VOLODYMYR DAHL EAST UKRAINIAN NATIONAL UNIVERSITY
(Full name of the higher education institution)
FACULTY OF ECONOMICS AND MANAGEMENT
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DEPARTMENT OF ECONOMICS AND ENTREPRENEURSHIP
(Full name of the department)

QUALIFICATION THESIS

Master's Level
(Level of Education)

Topic: "Development of a Digitalization Strategy for Enterprise Logistics Processes as a Factor in Minimizing Economic Risks"

Student: 2nd-year student, group EC-24dmi
Specialty: 051 Economics
Educational Program: Economics


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Kyiv – 2026

VOLODYMYR DAHL EAST UKRAINIAN NATIONAL UNIVERSITY
(Full name of the higher education institution)
Institute, Faculty, Department: Faculty of Economics and Management
Department of Economics and Entrepreneurship
Educational Level: Master's
Specialty: 051 "Economics"
Educational Program: Economics

APPROVED
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09.01.2026

TASK
FOR MASTER'S QUALIFICATION THESIS

Student Name: _____Li Chao_____

1. Thesis Topic: "Development of a Digitalization Strategy for Enterprise Logistics Processes as a Factor in Minimizing Economic Risks"
Supervisor: Maslosh Olha Volodymyrivna, Assoc. prof.
Approved by University Order: Date 08.01.2026. No.02/14

2. Submission Deadline: 20.03.2026

3. Initial Data for the Thesis**:** scientific works of domestic and foreign scholars on the digitalization of enterprise logistics processes, economic risk management, strategic management, and the functioning of logistics companies; financial statements, analytical materials, and management reports of the studied enterprise; materials of the pre-graduation internship report.

4. Content of the Explanatory Note**:** 1. Theoretical and methodological principles of the digitalisation of enterprise logistics processes and economic risk management. 2. Analysis of the organizational and economic characteristics of the enterprise under study, its competitive position, and the current level of digitalisation of logistics processes. 3. Assessment of the financial and economic condition, business activity, profitability, and economic risks of the logistics activities of the enterprise under study. 4. Development and economic substantiation of the strategy for digitalisation of the enterprise’s logistics processes. 5. Assessment of the impact of the proposed digital strategy on the economic sustainability, financial results, competitiveness, and long-term stability of the enterprise.

5. List of Graphic Materials:
Tables, figures and other demonstration material

6. Consultants for Thesis Chapters:

Chapter	|Consultant Name, Title	Signature|, Date	
		The Task is given	The task is received

7. Task Issuance Date: 09.01.2026

CALENDAR PLAN

No.	Task Stage	Deadline	Remarks
1	Approval and assignment of thesis topic	January 2026	
2	Justification of the topic's relevance	January 2026	
3	Bibliographic research and material preparation for Chapter 1	January 2026	
4	Submission of Chapter 1 materials	January 2026	
5	Data collection for Chapter 2	January 2026	
6	Submission of Chapter 2 materials	February 2026	
7	Preparation and drafting of Chapter 3	March 2026	
8	Submission of Chapter 3 materials	March 2026	
9	Drafting conclusions and finalizing the thesis	March 2026	
10	Defense presentation preparation	March 2026	

Student: 李超 Li Chao

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ABSTRACT

Master's thesis:98 p., 24 tables, 26 sources.

The object of the research is the logistics processes of an enterprise in the context of digital transformation and increased economic uncertainty.

The subject of the research is the theoretical, methodological, and practical aspects of the formation and implementation of a strategy for digitalising the logistics processes of an enterprise as a tool for minimising economic risks and increasing its economic sustainability.

The purpose of the qualification thesis is the theoretical substantiation and development of practical recommendations for forming and economically substantiating a strategy for digitalising the logistics processes of an enterprise aimed at minimising economic risks and ensuring long-term competitiveness.

The theoretical and methodological principles of digitalisation of enterprise logistics processes and economic risk management have been studied, and the conceptual foundations of integrating digital, strategic, and risk-oriented approaches into the enterprise management system have been generalised. Based on the analysis of Nova Poshta Company, an assessment of organizational and economic characteristics, competitive position, financial and economic performance, liquidity, solvency, business activity, profitability, the level of digitalisation of logistics processes, and economic risks has been carried out. Strategic directions of digital transformation of logistics processes have been substantiated, a set of measures has been developed, and the economic feasibility of the proposed strategy has been proved, taking into account its impact on operational efficiency, risk minimisation, economic sustainability, competitiveness, and long-term stability of the enterprise.

DIGITALISATION, LOGISTICS PROCESSES, ECONOMIC RISKS, DIGITAL STRATEGY, LOGISTICS ENTERPRISE, DIGITAL MATURITY, ECONOMIC SUSTAINABILITY, COMPETITIVENESS, RISK MANAGEMENT.

CONTENTS

INTRODUCTION

The modern development of logistics systems takes place in conditions of high economic uncertainty, rising operating costs, digital competition and increased risks associated with military, infrastructure and cyber threats. The logistics activities of enterprises increasingly depend on the speed of information processing, routing efficiency and the ability to respond quickly to changes in the external environment. In such conditions, the digitalisation of logistics processes becomes not only a tool for increasing efficiency but also a strategic factor for minimising economic risks and ensuring long-term sustainability.

For Ukrainian logistics enterprises, the issue of digital transformation is becoming particularly relevant due to the need to adapt to crisis phenomena, restructuring logistics routes, increasing resource costs, and increasing competitive pressure. The formation of a scientifically sound strategy for the digitalization of logistics processes allows for an increase in the level of economic security, stabilization of cash flows, and creation of prerequisites for the sustainable development of the enterprise.

In this regard, the topic of forming a strategy for digitizing the logistics processes of an enterprise as a factor in minimizing economic risks is relevant, theoretically significant, and practically necessary.

The object of the study is the logistics processes of an enterprise (using the example of Nova Poshta) in the context of digital transformation and increased economic uncertainty.

The subject of the study is the theoretical, methodological and practical aspects of the formation and implementation of a strategy for digitizing the logistics processes of an enterprise as a tool for minimizing economic risks and increasing its economic sustainability.

The purpose of the study is to develop and economically justify a strategy for digitizing the enterprise's logistics processes, aimed at minimizing economic risks and ensuring long-term competitiveness.

To achieve the set goal, the work provides for the solution of the following tasks:

- To summarize the theoretical and methodological principlesdigitalization of the enterprise's logistics processes.
- Systematize the economic risks of logistics activities and determine their impact on the financial results of the enterprise.
- Analyze the organizational and economic state of the enterprise and assess the level of digitalization of its logistics processes.
- Conduct a quantitative assessment of economic risks and determine their relationship with the level of digital maturity.
- Develop a strategydigitalization of logistics processes and create a roadmap for its implementation.
- Justify the economic efficiency of the proposed measures using NPV, IRR, and payback period indicators.
- Assess the impact of a digital strategy on the economic sustainability, competitiveness, and long-term stability of an enterprise.

Achieving the goal and solving the tasks set to form a strategy for digitizing the logistics processes of an enterprise as a factor in minimizing economic risks necessitated the use of a complex of general scientific and special research methods.

In the process of generalizing the theoretical foundations of the digital transformation of logistics, the methods of analysis and synthesis, induction and deduction, scientific abstraction and systematization were applied to clarify the essence of the concepts of "digitalization of logistics processes", "economic risks of logistics activities", "digital maturity of the enterprise". The method of the systems approach allowed us to consider the logistics processes of the enterprise as an integrated multi-level system of interconnected material, information and financial flows.

