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OPTIMIZATION OF SUPPLY CHAIN LOGISTICS IN THE CONTEXT OF GLOBAL DIGITALIZATION

Today's global economy functions in an environment of constant change, where the speed of delivery becomes an important factor of competitive advantage. The digitization of logistics chains goes far beyond the implementation of electronic document management; it is about a deep transformation of business processes based on big data analysis. The use of *artificial intelligence* algorithms, *machine learning* and *Internet of Things* technologies opens new horizons for transforming traditional logistics operations into a dynamic and adaptive ecosystem capable of responding promptly to real-time challenges.

Nova Poshta is selected as the key object of this research, as it is a leader in the Ukrainian express delivery market and holds a strong position internationally. Its infrastructure includes over 50,000 service points, comprising approximately 15,900 branches and 34,200 parcel lockers, and handles millions of shipments daily (Interfax-Ukraine, 2026a, 2026b; Reuters, 2025). Driven by its well-developed IT ecosystem and commitment to innovation, Nova Poshta has evolved from a traditional logistics operator into a modern digital platform. All stages of delivery are integrated with automated decision-making systems, making the company an excellent example for studying the processes of digitalization and optimization of logistics.

Nova Poshta's development strategy is based on the deep integration of route optimization algorithms and predictive analytics. The basis of this system is the use of Big Data technologies, which allow building dynamic supply chains. A key aspect is load forecasting: intelligent algorithms analyze arrays of pre-order data and seasonal

fluctuations. This gives the company the ability to preemptively allocate resources between terminals, avoiding critical congestion during peak periods such as public holidays or large-scale sales (Ohiievskyi, 2025). The use of smart systems to plan courier routes allows not only to reduce waiting times for customers, but also to significantly reduce the mileage of the transport fleet. As a result, it helps reduce the shipping costs of each package and improves the company's financial performance.

The efficiency of modern logistics is inseparably linked to the application of innovative engineering solutions, a clear example of which is the high-tech KIT and LEO terminals. These facilities embody digitalization through automated sorting processes, where intelligent pipelined systems determine the weight, dimensions and route of parcels in a fraction of a second. This approach significantly reduces the impact of the human factor and minimizes the risk of errors during cargo handling. An important part of this digital ecosystem is the integrated payment system NovaPay, which operates within the logistics chain. The use of this system ensures instant financial transactions, removes settlement delays, and significantly enhances the speed of goods delivery from the sender to the final recipient.

A new stage of development was the implementation of artificial intelligence into service processes, the results of which were comprehensively examined during a case study and hackathon with the Civitta company in 2025. Two main directions were identified, which gave the greatest economic effect. First, the implementation of AI-based voice assistants enabled automated responses to typical customer requests, ensuring the processing of huge sets of requests without the involvement of additional staff. Second, AI-driven algorithms that automatically generate documents using company templates (Civitta, n.d.). This is especially critical for international deliveries, as the removal of administrative barriers makes the logistics chain continuous and the service as adaptable as possible to the requirements of today's digital society.

The study demonstrates that the digital transformation of supply chain logistics, driven by artificial intelligence, Big Data analytics, and automation technologies, significantly enhances operational efficiency, flexibility, and resilience. The case of Nova Poshta confirms that the integration of predictive analytics, route optimization

systems, and automated sorting infrastructure enables the company to reduce operational costs, improve delivery speed, and maintain a high level of service quality even under conditions of increased demand and external instability.

In addition, the implementation of AI-based customer service tools, such as voice assistants, along with automated document generation systems, contributes to the scalability of operations and reduces the need for manual intervention. The integration of digital financial solutions, such as NovaPay, further ensures the continuity of logistics processes by eliminating delays in transactions and facilitating faster order processing. These findings highlight that digitalization not only optimizes internal logistics operations but also creates a more adaptive and customer-oriented service model. Moreover, the successful transformation of Nova Poshta demonstrates the broader impact of digital innovation on the development of the e-commerce ecosystem, setting higher standards for speed, accessibility, and reliability of delivery services.

Overall, digital technologies should be viewed not merely as operational tools, but as a strategic foundation for long-term competitiveness. Companies that actively integrate intelligent systems into their logistics chains are better positioned to respond to market volatility, sustain growth, and ensure stability in an increasingly complex global environment.

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