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THE MAIN DIRECTIONS OF MODERNIZING POSTAL INFRASTRUCTURE IN THE CONTEXT OF THE DIGITAL ECONOMY

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Abstract: *This article examines the main directions of modernizing postal infrastructure in the context of the digital economy. The rapid development of information and communication technologies, the expansion of e-commerce, and changes in consumer demand are creating new requirements for postal and logistics services. Under these conditions, the modernization of postal infrastructure is becoming an important factor in improving the efficiency, accessibility, reliability, and competitiveness of postal services. The study focuses on the digital transformation of postal operations, the introduction of automated sorting and tracking systems, the development of electronic payment services, optimization of logistics processes, implementation of information technologies, and improvement of customer service. Particular attention is paid to the integration of postal services with digital platforms and e-commerce ecosystems. The article also considers the potential of modern technologies, including artificial intelligence, big data, Internet of Things technologies, and automated logistics systems, in improving postal operations. Based on the analysis, recommendations are proposed for the further modernization of postal infrastructure and the development of innovative postal services in the digital economy.*

Keywords: *digital economy, postal infrastructure, modernization, digital transformation, postal services, e-commerce, logistics, automation, information and communication technologies, electronic payments, innovative technologies, customer service, digital platforms.*

INTRODUCTION

The rapid development of the digital economy has significantly transformed the organizational and technological foundations of modern postal services. The widespread adoption of information and communication technologies, the growth of electronic commerce, and the increasing demand for fast and convenient delivery services have created new requirements for postal infrastructure. In this context, traditional postal systems are gradually transforming into integrated digital logistics platforms capable of providing not only conventional mail delivery but also electronic, financial, logistics, and other digital services. Digital transformation is therefore becoming an important factor in improving the competitiveness and sustainability of postal operators.¹

Postal infrastructure plays an important role in ensuring the accessibility of communication and logistics services for individuals, businesses, and public institutions. At

¹ International Telecommunication Union (ITU). *Digital Trends in Post and Logistics: Digital Transformation and the Future of Postal Services*. Geneva: ITU.

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the same time, the development of e-commerce has substantially increased the importance of postal and parcel delivery networks. Customers increasingly expect fast delivery, real-time tracking, flexible delivery options, electronic payments, and personalized services. These changes require postal organizations to modernize their infrastructure, improve logistics processes, introduce automated sorting systems, and establish effective digital interaction with customers.²

The modernization of postal infrastructure in the digital economy should therefore be considered not merely as the replacement of outdated equipment, but as a comprehensive process involving technological, organizational, economic, and managerial transformations. The implementation of automated sorting and distribution systems, digital tracking technologies, artificial intelligence, big data analytics, Internet of Things technologies, electronic payment systems, and cloud-based information platforms can significantly improve the efficiency of postal operations.

In addition, the integration of postal services with e-commerce platforms creates new opportunities for expanding the range of services and increasing the economic efficiency of postal organizations. Modern postal operators are increasingly required to function as logistics partners for online businesses, providing integrated solutions for order processing, warehousing, transportation, delivery, and returns management. Consequently, the modernization of postal infrastructure has become an important condition for adapting the postal sector to the requirements of the digital economy.

MAIN PART

Digital Transformation of Postal Infrastructure

The modernization of postal infrastructure in the digital economy is primarily associated with the digital transformation of traditional postal operations. Digital technologies make it possible to automate many processes that previously required significant human resources and time. The introduction of digital information systems enables postal organizations to collect, process, store, and exchange information more efficiently, thereby improving the quality and speed of services.

One of the most important directions of digital transformation is the creation of integrated information systems that connect post offices, sorting centers, transportation services, warehouses, and customers within a single digital environment. Such systems allow postal operators to monitor the movement of postal items at every stage of the delivery process. Customers, in turn, can receive real-time information about the location and status of their shipments.

Digitalization also contributes to the development of electronic postal services. Customers can submit applications online, pay for services electronically, generate shipping documents, and receive digital notifications without visiting a post office. This reduces administrative costs and improves the accessibility of postal services, particularly for people living in remote and rural areas.

² Universal Postal Union (UPU). *Postal Development Report 2024: Unlocking a New Era of Postal Development*. Bern: Universal Postal Union, 2024.

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According to the Universal Postal Union, the development of digital postal services and the integration of physical and digital channels are becoming increasingly important for the competitiveness of postal operators in the modern economy.³

Automation and Intelligent Technologies in Postal Operations

Another important direction of postal infrastructure modernization is the introduction of automated and intelligent technologies. Traditional manual sorting and distribution processes can be time-consuming and may increase the probability of human error. Automated sorting centers can significantly improve the speed and accuracy of processing letters, parcels, and other postal items.

Modern sorting equipment can automatically identify postal codes, addresses, barcodes, and other information contained on postal items. The application of optical character recognition technologies makes it possible to process addresses automatically, while automated conveyor systems can direct postal items to the appropriate transportation routes.

Artificial intelligence and machine learning technologies can further improve postal operations. These technologies can be used to predict parcel volumes, optimize transportation routes, identify potential delays, and improve resource allocation. Big data analytics can also help postal organizations understand customer behavior and develop services that correspond to changing consumer needs.

The use of Internet of Things technologies provides additional opportunities for monitoring postal infrastructure. Sensors installed in vehicles, warehouses, sorting centers, and parcel delivery equipment can continuously collect information about temperature, location, equipment condition, and other operational parameters. This information can be used for preventive maintenance and more effective management of logistics processes.⁴

CONCLUSION

The modernization of postal infrastructure is becoming increasingly important under the conditions of the digital economy. The rapid development of information and communication technologies, the expansion of e-commerce, and changing customer expectations require postal organizations to move from traditional service models toward integrated digital and logistics systems.

The analysis demonstrates that the main directions of postal infrastructure modernization include the digital transformation of postal operations, automation of sorting and distribution processes, development of modern logistics centers, integration with e-commerce platforms, implementation of electronic payment systems, and improvement of customer-oriented digital services. The application of artificial intelligence, big data, Internet of Things technologies, and automated information systems can significantly increase the efficiency, speed, reliability, and transparency of postal operations.

An important condition for successful modernization is the creation of an integrated digital infrastructure connecting postal offices, sorting centers, logistics facilities,

³ Universal Postal Union (UPU). *Postal Development Report 2024: Unlocking a New Era of Postal Development*. Bern: Universal Postal Union, 2024.

⁴ International Telecommunication Union (ITU). *The Digital Transformation of Postal Services*. Geneva: ITU.



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transportation systems, online platforms, and customers. Such integration can reduce operational costs, optimize transportation routes, improve shipment tracking, and increase the overall quality of postal services.

At the same time, digital transformation requires appropriate attention to cybersecurity, personal data protection, technical infrastructure, and professional development of postal employees. Investments in modern technologies should therefore be accompanied by the development of human resources and improvement of organizational management.

In conclusion, modernization of postal infrastructure should be viewed as a comprehensive and continuous process aimed at creating a flexible, technologically advanced, customer-oriented, and economically efficient postal system. The implementation of innovative technologies and integration with the digital economy will create new opportunities for improving postal services, supporting e-commerce, strengthening logistics networks, and increasing the competitiveness of the postal sector.

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