To study economic risks and assess their impact on the company's performance, economic analysis methods were used, including horizontal and vertical analysis of financial indicators, the method of relative and average values, calculation of coefficients of variation and risk load. Quantitative assessment of risks was carried out

using statistical data processing methods, including calculation of the standard deviation, coefficient of variation and correlation analysis to determine the relationship between the level of digitalization and the risk profile of the company.

To determine the level of digital maturity, an integral assessment method with normalization of indicators and the use of weighting coefficients was applied. The construction of an integral indicator of economic risk minimization was based on the method of weighted aggregation of partial indicators.

The economic justification of the proposed strategy was carried out using investment analysis methods: calculation of net present value (NPV), internal rate of return (IRR), payback period, and return on investment index. To verify the sustainability of the project, sensitivity analysis and scenario modeling were used, which allowed assessing the impact of changes in key parameters on financial results.

Methods of economic and mathematical modeling and forecasting were used to form a forecast of the financial and economic indicators of the enterprise's activities in the medium term. Graphical and tabular methods were used to visually present the results of the calculations.

The comprehensive application of these methods ensured the scientific validity of the results obtained, their logical consistency and practical suitability for implementation in the activities of logistics enterprises.

CHAPTER 1. THEORETICAL AND METHODOLOGICAL PRINCIPLES OF DIGITALISATION OF LOGISTICS PROCESSES OF AN ENTERPRISE

1.1. Theoretical foundations of digital transformation of logistics

In the modern economy, the digital transformation of logistics systems appears not as a separate technological trend, but as a systemic factor of structural changes in value creation mechanisms. The changing nature of global supply chains, increasing requirements for speed and transparency of operations, and increasing instability of the external environment have necessitated a rethinking of the role of information technologies in logistics management. If at the early stages of logistics development, digital solutions performed an auxiliary function, ensuring the automation of accounting operations, then in modern conditions they are transformed into a strategic resource that forms a new configuration of business models.

The concept of "digitalization" in scientific discourse is interpreted as the process of integrating digital technologies into all aspects of the organization's functioning in order to increase its adaptability, productivity and innovative capacity. Unlike automation, which involves replacing manual operations with software algorithms, digital transformation encompasses deeper changes in the organizational structure, management culture and interaction with stakeholders. From the standpoint of the systems approach developed by L. von Bertalanffy and his followers, the logistics system is considered as an open multi-level structure capable of self-organization under the influence of information flows. In this context, digitalization acts as a mechanism for increasing its coherence and synchronization.

The evolution of digitalization of logistics systems conventionally went through several stages. The first stage, which falls on the 1960s–1980s, was characterized by the introduction of electronic computing systems for inventory management and transport operations. Research by J. Bowersox and D. Closs proved that information coordination is a key factor in reducing logistics costs. At this stage,

the understanding of information as a resource that complements material and financial flows was formed.

The second stage, associated with the spread of ERP and SCM systems in the 1990s–2000s, was marked by the integration of functional subsystems of the enterprise into a single information platform. According to M. Christopher, strategic logistics began to be perceived as a tool for creating competitive advantages, and digital technologies as a means of coordinating supply chains in real time. It was during this period that the concepts of integrated supply chain management and electronic data interchange (EDI) appeared.

The third stage of development is associated with the emergence of the concept of Industry 4.0, which was revealed in their works by K. Schwab and H. Kagermann. It is characterized by the transition from digital support of processes to the formation of cyber-physical systems, within which information and material flows interact autonomously. In logistics, this is manifested in the use of the Internet of Things, artificial intelligence, blockchain technologies, autonomous transport and digital twins. Digitalization acquires the characteristics of an ecosystem when individual enterprises are integrated into a common digital space.

The essence of digitalization of logistics systems is the transformation of the methods of generating and using information for making management decisions. If traditional logistics was based on retrospective data analysis, then modern digital systems provide forecasting based on machine learning algorithms. As S. Ivanov and A. Dolgui note, digital platforms allow modeling supply chain development scenarios taking into account risks and uncertainties. Thus, information becomes not only a means of control, but also a tool for strategic management.

An important characteristic of the modern stage is the integration of physical and digital flows. Logistics facilities are equipped with sensors that transmit data on the location, condition of the cargo and transportation parameters. The resulting data sets are processed in analytical centers, which allows for prompt adjustment of routes, optimization of stocks and minimization of downtime. This approach ensures increased

transparency of operations and the formation of trust between supply chain participants.

To systematize evolutionary changes, it is advisable to summarize the key characteristics of the stages of development of logistics digitalization in Table 1.1.

Table 1.1

The evolution of digitalization of logistics systems

Development stage	Basic technologies	Nature of impact on logistics	Strategic importance
Automation	Computer systems, MRP	Improving accounting accuracy	Operational efficiency
Integration	ERP, SCM, EDI	Coordination of departments and partners	Reducing costs and accelerating turnover
Digital ecosystem	IoT, AI, Blockchain, Digital Twin	Forecasting, autonomy, flexibility	Building competitive advantages and sustainability

From the standpoint of economic theory, digitalization changes the structure of transaction costs. R. Coase in the middle of the twentieth century substantiated the role of information in reducing coordination costs. Modern digital platforms radically reduce the costs of searching for information, concluding contracts and monitoring the fulfillment of obligations. This is especially important for logistics systems that operate in an environment of high volatility.

At the same time, digitalization creates new challenges related to cyber risks and dependence on information infrastructure. As M. Porter emphasizes, technological innovations are able to change the industry structure of competition, strengthening the role of those companies that are faster to integrate digital solutions into their strategy. Thus, digitalization becomes not only a tool for optimization, but also a factor in the redistribution of market positions.

In the face of global crises, including the COVID-19 pandemic and military conflicts, digital logistics systems have demonstrated greater adaptability compared to traditional models. The use of big data analytics allows predicting disruptions in supply chains, and digital platforms allow for rapid reorientation of flows. Thus, the evolution

of logistics digitalization is closely linked to increasing its resilience and ability to recover.

Therefore, the essence of digitalization in logistics systems lies in the deep integration of digital technologies into the processes of managing material, information and financial flows in order to increase the efficiency, flexibility and economic security of the enterprise. The evolution of this process from the automation of individual operations to the creation of digital ecosystems reflects the general trends in the development of the global knowledge economy.

In modern conditions of enterprise functioning, logistics processes cease to be considered exclusively as an auxiliary component of operational activities and are transformed into a strategic resource for the formation of competitive advantages. Intensification of global competition, growing consumer demands for speed and reliability of deliveries, as well as an increase in the level of uncertainty of the external environment necessitate a systematic rethinking of logistics as an object of digital transformation.

Logistics processes encompass a set of interrelated operations aimed at planning, organizing, managing and controlling material, information and financial flows within and outside the enterprise. As M. Christopher notes, modern logistics integrates the processes of supply, production, warehousing, transportation and distribution into a single system of creating value for the consumer. In this context, digitalization is considered as a mechanism for ensuring the synchronization of these processes in real time.

The objectivity of logistics processes within the framework of digital transformation is determined by their complexity, multi-level and high dependence on information support. Unlike production operations, which can be standardized and relatively stable, logistics processes are characterized by high variability, which necessitates the need for constant data analysis and operational decision-making. That is why they are a priority area for the implementation of digital technologies.

From the perspective of the process approach, the logistics system of an enterprise includes internal and external subprocesses. Internal processes are related to

inventory management, order processing, warehouse operations and internal transportation. External processes are related to the coordination of suppliers, distributors, carriers and end users. According to J. Bowersox, the efficiency of logistics is determined not only by the quality of individual operations, but also by the level of their integration. Digital transformation creates conditions for the transition from fragmented management to an integrated digital ecosystem.

