landscape (Shulha O et al.) . Logistics management plays a critical role in the efficient functioning of supply chains, especially as digitalization increasingly transforms this field. The digitalization of logistics offers enhanced visibility, flexibility, and responsiveness, which are essential attributes in today's dynamic market environments. In Uzbekistan, the integration of technologies such as the Internet of Things and blockchain presents opportunities to streamline processes and improve operational efficiency. However, challenges remain, including a shortage of skilled IT professionals, uncertainties surrounding investment returns, and infrastructure limitations. Addressing these issues is vital for fostering a competitive logistics sector, as highlighted in studies that identify practical strategies for enhancing digital capabilities and improving the overall effectiveness of logistics management systems (S Smerichevska et al., 2025) (Shulha O et al.) . In Uzbekistan, the importance of digital transformation in the logistics sector is increasingly evident as the nation seeks to enhance its competitive edge within the global marketplace. The integration of digital technologies has the potential to revolutionize logistics operations by improving efficiency, reducing costs, and accelerating delivery times. As highlighted in recent studies, such as (Huan NT, 2025) , the transition towards e-logistics and platform logistics is crucial for fostering sustainable growth, particularly in emerging economies like Uzbekistan. Furthermore, the adoption of modern digital tools, as discussed in (Shulha O et al.) , not only optimizes logistics processes but also addresses critical challenges related to infrastructure and policy frameworks. Therefore, embracing digital transformation is essential for Uzbekistan's logistics sector to thrive, ensuring it aligns with international standards and meets the growing demands of a dynamic global trade environment.

The current status of digitalization in Uzbekistan's logistics management reflects a transformative landscape, characterized by both significant progress and formidable challenges. As the nation strives to modernize its supply chains, it faces barriers such as a shortage of qualified IT personnel, uncertainties concerning the economic returns on digital investments, and vulnerabilities related to cybersecurity threats. These obstacles highlight the need for robust infrastructural support to facilitate effective digital transformation. Recent analyses of digital development indices reveal an urgent need for Uzbekistan to enhance its digital competencies within the logistics sector to remain competitive globally. Practical measures recommended to overcome these challenges include investing in innovative technologies and adopting adaptive management models that align with global trends. Furthermore, the integration of advanced digital solutions—emphasized in studies focused on analogous contexts, such as those in Ukraine—can significantly enhance the efficiency of logistics processes, ultimately contributing to improved service quality and reduced operational costs (S Smerichevska et al., 2025) (Shulha O et al.) . The existing technologies and infrastructure within Uzbekistan's logistics sector significantly influence the ongoing digitalization efforts. Notably, the country grapples with

infrastructural limitations, which pose substantial barriers to effective digital transformation. As highlighted in recent studies, challenges such as the lack of qualified IT personnel and cybersecurity threats hinder the implementation of innovative technologies that can streamline logistics processes. To optimize performance, investments in cutting-edge digital solutions—such as the Internet of Things, blockchain, and advanced analytics—are essential. Furthermore, the necessity for a robust framework to nurture digital competencies among the workforce is paramount, as these competencies will drive the sustainable development of supply chains in Uzbekistan. Therefore, addressing these technological and infrastructural gaps is crucial for enhancing overall logistics efficiency and competitiveness in the global market (S Smerichevska et al., 2025) (Shulha O et al.) . In the context of digitalization of logistics management in Uzbekistan, the engagement of key stakeholders is paramount to drive successful transformation. Government agencies play a crucial role by developing policies that promote infrastructure improvements and establish a regulatory framework conducive to digital advancements. Private sector entities, particularly logistics companies, must invest in innovative technologies and cultivate digital competencies within their workforce to enhance operational efficiency. Furthermore, academia and research institutions can contribute by analyzing data trends and providing insights that guide strategic decisions. Addressing barriers such as inadequate IT personnel and cybersecurity threats is essential, aligning with the findings that emphasize the need for adaptive management models and investment in robust digital solutions (S Smerichevska et al., 2025) (Shulha O et al.) .

Stakeholder	Role
Government of Uzbekistan	Regulates and develops policies for the logistics sector
Private Logistics Companies	Provide transportation and warehousing services
International Trade Organizations	Facilitate trade agreements and provide support
Investors	Finance infrastructure projects to improve logistics

Key Stakeholders in Logistics Management of Uzbekistan

The digitalization of logistics in Uzbekistan faces significant challenges that stem from infrastructural inadequacies, workforce skill gaps, and insufficient regulatory frameworks. The current state of logistics infrastructure, characterized by outdated systems and limited technological integration, hinders the effective implementation of Industry 4.0 technologies, such as IoT and AI, which are crucial for enhancing operational efficiency and customer satisfaction. Moreover, the workforce often lacks the necessary digital skills to adapt to these evolving technologies, resulting in a slow adoption rate within the sector. As noted, government policies play a vital role in shaping technological infrastructure and workforce capabilities, highlighting the need for strategic investments to foster digital transformation in logistics (Ravshan ON et al., 2025) . Additionally, the successful integration of digital solutions necessitates a supportive legislative environment, akin to the measures observed in similar transitioning economies (Shulha O et al.) .