A feature of logistics processes as an object of digitalization is their close relationship with the risk environment. Violations of delivery terms, fluctuations in demand, failures of transport infrastructure or information systems can lead to significant economic losses. S. Ivanov in his research proves that digital tools allow you to model scenarios of events and assess the impact of various factors on the sustainability of the supply chain. Thus, the digitalization of logistics is aimed not only at optimizing costs, but also at minimizing economic risks.

Structurally, logistics processes as an object of digital transformation can be represented as a set of interconnected components that are subject to digitization and integration (Table 1.2).

Table 1.2

Structural components of logistics processes in the context of digital transformation

Process component	Contents of operations	Digital transformation tools	Expected effect
Inventory management	Forecasting, planning, control	AI analytics, ERP systems	Reducing excess inventory
Warehouse logistics	Receiving, storage, packaging	WMS, robotics, IoT	Increasing processing speed
Transport logistics	Route planning, monitoring	GPS, TMS, Big Data	Optimization of costs and delivery times
Information coordination	Data exchange between partners	SCM platforms, Blockchain	Transparency and reduced transaction costs

From an economic point of view, the digital transformation of logistics processes involves a transition from a reactive management model to a proactive one. In the traditional model, decisions were made based on retrospective information, which limited the ability to respond in a timely manner to changes in demand or supply

disruptions. Modern digital systems provide processing of large data sets in real time, which allows for forecasting and prompt adjustment of operations.

An important aspect is the changing role of the human factor in logistics processes. According to H. Kagermann, within the framework of the Industry 4.0 concept, employees are moving from performing routine operations to controlling and configuring automated systems. This increases the requirements for personnel qualifications and forms a new model of organizational culture focused on digital competencies.

Logistics processes as an object of digital transformation also have an ecosystem dimension. The interaction of the enterprise with partners is carried out through digital platforms that provide data exchange on orders, stocks, transport resources and financial transactions. M. Porter and J. Heppelmann emphasize that "smart" and connected systems change the nature of competition, as they allow the formation of network effects and increase barriers to entry into the market.

Digitalization of logistics becomes especially important in conditions of increased instability. Disruptions of transport corridors, fluctuations in exchange rates, restrictions on access to resources require quick decision-making based on reliable data. Integration of analytical platforms with risk management systems allows the enterprise to minimize the negative consequences of external shocks.

At the same time, the digital transformation of logistics processes requires a comprehensive approach. It is not enough to implement individual technological solutions; it is necessary to ensure their integration into a single management architecture. This involves changing business processes, updating regulations, forming a digital strategy, and assessing the economic efficiency of investments.

Therefore, the logistics processes of an enterprise are a key object of digital transformation due to their multidimensionality, high level of risk and strategic importance for the formation of competitiveness. Digitalization provides increased transparency, flexibility and adaptability of the logistics system, contributes to cost reduction and minimization of economic risks.

The globalization of economic processes and the intensive development of digital technologies have led to the formation of a new stage of logistics transformation, which in the scientific literature is associated with the concepts of Industry 4.0 and Smart Logistics. International experience shows that the digitalization of logistics systems is becoming strategic and a key factor in ensuring the sustainability, flexibility and competitiveness of enterprises and national economies.

The concept of Industry 4.0, initiated in Germany and revealed in the works of H. Kagermann, involves the integration of cyber-physical systems, the Internet of Things, artificial intelligence and big data into production and logistics processes. Within this model, logistics is transformed into a digitally controlled network, where material flows are coordinated through intelligent algorithms. According to the definition of K. Schwab, the fourth industrial revolution is characterized by the speed, scale and systematicity of changes that cover all areas of the economy, in particular supply chain management.

In the European Union countries, the digitalization of logistics is carried out within the framework of digital unity programs and the development of "smart" infrastructures. Germany has become one of the leaders in the implementation of automated warehouses and robotic cargo processing centers. France and the Netherlands are actively developing digital ports, where real-time cargo flow monitoring systems are used. In Rotterdam, a digital port infrastructure management platform has been implemented, which allows predicting terminal workload and minimizing vessel downtime.

Germany's experience in integrating digital technologies into transport and logistics networks is particularly illustrative. The use of digital twins of transport nodes allows for the simulation of various scenarios, the assessment of the impact of external factors and the optimization of resource use. This approach contributes to the increased resilience of logistics systems to crisis events.

In the United States of America, the digitalization of logistics is based on the development of the platform economy and the use of big data analytics. Leading logistics operators are actively using machine learning algorithms to forecast demand,

optimize routes and manage inventories. As M. Porter notes, the integration of "smart" technologies into products and services changes the structure of competition and creates new sources of value. In logistics, this is manifested in the formation of digital ecosystems that unite carriers, warehouses, suppliers and customers in a single information environment.

China is demonstrating a different model of digital logistics transformation, based on large-scale investments in digital infrastructure and the development of e-commerce. Logistics networks are integrated with digital marketplaces, and automated warehouses are equipped with robotic sorting and picking systems. D. Ivanov's research emphasizes that the Chinese model is characterized by a high speed of technology adoption and centralized management of innovation processes.

The Smart Logistics concept deserves special attention, which involves the creation of intelligent logistics systems based on the integration of digital platforms, sensor technologies and data analytics. Smart Logistics is focused on ensuring transparency of supply chains, improving the level of service and minimizing environmental impact. In the Scandinavian countries, "green" logistics solutions are being actively implemented, combining digitalization with the principles of sustainable development.

To summarize the international experience of digitalization of logistics, it is advisable to present a comparative description of the approaches of different regions (Table 1.3).

Table 1.3

Comparison of international models of logistics digitalization

Region	Key areas of digitalization	Characteristic technologies	Strategic outcome
EU	Intelligent infrastructures, digital ports	IoT, Digital Twin, automation	Increasing sustainability and environmental friendliness
USA	Platform integration, big data analytics	AI, Big Data, Cloud platforms	Increasing efficiency and speed
China	Large-scale automation and e-commerce	Robotics, digital marketplaces	Processing speed and scalability

International experience also shows the growing role of blockchain technologies in ensuring transparency of logistics operations. The use of distributed registries allows to minimize the risks of document falsification, simplify customs clearance procedures and increase trust between participants in the supply chain. At the same time, the development of digital platforms is accompanied by increased requirements for cybersecurity and data protection.

In the context of crisis phenomena, in particular the COVID-19 pandemic, international companies have demonstrated the ability to quickly adapt logistics networks thanks to digital technologies. Analytical systems made it possible to predict shortages of goods, and automated warehouses ensured the continuity of operations even with limited personnel access. This confirms S. Ivanov's conclusion that digitalization is a necessary condition for ensuring the viability of supply chains. Thus, the international experience of digitalization of logistics demonstrates the transition from local automation to the formation of global digital ecosystems that ensure the integration of market participants in real time. The concepts of Industry 4.0 and Smart Logistics create a methodological basis for the transformation of logistics processes of enterprises, focusing them on innovation, adaptability and minimization of economic risks.

1.2. Economic risks of the logistics activities of the enterprise

The logistics activity of the enterprise is carried out in conditions of high dynamics of the market environment, which causes an increased level of uncertainty and risk. Economic risks in logistics are formed under the influence of both internal factors of business process organization and external factors of macroeconomic, institutional and infrastructural nature. In this regard, their systematization and classification is a necessary prerequisite for building an effective risk management system.

In the general economic sense, risk is interpreted as the probability of events that may lead to deviations of actual activity results from planned ones. F. Knight also

distinguished between the concepts of risk and uncertainty, emphasizing the possibility of quantitative assessment of the former and the unpredictability of the latter. In the field of logistics, risk is complex in nature, as it combines operational, financial, informational and strategic components.

Logistics processes cover the management of material, information and financial flows, therefore economic risks in this area directly affect the costs of the enterprise, its profitability and competitiveness. According to M. Christopher, disruption of the continuity of the supply chain can generate a multiplicative effect of losses, which extends to all participants in the system. This reinforces the need for a comprehensive approach to risk classification.

One of the basic classification features is the source of risk. This feature distinguishes between internal and external economic risks of logistics activities. Internal risks are associated with imperfect process organization, planning errors, insufficient personnel qualifications or technical failures. External risks are formed under the influence of changes in demand, exchange rate fluctuations, political instability, regulatory restrictions or force majeure.

Another important classification feature is the functional relevance of risks within the logistics system. Taking into account the structural components of logistics, it is advisable to distinguish supply risks, production and warehouse, transport, information and sales risks. D. Ivanov's research shows that the most vulnerable are transport and supply risks, since they directly depend on the state of the external environment.

From the perspective of financial impact, economic risks of logistics can be divided into cost, revenue and investment risks. Cost risks are associated with increased logistics costs due to higher fuel prices, increased transportation tariffs or inefficient inventory management. Revenue risks arise from losing customers due to delivery delays or reduced service quality. Investment risks relate to investments in logistics infrastructure or digital solutions that may not provide the expected economic effect.

Depending on the nature of the manifestation, risks can be systemic and specific. Systemic risks are associated with general economic crises, global disruptions

in supply chains or changes in international trade. Specific risks are local in nature and are determined by the specifics of the activities of a particular enterprise or industry. As E. Hofmann notes, in modern conditions, the role of systemic risks is increasing, which requires integrated management at the level of the entire logistics network.

To generalize classification approaches, it is advisable to present the systematization of economic risks in logistics in Table 1.4.

Table 1.4

Classification of economic risks of the logistics activities of an enterprise

Classification feature	Types of risks	Economic consequences
By source of origin	Internal, external	Rising costs, loss of profit
By functional affiliation	Supply, warehousing, transport, information, sales	Violation of deadlines, additional costs
By financial impact	Expense, income, investment	Declining profitability
By scale of influence	Systemic, specific	Destabilization of activities

A separate group is made up of information and cyber risks, which are becoming particularly relevant in the context of digitalization of logistics. Violations of the functioning of information systems, unauthorized access to data or software failures can lead to the suspension of operations and financial losses. In view of this, the classification of economic risks in logistics must take into account the digital component.

The division of risks by the degree of manageability is also of great importance. Manageable risks can be minimized by improving internal procedures, diversifying suppliers or insurance. Unmanageable risks are of a force majeure nature and require the creation of reserves or the implementation of adaptability mechanisms. As M. Porter emphasizes, the competitive advantage of an enterprise is determined by the ability not only to generate profit, but also to effectively manage risks.

Risk assessment of logistics processes is a key element of the enterprise's economic security management system. Given the complexity and multi-level nature of logistics systems, methodological approaches to risk assessment should combine quantitative and qualitative analysis tools, take into account both internal parameters of activity and external environmental factors. In modern scientific literature, a number

of approaches to risk analysis have been developed that are adapted to the specifics of logistics and supply chains.

The theoretical basis of risk assessment is the concept of expected utility, developed by J. von Neumann and O. Morgenstern, according to which decisions are made taking into account the probability of events occurring and the magnitude of possible consequences. In logistics processes, this means the need to determine the probability of supply disruptions, transport failures or cost overruns and assess their financial impact on the enterprise.

The most common is the probabilistic-statistical approach, which is based on the analysis of the variation of performance indicators. To assess the risk, indicators such as the mean square deviation, coefficient of variation, confidence intervals are used. In logistics, these methods are used to analyze fluctuations in delivery times, inventory levels or transportation costs. According to the conclusions of D. Ivanov, statistical analysis allows you to identify the most unstable elements of the supply chain and form priorities for managerial influence.

Along with quantitative methods, expert approaches are widely used, which involve the use of qualitative assessments of specialists. The Delphi method, T. Saaty's hierarchy analysis, and the construction of a risk matrix make it possible to systematize potential threats in conditions of insufficient statistical information. In logistics practice, expert assessment is especially relevant for the analysis of political, regulatory, or force majeure risks that are difficult to formalize.

A systematic approach to assessing the risks of logistics processes involves considering them as elements of a single network of relationships. According to the concept of Supply Chain Risk Management, developed by M. Christopher, it is necessary to take into account the cumulative effect of risks arising at different stages of the supply chain. This necessitates the use of scenario analysis and modeling methods.

One of the modern tools is simulation modeling, which allows you to reproduce the functioning of the logistics system under different scenarios of events. Monte Carlo models provide an opportunity to assess the distribution of possible outcomes and

determine the probability of critical deviations. Ivanov and Dolgui in their research prove the effectiveness of using digital twins of supply chains to analyze the consequences of violations and determine optimal response strategies.

The financial approach to risk assessment involves calculating indicators that reflect the impact of logistical threats on the financial results of the enterprise. These include Value at Risk (VaR), Cash Flow at Risk (CFaR), and cost coverage ratios. The use of these indicators allows us to quantitatively assess the maximum possible losses at a given level of probability.

In the practice of logistics risk management, an important place is occupied by the matrix assessment method, which combines indicators of probability and scale of consequences. Building a risk matrix allows you to classify threats by level of criticality and determine management priorities. An example of a generalized assessment structure is given in Table 1.5.

Table 1.5

Methodological approaches to risk assessment of logistics processes

Approach	Basic tools	Advantages	Limitation
Statistical	Variance, coefficient of variation	Objectivity of calculations	Requires a sufficient amount of data
Expert	Delphi, AHP, risk matrix	Flexibility, adaptability	Subjectivity of assessments
Imitation	Monte Carlo, Digital Twin	Modeling complex scenarios	High complexity of implementation
Financial	VaR, CFaR	Reflecting the impact on profit	Does not consider non-financial consequences

In the context of digital transformation, the importance of big data analytics and machine learning algorithms is growing. Using Predictive Analytics allows not only to assess risks based on historical data, but also to predict their occurrence. This approach ensures the transition from reactive to proactive management.

An important component of methodological support is the integration of risk assessment into the strategic planning of the enterprise. According to the concept of Enterprise Risk Management, supported by M. Porter, risk management should be part of the corporate strategy and take into account long-term development goals. For

logistics, this means the need to coordinate investments in digital technologies with the results of risk assessment.

Therefore, methodological approaches to assessing the risks of logistics processes are multi-component and involve the use of both quantitative and qualitative analysis tools. Modern trends in the development of digital technologies expand the capabilities of risk analysis, ensuring increased forecasting accuracy and timeliness of management decisions. Systematic application of these approaches forms the basis for developing an effective strategy for minimizing economic risks in the logistics activities of an enterprise.

In modern conditions, digital technologies are becoming a key tool for transforming logistics process management systems and minimizing economic risks. While traditional risk management mechanisms were focused mainly on responding to existing threats, digital solutions provide the ability to predict, prevent, and adaptively adjust the company's activities. In this context, digitalization is not only a factor in increasing operational efficiency, but also a systemic element of economic security.

The economic security of an enterprise in the field of logistics is determined by the ability to maintain the stability of material, information and financial flows under the influence of internal and external threats. As M. Christopher emphasizes, the stability of supply chains is directly related to the level of their transparency and information integration. It is digital technologies that provide such transparency through the use of intelligent monitoring systems and data analytics.