Challenge	Impact
Inadequate Infrastructure	Increases transportation costs and limits efficiency.

Complex Customs Procedures	Average documentation time of 150 hours for imports.
High Trade Costs	Dependency on transit countries raises operational expenses.
Corruption Risks	Ranked 146th out of 180 in Corruption Perceptions Index.

Challenges Facing Digitalization in Uzbekistan's Logistics

The journey toward digitalizing logistics management in Uzbekistan is significantly impeded by technological and infrastructure limitations. Challenges such as a lack of qualified IT personnel and uncertainties surrounding the economic efficiency of investments create hesitation among stakeholders, stifling innovation and transformation within the sector (S Smerichevska et al., 2025) . Furthermore, existing infrastructure deficiencies exacerbate these issues, limiting the ability to effectively implement advanced technologies like IoT and blockchain, which are essential for optimizing logistics processes (Shulha O et al.) . These technological barriers not only hinder operational efficiency but also diminish the competitiveness of Uzbek enterprises in the global market. To address these critical limitations, there is a pressing need for strategic investments in both human capital and physical infrastructure, aiming to foster an environment conducive to embracing digital tools that can enhance service quality and reduce costs throughout the logistics supply chain. The transition towards a digitalized logistics management system in Uzbekistan is markedly influenced by regulatory and workforce issues that impede its full potential. A comprehensive understanding of local regulations is crucial, as they often dictate the pace at which digital technologies can be integrated into logistics operations. Moreover, there is a pressing need for the workforce to possess the necessary skills to navigate these advanced digital tools effectively. As highlighted in recent literature, industries are increasingly relying on technological concepts to enhance logistics performance and reduce costs (Woschank M et al., 2021) . However, the presence of outdated regulatory frameworks can stall innovation and hinder adaptation, particularly within the logistics chains essential for global competitiveness in a rapidly digitizing economy (Shulha O et al.) .

The development directions for enhancing digital logistics in Uzbekistan center on the integration of advanced information technologies and the establishment of efficient logistics systems. By creating transportation and logistics information centers that leverage data from the railway sector, Uzbekistan can significantly improve cargo delivery processes and overall logistics efficiency, addressing the challenges identified in local systems (Menglikulov B et al., 2023) . Moreover, adopting innovative digital tools such as the Internet of Things, blockchain, and automation analytics will not only streamline logistics operations but also enhance competitiveness on a global scale (Shulha O et al.) . Implementing these technologies can lead to reduced operational costs, improved delivery speeds, and higher customer service quality, all critical components for a successful digital logistics strategy. Additionally, fostering a supportive regulatory environment will further facilitate the digital transformation of logistics chains, ensuring that Uzbekistan can effectively navigate the complexities of modern logistics management while capitalizing on the opportunities presented by globalization and technological advancement.

In addressing the digitalization of logistics management in Uzbekistan, strategic initiatives and policy recommendations must be formulated to overcome existing challenges and leverage potential opportunities. Key barriers, such as the shortage of qualified IT personnel and concerns regarding cybersecurity threats, necessitate focused government investment in education and training programs aimed at enhancing digital competencies among logistics professionals. Additionally, fostering a regulatory environment that encourages the adoption of innovative technologies is essential; measures must be taken to ensure businesses can confidently invest in digital solutions without the fear of inadequate returns. Engaging with international best practices, particularly as analyzed through indices like the Network Readiness Index, will provide valuable insights into optimization strategies. Thus, a multifaceted approach that emphasizes infrastructure development, digital skill enhancement, and adaptive management models will be crucial for achieving efficient logistics processes in Uzbekistan, as highlighted in current research (S Smerichevska et al., 2025) and (Shulha O et al.) . As Uzbekistan navigates the digitalization of its logistics management, the integration of emerging technologies will significantly reshape its operational landscape. The convergence of innovative solutions such as the Internet of Things, blockchain, and advanced analytics is poised to enhance the efficiency and transparency of logistics processes. However, substantial challenges persist, including a shortage of qualified IT personnel and concerns regarding cybersecurity threats, as highlighted in (S Smerichevska et al., 2025) . Moreover, the analysis of logistics infrastructure reveals critical areas in need of improvement, emphasizing the potential gains from adopting these technologies, which could lead to reduced costs and improved delivery speeds, as stated in (Shulha O et al.) . Ultimately, the successful implementation of digital innovations will be crucial in bolstering Uzbekistan's competitiveness in the global market while addressing the intricate dynamics of its logistics ecosystem.