One of the basic directions of influence of digital technologies on risk reduction is increase of forecasting accuracy. Machine learning algorithms and big data analytics allow to analyze historical demand indicators, seasonal fluctuations, behavioral models of customers and to form forecasts with high level of reliability. This helps to optimize stocks, reduce storage costs and minimize the risk of shortage or surplus of products. According to the results of research by D. Ivanov, implementation of Predictive Analytics allows to reduce losses from supply interruptions up to 20–30%.

Another important tool is the Internet of Things (IoT) technologies, which provide continuous monitoring of the condition of cargo, transport and warehouses.

Thanks to sensor systems, the company receives information about the location of the goods, temperature, humidity and other parameters. This allows for timely detection of deviations and prevention of product spoilage or violation of delivery deadlines.

The use of digital supply chain management (SCM) platforms creates conditions for the integration of logistics network participants in a single information environment. M. Porter and J. Heppelmann emphasize that “smart” systems allow the formation of network effects that increase coordination and reduce transaction costs. In logistics, this is manifested in reducing the risk of information gaps, delays in order transfer and errors in documentation.

The implementation of blockchain technologies is important, ensuring the immutability and transparency of data in supply chains. Distributed ledgers allow recording all cargo transactions, which reduces the risk of fraud and document forgery. In addition, the automation of contractual relations through smart contracts minimises legal risks and accelerates the fulfilment of obligations.

The use of digital twins of logistics systems has a significant impact on economic security. Digital Twin enables modelling alternative event scenarios, assessing the consequences of failures, and determining optimal ways to respond. This approach allows the enterprise to prepare in advance for potential crisis situations, thereby increasing its adaptability.

To summarise the impact of digital technologies on risk minimisation, it is advisable to present the correspondence between risk types and tools for their reduction (Table 1.6).

Table 1.6

The impact of digital technologies on reducing economic risks in logistics

Risk type	Digital tool	Economic effect
Risk of inventory shortage or surplus	Big Data, AI forecasting	Reduced storage costs
Transport risks	GPS monitoring, TMS	Optimization of routes and delivery times
Information risks	SCM platforms, Blockchain	Transparency and reduced transaction costs
Operational failures	Digital Twin, IoT	Increasing response speed

At the same time, digitalization creates new challenges related to cybersecurity and information protection. Growing dependence on information systems increases the risk of cyberattacks or technical failures. Therefore, the introduction of digital technologies must be accompanied by the development of cyber protection and data backup systems.

In a strategic dimension, digital technologies form the basis for an integrated risk management system. According to the concept of Enterprise Risk Management, an effective combination of data analytics, automated procedures and strategic planning ensures the long-term sustainability of the enterprise. In logistics, this means moving to a proactive management model focused on threat prevention.

1.3. Methodological approaches to forming a digitalization strategy

Digital transformation of an enterprise in modern conditions ceases to be a local technological project and acquires the features of a strategic process that covers all levels of management and changes the logic of forming competitive advantages. This is especially relevant for enterprises with developed logistics systems, where the integration of digital solutions directly affects the speed of capital turnover, cost structure and resistance to external risks. Strategic management of digital transformation involves a systematic combination of technological innovations with long-term development goals of the enterprise.

In the scientific literature, strategy is considered as a coordinated set of decisions aimed at achieving sustainable competitive positions. M. Porter emphasized that strategy consists in creating a unique position in the market through a distinctive configuration of activities. In the context of digitalization, this means not just the introduction of new technologies, but the formation of a new business process architecture that provides synergy between digital tools and logistics operations.

Strategic management of digital transformation is based on several key principles. The first principle is integration, which involves the inclusion of digital strategy in the overall corporate strategy. Digitalization cannot be an isolated area of

activity; it must be consistent with the financial, marketing and operational plans of the enterprise. The second principle is a focus on value creation, which involves assessing digital investments from the perspective of their impact on economic results and competitiveness. The third principle is adaptability, which ensures a flexible response to changes in the technological environment.

According to the concept of dynamic capabilities proposed by D. Teece, an enterprise must have the ability to integrate, form and restructure internal and external competencies in accordance with environmental changes. Digital transformation is a tool for implementing such capabilities, as it allows you to quickly adapt logistics processes to fluctuations in demand, supply disruptions or changing market conditions.

Strategic digitalization management involves several stages. The first stage involves diagnosing the current state of the enterprise, in particular the level of digital maturity and the efficiency of logistics processes. The second stage involves the formation of strategic goals for digital transformation, which should be specific, measurable and consistent with the long-term vision of development. The third stage involves developing a roadmap for implementing digital solutions, determining resource provision and a performance control system.

Change management is of particular importance, as digital transformation affects not only the technological infrastructure, but also the organizational culture. According to J. Kotter's approaches, effective transformation requires the formation of a coalition of change, communication of the strategic vision and motivation of personnel. In logistics systems, this means increasing the digital competencies of employees and involving them in the modernization process.

In a strategic dimension, the digital transformation of logistics contributes to the formation of new business models. The use of digital platforms allows integrating suppliers and customers into a common information ecosystem, which increases the level of service and reduces transaction costs. As M. Porter and J. Heppelmann point out, the emergence of “smart” and connected systems changes the structure of competition and strengthens the role of data as a strategic resource.

At the same time, strategic management of digital transformation must take into account the risk aspect. Investments in digital technologies are associated with a high level of uncertainty, rapid obsolescence of equipment and possible cyber threats. Therefore, the digital strategy must be based on the principles of risk-based planning and provide for mechanisms for redundancy and diversification.

To systematize the key elements of strategic management of digital transformation, it is advisable to present them in a structured form (Table 1.7).

Table 1.7

Key elements of strategic digital transformation management

Strategy element	Content	Expected result
Strategic vision	Defining the role of digitalization in enterprise development	Consistency of goals
Diagnostics	Digital maturity and risk assessment	Reasonableness of decisions
Implementation plan	Roadmap and resource provision	Implementation efficiency
Control and monitoring	System of indicators and KPIs	Achieving strategic goals

As can be seen, the strategic management of the digital transformation of an enterprise is a complex process that combines technological innovations with long-term planning and a risk management system. In the field of logistics, this ensures increased efficiency of operations, strengthening economic security and the formation of sustainable competitive advantages. The development of a digital strategy should be based on a systemic approach, integration with corporate goals and taking into account the dynamics of the external environment.

Developing a digital strategy for an enterprise requires the use of conceptually sound models that allow for a systematic assessment of the current state, identification of strategic priorities, and formation of a sequence of transformational changes. In modern scientific and applied practice, the most common are the Digital Maturity Model and the Risk-based approach. Their combination creates a methodological basis for forming a strategy for digitizing logistics processes, taking into account the economic security of the enterprise.

The digital maturity model is based on the assumption that digital transformation is a staged process and reflects the gradual development of organizational, technological and managerial competencies. In the studies of G. Westerman, D. Bonnet and A. McAfee, digital maturity is defined as the level of integration of digital technologies into business processes and the ability of the organization to use them to create competitive advantages. In logistics, this means the transition from fragmented use of IT solutions to the formation of an integrated digital ecosystem.

The typical structure of the Digital Maturity Model involves several levels of development: initial (ad hoc), functional, integrated, data-driven, and innovative. At the initial level, digital tools are used episodically and are not integrated into strategic planning. At the integrated level, a single information architecture of logistics processes is formed. The innovative level involves the use of big data analytics, artificial intelligence, and digital twins for strategic management.

In the context of logistics, a digital maturity assessment can cover areas such as automation of warehouse operations, digital integration of transportation systems, use of predictive analytics, cybersecurity levels, and organizational readiness of personnel for change. The assessment results allow us to identify the “digital gap” between the current and desired states, which serves as the basis for strategic decisions.

At the same time, focusing solely on technological development is insufficient in conditions of high uncertainty. That is why a risk-oriented approach to developing a digital strategy is becoming increasingly important. Its essence lies in integrating risk management processes into the strategic planning for digital transformation. According to the concept of Enterprise Risk Management, strategic decisions should be made by considering the likelihood of threats and the scale of their consequences.

A risk-based approach in logistics involves identifying key supply chain risks, assessing their impact on financial results, and defining digital tools to minimize them. For example, high transportation risk may require implementing GPS monitoring and route analytics. Inventory risk may require integrating demand forecasting algorithms.

D. Ivanov's scientific works emphasise that modern logistics systems should combine digital maturity assessment with supply chain vulnerability analysis. This allows not only to determine the direction of technological development, but also to justify the economic feasibility of investments in digital solutions.

To summarise the characteristics of the two approaches, it is advisable to present their comparative analysis (Table 1.8).

Table 1.8

Comparison of digital strategy formation models

Criterion	Digital Maturity Model	Risk-based approach
Main goal	Determining the level of digital development	Minimizing economic risks
Key tool	Process maturity assessment	Analysis of the probability and consequences of risks
Focus of attention	Technological and organizational competencies	Financial stability and security
Strategic outcome	Increasing innovation	Strengthening economic security

The integration of these models ensures the complexity of the digital strategy. First, the company determines its level of digital maturity, and then forms strategic initiatives taking into account the most critical risks. This approach allows for optimal allocation of resources and increased efficiency of investments in digitalization.

The application of the combined model is especially relevant for enterprises with developed logistics networks, where numerous internal and external participants interact. In conditions of global instability, a strategy that combines digital maturity assessment with risk-based analysis lays the groundwork for an adaptive, sustainable logistics system.

Therefore, the Digital Maturity Model and Risk-based approach constitute a methodological basis for developing a digitalization strategy for an enterprise. Their combination allows for a balance between technological development and economic risk management, a necessary condition for the long-term competitiveness and economic security of logistics activities.

The effectiveness of a company's digital strategy cannot be assessed solely by the implementation of technological solutions. It must be measured through a system

of quantitative and qualitative indicators that reflect the economic, operational and strategic results of digital transformation. In the field of logistics, such an assessment takes on particular importance, since digitalization directly affects costs, capital turnover, service level and risk profile of the company.

In the theory of strategic management, one of the basic approaches to assessing performance is the balanced scorecard concept by R. Kaplan and D. Norton, which evaluates strategy through financial and non-financial indicators. In the context of digital transformation of logistics, this means the need to integrate financial indicators (profitability, return on investment) with operational (order processing speed, level of automation) and strategic (level of digital maturity, competitiveness).

Financial indicators remain the basic criterion for assessing the effectiveness of a digital strategy. These include net present value (NPV), internal rate of return (IRR), payback period, logistics cost savings, and operating profit growth. The implementation of digital solutions in logistics, in particular, warehouse automation or route optimization, should be reflected in a reduction in specific transportation and storage costs.

Operational indicators characterize the impact of digital strategy on the productivity and quality of logistics processes. These include average order fulfilment time, on-time delivery ratio, level of demand forecasting accuracy, inventory turnover, and level of vehicle utilisation. According to M. Christopher, operational stability is the basis for building customer trust and reducing the risk of losing the market.

A separate group consists of digital maturity indicators that reflect the level of integration of technologies into business processes. This may be the share of automated operations, the level of use of big data analytics, the degree of integration of information systems, the level of cyber protection. In the works of G. Westerman, it is emphasised that a high level of digital maturity correlates with higher rates of growth in revenue and profitability of the enterprise.

In the context of risk management, it is important to assess the impact of a digital strategy on reducing economic risks. Such indicators can be a reduction in the frequency of logistical failures, a decrease in cost variation, a decrease in the level of

losses from delays or damage to cargo. The use of Value-at-Risk (VaR) methods or scenario analysis enables us to quantitatively assess changes in an enterprise's risk profile after implementing digital solutions.

To systematise the indicators, it is advisable to present them in a structured form in Table 1.9.

Table 1.9

A system of indicators for assessing the effectiveness of a digital strategy in logistics

Indicator group	Main indicators	Economic content
Financial	NPV, IRR, cost reduction	Return on investment assessment
Operational	Delivery time, inventory turnover	Productivity improvement
Digital maturity	Level of automation, systems integration	Technological development
Risk-oriented	Failure rate reduction, VaR	Increasing economic security

An important condition for the effective functioning of the system of indicators is their interconnection and alignment with the enterprise's strategic goals. Indicators should form a single analytical platform that allows monitoring the implementation of the digital strategy in dynamics. The use of digital analytical panels (dashboard) provides operational control and timely adjustment of management decisions.

In the strategic dimension, the scorecard serves as a feedback mechanism, allowing assessment of the alignment of the achieved results with the planned goals. If financial or operational indicators do not reach the predicted values, this signals the need to review the priorities of the digital strategy or optimize the implemented technologies.

Therefore, the system of indicators for assessing the effectiveness of a digital strategy in logistics should be comprehensive, multi-level, and integrated into the enterprise's overall strategic management system. Its formation ensures objective measurement of the results of digital transformation, increased transparency in management, and strengthened economic security.

Conclusions to Chapter 1

The first section of the study provides a theoretical and methodological basis for the analysis and development of a strategy for the digitalization of logistics processes of an enterprise. The generalization of scientific approaches has made it possible to establish that the digital transformation of logistics is an evolutionary process that has gone from the automation of individual operations to the formation of integrated digital ecosystems within the concepts of Industry 4.0 and Smart Logistics. Digitalization in the modern sense is not only a technological innovation, but also a strategic factor in the formation of competitive advantages, increasing adaptability and ensuring economic security of the enterprise.

It has been proven that logistics processes are a priority for digital transformation due to their multi-level nature, high degree of interdependence, and significant impact on financial performance. Integration of digital solutions into the material, information and financial flow management system contributes to increasing the transparency of operations, reducing transaction costs and minimizing losses associated with the uncertainty of the external environment.

The systematization of economic risks of logistics activities made it possible to determine their multidimensional nature and the need for an integrated approach to management. The classification of risks by source of origin, functional affiliation, financial impact and scale of manifestation creates the basis for further quantitative assessment and formation of mechanisms for their minimization. It is substantiated that digital technologies play a key role in reducing risks by increasing the accuracy of forecasting, improving decision-making efficiency, and ensuring the integration of logistics network participants.

Methodological approaches to the formation of a digitalization strategy are considered, in particular, digital maturity models and a risk-oriented approach. It is established that their integration allows combining the assessment of the enterprise's technological development with the analysis of economic threats, thereby ensuring the balance of strategic decisions. The system of indicators for assessing the effectiveness

of the digital strategy, which includes financial, operational, technological and risk-oriented indicators, is identified as a necessary tool for monitoring the effectiveness of digital transformation.

Thus, the theoretical provisions summarized in the section form a methodological basis for further analytical research into the level of digitalization of logistics processes of an enterprise and assessment of their impact on economic risks. This establishes the prerequisites for developing a sound digital transformation strategy to increase the enterprise's sustainability and competitiveness in an unstable market environment.