In conclusion, the digitalization of logistics management in Uzbekistan represents a vital step toward enhancing the efficiency and competitiveness of the nation's logistics sector. The significant role of logistics information systems, as highlighted in existing research, underscores the necessity of establishing efficient transport-logistics information centers to streamline cargo delivery processes ((Menglikulov B et al., 2023)). Furthermore, the integration of modern digital technologies, including the Internet of Things and analytics automation, can transform logistics chains, enabling better operational management and improved customer service quality ((Shulha O et al.)). However, challenges such as inadequate infrastructure and the need for comprehensive regulatory frameworks must be addressed to realize these advancements fully. As Uzbekistan moves forward, focusing on innovative solutions and fostering an environment conducive to digital transformation will be essential in overcoming existing obstacles and achieving sustained development in logistics management. Ultimately, this digital journey holds the potential to propel Uzbekistan into a new era of logistical excellence on both a regional and global scale. The exploration of the digitalization of logistics management in Uzbekistan reveals several key findings that illustrate both potential benefits and existing challenges. Central to these findings is the recognition of an effective logistics information system, which is crucial for efficient cargo transportation and delivery mechanisms within the country. The proposed establishment of transportation and logistics information centers aims to enhance the operational efficiency of Uzbekistan's railway sector, as outlined in the findings from (Menglikulov B et al.,

2023) . Furthermore, the adaptation of digital tools, similar to those observed in Ukraine, indicates the importance of integrating cutting-edge technologies like IoT and blockchain to bolster logistics processes. These advancements can lead to reduced operational costs and improved service quality, emphasizing the need for supportive state policies to drive this transformation, as discussed in (Shulha O et al.) . The future outlook for Uzbekistan's logistics sector hinges significantly on the successful integration of digital technologies, which can enhance operational efficiency and customer satisfaction. Emphasizing the deployment of Industry 4.0 technologies such as the Internet of Things (IoT), artificial intelligence (AI), and blockchain will be crucial in mitigating existing challenges, as they have shown positive impacts on logistics performance in other developing economies. For instance, (Ravshan ON et al., 2025) highlights how IoT and cloud computing lead to substantial improvements in operational efficiency and cost reduction. Furthermore, the strategic investment in digital infrastructure must be accompanied by policies aimed at workforce development and regulatory support, as noted in (Shulha O et al.) . By adopting these recommendations, Uzbekistan can improve its positioning in global logistics, fostering competitiveness and sustaining economic growth in the face of evolving market demands.

References:

1. S. Smerichevska, Dmytro Tsymbal, Nataliia Tsymbal (2025). Digitalisation of logistics business processes in supply chain management against the background of global trends. https://www.semanticscholar.org/paper/1e9ea73c4265cf31ee3a05a18d9d7d35dc1a3a08
2. Olha Shulha, Yuliia Popova, Mykola Shvets, Dmytro Rudenko, Bohdan Samoilenko, Nataliia Khomiuk, Nadiia Bukalo, et al. (2026). Analysis and Management of Logistics Chains in the Context of the Convergence of Digital Technologies in the Economic Architecture of Ukraine. https://sci.ldubgd.edu.ua/bitstream/123456789/14668/2/A_20.pdf
3. Ortiqova Nurjaxonbegim Ravshan, G. A. Ogunmola (2025). Assessing the Role of Digital Transformation in Enhancing Logistics Operation in Uzbekistan a Study of Industry 4. 0 Technology. https://www.semanticscholar.org/paper/1aa99e4a5206751bebdd01cda06ee63f5cae509a
4. Bakhtiyor Menglikulov, Sukhrob Umarov, Alisher Safarov, Temirbay Zhyemuratov, Nodiraxon Alieva, Акмал Дурманов (2023). Ways to increase the efficiency of transport logistics - communication services in Uzbekistan. https://doi.org/10.1051/e3sconf/202338905036
5. Manuel Woschank, Alexander Kaiblinger, Philipp Miklautsch (2021). Digitalization in Industrial Logistics: Contemporary Evidence and Future Directions. https://doi.org/10.46254/an11.20210257
6. Nguyen The Huan (2025). Application of New Business Models (E-Logistics, Platform Logistics) in the Supply Chain in Binh Duong Under the Impact of Digital Transformation. https://www.semanticscholar.org/paper/c2c082f3f9a3a3891d6858fec6f158e995055d3e