CHAPTER 2 ANALYSIS OF THE LEVEL OF DIGITALIZATION AND ECONOMIC RISKS OF THE LOGISTICS PROCESSES OF THE ENTERPRISE

2.1. Organizational and economic characteristics of the enterprise

The object of the study is the company Nova Poshta, one of the leaders in the Ukrainian market for express delivery and logistics services. Analysis of the company's development history and market position enables us to identify the strategic prerequisites for the digital transformation of logistics processes and assess the level of its competitiveness.

The company was founded in 2001 as a regional express delivery operator focused on fast cargo transportation between major cities of Ukraine. The initial stage of development was characterized by the formation of a basic network of branches, the creation of its own fleet and the gradual expansion of the client base. Already at an early stage, the company chose an active scaling model, which involved the opening of new points of presence and the introduction of standardized service procedures.

In the period 2008–2015, the company made a significant leap in development, driven by the growth of domestic trade and the rapid spread of e-commerce. The company expanded its branch network to a national scale, invested in sorting centre automation, and began implementing information systems for real-time order processing. It was at this stage that the company's logistics began to transform from a traditional cargo transportation model to an integrated service platform.

Further development of the company is associated with the digitalization of business processes and diversification of services. Over the past decade, the company has actively developed mobile services for customers, implemented shipment tracking systems, and automated cargo processing at sorting terminals. Significant investments were made in the creation of modern logistics hubs and the introduction of innovative technologies, which allowed to increase the speed and accuracy of delivery.

From an organizational point of view, the company has a divisional management structure with the distribution of functions by areas of activity: operating

unit, financial unit, IT department, infrastructure development and international logistics units. Such a structure allows combining centralized strategic planning with operational flexibility at the regional level.

Analyzing the history of the company's development, several key stages of evolution can be distinguished: the formation of a regional operator, national scaling, integration of digital technologies and transformation into a logistics ecosystem. Each of these stages was accompanied by investments in infrastructure and information systems that laid the foundation for a subsequent digital strategy.

The competitive environment in the Ukrainian postal and logistics services market in 2021-2023 was characterized by high dynamism, structural heterogeneity, and the increasing role of digital tools in securing operators' market positions. During the specified period, competition unfolded not only between classic postal operators, but also between private express delivery companies, freight logistics enterprises, as well as entities that actively integrated logistics services with e-commerce. This led to a transition from price competition to competition over service speed, logistics network accessibility, delivery reliability, service technology, and the enterprise's ability to maintain operational stability even in the face of significant external challenges.

A feature of the studied market is that its participants operate in different segments and, although formally belonging to the same type of economic activity, in fact implement different competitive models. Thus, JSC "Ukrposhta" performs the functions of a national operator and maintains a presence in the vast majority of settlements in the country, which distinguishes it in terms of territory coverage and the availability of basic postal services. Meest company occupies notable positions in domestic and international transportation, especially in the e-commerce and cross-border delivery segments. At the same time, Delivery and SAT specialize mainly in freight transportation, logistics for business and delivery of large-sized shipments. Against this background, LLC "Nova Poshta" occupies leading positions in the express delivery segment, combining mass service, an extensive logistics network, high delivery speed, and the active implementation of digital solutions in key business processes.

The competitive struggle in the postal and logistics services market during the period under review was largely determined by changing consumer expectations. Customers increasingly focused not only on the basic ability to send shipments, but also on the convenience of digital interaction with the operator, transparency of the delivery route, speed of receiving information about the shipment, flexibility of service channels and the possibility of remote registration of services. In these conditions, competitive advantages began to form not so much on the basis of the presence of physical infrastructure as such, but on the ability to integrate it with digital logistics management platforms, mobile services, automated delivery points and electronic offices for customers. That is why digitalization has become one of the determining factors in strengthening the market positions of logistics companies.

For Nova Poshta LLC, the main sources of competitive advantages in 2021–2023 were a wide geographical coverage, a significant scale of the network, high speed of logistics operations, service orientation and a high level of digitalization of interaction with customers. It is important to emphasize that the quantitative parameters of the company's activities, in particular the volumes of services provided and the number of branches, have already been given in the previous table of main technical and economic indicators, therefore, in this case, it is advisable to focus on the qualitative characteristics of its market position. The company's advantage is that it has formed not just an extensive network of acceptance and delivery of shipments, but a holistic logistics system in which the physical processes of processing, transportation and delivery are closely combined with digital services for order management, tracking of shipment movements, analytics of logistics flows and remote communication with the client.

Unlike some of its competitors, Nova Poshta is consistently developing an omnichannel service model, in which clients can interact with the company through various channels: stationary branches, post offices, mobile application, personal account, electronic invoices, and integrated services for online stores and corporate clients. This approach ensures not only increased convenience in using services, but also reduced time for performing individual operations, reduced workload on

personnel, accelerated document flow, and increased accuracy in order processing. In fact, the company's digital infrastructure is not an auxiliary element but a central mechanism for ensuring its competitiveness. It is through digital solutions that better coordination between the stages of the logistics chain is achieved, the controllability of operations is increased and the likelihood of failures that can cause economic losses is reduced.

Comparison with the main market participants allows us to specify the enterprise under study's competitive position (Table 2.1).

Yes, Ukrposhta's advantage lies in the scale of territorial coverage and presence in the most remote settlements, however, Nova Poshta demonstrates stronger positions in the segment of urgent delivery, speed of shipment processing and digital convenience of the service. In the case of Meest, the competition is closer, since both operators are actively operating in e-commerce, domestic delivery, and digital customer support. However, Nova Poshta has greater recognition, a larger internal logistics infrastructure, and stronger positioning in the mass express delivery segment. Delivery and SAT, in turn, remain significant competitors mainly in the field of freight transportation and logistics services for business clients, however, their model is less focused on large-scale servicing of individual consumers and the mass segment of small shipments, which limits their competitive impact on the key areas of Nova Poshta's activity.

Table 2.1

Comparative characteristics of the main players in the Ukrainian postal and logistics services market in 2021-2023.

Operator	Market profile in 2021–2023.	Network and coverage	Digital tools	The nature of competition regarding Nova Poshta
New mail	Leader in the private express delivery segment; competition is based on speed, frequency of shipments, service and integration with e-commerce	The quantitative parameters of the network and transportation volumes are already given in the previous table; delivery within the city is officially declared within 1 day, between large cities 1–2 days	Business office, mobile application, API, mail machines, fulfillment	Sets the market standard for speed, self-service convenience, and digital customer engagement
Ukrposhta	National universal postal service operator; competes primarily on territorial coverage and accessibility	9,020 post offices as of 12/31/2021; 7,172 as of 12/31/2022; in 2023 — about 28,967 points of presence; coverage of 20,204 settlements	Mobile application, chatbot, personal account, API for e-commerce	Strongest competitor in terms of universal coverage of the country, especially small and rural settlements; less focused on the express service model
Most / Most Mail	Private postal and logistics operator with strong positions in domestic and international delivery, especially for online commerce	In 2021, the company reported over 4,000 branches; for e-commerce, it declares 5,000+ branches and ATMs as part of the network	Meest API, Meest cabinet, CRM integrations, a single API for entering foreign markets	The main competitor in the e-commerce and international/cross-border delivery segment
Delivery	Logistics operator specializing mainly in freight transportation, pallets, B2B logistics	Over 300 cargo offices, 27 sorting and distribution centers, over 500 flights daily	API, personal account, mobile services, tracking	Competitive pressure is mainly in the freight, corporate and address segments, rather than in mass express delivery of small parcels
SAT	Transport and logistics company focused on transporting cargo, parcels and documents across Ukraine	Network in more than 180 cities, own fleet, branches in major cities	Personal account, tracking, mobile application, API, integration with 1C	Competes with Nova Poshta primarily in the freight and regional transportation segment, as well as B2B services

Of significant importance for assessing the competitive environment is also the fact that in 2022-2023 the postal and logistics services market operated in unprecedented instability, associated with changing transportation routes, the destruction of part of the infrastructure, disruption of traditional transport links, population displacement, and the restructuring of demand for logistics services. Under such conditions, not only the scale of the network or the level of automation, but also the organizational flexibility of the operator gained special value. The ability of the enterprise to quickly change routes, redistribute loads between logistics nodes, restore service point operations, adapt transportation schedules, and quickly implement new service formats has become an independent factor of competitiveness. In this regard, Nova Poshta demonstrated high adaptability, enabling it to maintain operational stability and its leading market position.

It is worth emphasizing that in modern conditions, the competitiveness of a logistics enterprise cannot be assessed solely by traditional indicators of the scale of activity or financial results. Parameters that reflect the quality of business process organization are becoming no less important: the level of digital integration of logistics operations, the speed of information exchange, the ability to forecast load, the efficiency of route management, the degree of automation of sorting and issuing shipments, as well as the ability to provide a stable customer experience in various service channels. It is these characteristics that form the basis of long-term competitive advantage, since they determine not only the current efficiency of operations, but also the company's ability to minimize economic risks in the future.

In summary, it should be noted that the competitive environment in the Ukrainian postal and logistics services market in 2021-2023 was multi-level and quite intense, and its key parameters were territorial coverage, delivery speed, digitalization of services, operator specialization and the ability to adapt to external changes. Within this environment, Nova Poshta LLC has developed sustainable competitive advantages through an extensive logistics network, service orientation, intensive use of digital technologies, and high flexibility in managing operational processes. This operating model provides the company not only with strong market positions, but also creates

the prerequisites for further formation of a strategy for digitalization of logistics processes as a tool for increasing operational efficiency and minimizing economic risks.

To assess the market position, it is advisable to analyze such indicators as the scale of the network, the volume of processed shipments, market share and the level of service. During the analyzed period, the company continued to expand the network of branches and ATMs, which ensured convenient access for customers even in small settlements (Table 2.2). In parallel, the sorting centers were modernized with the introduction of automated cargo processing lines, which contributed to increasing productivity.

Table 2.2

Market position indicators of Nova Poshta LLC in 2021–2023.

Indicator	2021	2022	2023
Network scale, customer contact points, units.	over 20,000	over 23,000	27,050
Number of post offices, units	13,000	over 13,000	15,590
Volume of delivered shipments, million units.	372	315	412
Estimated market share by number of shipments, %	n/a	70.6	75.7
Average delivery speed in Ukraine	11 p.m.	At the beginning of the full-scale war, the indicator temporarily increased to 5 days, and in May it was restored to 23 hours.	11 p.m.
Development of sorting infrastructure	The second line of the Kyiv Innovation Terminal was launched; sorting capacity increased to 50 thousand parcels per hour; 17 new automated sorting terminals were opened	innovative terminals opened in Dnipro and Zaporizhia	the construction of innovative logistics complexes in Kyiv and Odessa continued

The indicators presented in the table indicate that during 2021-2023, Nova Poshta LLC not only maintained but also consistently strengthened its positions in the

domestic market for postal and logistics services. One of the most significant indicators of this is the scale of the company's logistics network. The company ensured the stable operation of a significant number of customer service points and, at the same time, expanded alternative interaction formats, primarily through the development of a network of post offices. This approach contributed to increasing the spatial accessibility of services, simplifying the process of receiving and sending parcels, as well as reducing the time of contact between the client and the operator. Of particular importance is that, even under conditions of significant external environment complications in 2022, the company did not stop infrastructure development and, already in 2023, ensured further growth in network coverage. This indicates a high level of flexibility in the logistics system and its ability to maintain service continuity across different regions of the country.

An important criterion for assessing the enterprise's market position is also the dynamics of the volumes of delivered shipments. In 2021, the company operated at a significant scale, confirming its leading role in the market even before the aggravation of military-economic challenges. In 2022, shipments declined, a natural reaction to deteriorating business conditions, the destruction of part of the logistics infrastructure, changes to transport routes, a decrease in business activity, and the general instability of the economic environment. At the same time, in 2023, the enterprise managed not only to restore lost positions, but also to exceed previous results. Such dynamics indicate the stability of the company's functioning, the effectiveness of its management decisions and the ability to quickly adapt logistics processes to new operating conditions. The increase in market share, as measured by the number of shipments during the studied period, also confirms the enterprise's strengthening competitive position and its ability to effectively respond to changing market conditions.

An essential aspect of assessing the competitiveness of an enterprise is the level of service, which, in the case of Nova Poshta LLC, should be considered through the prism of delivery speed, the stability of logistics operations, and the quality of customer service. During the period under study, delivery speed remained one of the company's key competitive advantages. Even despite the temporary deterioration of certain

service parameters due to military operations and logistical restrictions, the enterprise managed to stabilize its work in a relatively short time and restore the usual level of delivery efficiency. Maintaining such an indicator in 2023 indicates the effectiveness of anti-crisis management, the appropriate level of coordination of internal processes and high efficiency of organizing logistics activities. Thus, the service component of the company's market position is directly related to its ability to promptly respond to external changes, maintain service stability, and guarantee the predictability of logistics outcomes for consumers.

Separate consideration is required for the development of sorting infrastructure, which during the analyzed period became one of the determining factors in maintaining the leading positions of the enterprise. Strengthening the automation of sorting processes, modernization of existing logistics facilities and opening of new innovative facilities made it possible to increase the productivity of cargo processing, reduce the duration of individual operations and improve the manageability of logistics flows. It is important that infrastructure investments were made not only in conditions of stable development, but also during periods of crisis upheavals, which indicates the strategic nature of approaches to enterprise management. The continued development of logistics complexes and sorting terminals indicates that the strengthening of the market positions of Nova Poshta LLC in 2021-2023 was based not only on the quantitative expansion of the network, but also on the qualitative improvement of internal business processes.

In summary, the strengthening of Nova Poshta LLC's market position during the period under study was due to the complex interplay of several interrelated factors. These include the expansion of the service network, the restoration and increase in the volume of shipments, maintaining a high level of service, as well as the systematic modernization of the sorting infrastructure. The combination of these trends indicates that the company derives its competitive advantages not only from the scale of its operations, but also from the consistent improvement of logistics processes, the active implementation of technological solutions, and increased flexibility in its management system. It is this development model that creates the basis for further digitalization of

logistics processes and the use of digital tools as a means of increasing the efficiency of operations and minimizing economic risks.

Financial and economic analysis of an enterprise's activities is a necessary prerequisite for assessing the potential of its digital transformation and ability to implement strategic innovation projects. For a logistics company, financial indicators are directly related to the scale of operations, the level of automation, the cost structure and resilience to external risks.

The analysis was carried out over the three-year period 2021-2023, which allows us to trace the dynamics of the enterprise's activities in the pre-crisis period, the shock impact of military factors, and subsequent adaptation (Table 2.3).

Analysis of the dynamics of net income from service sales indicates a steady increase in the scale of the enterprise's economic activity throughout the entire period under study. In 2021, net income amounted to 20,843,502 thousand UAH, in 2022 it increased to 23,687,034 thousand UAH, and in 2023 it reached 36,468,879 thousand UAH. The absolute increase in income in 2023 compared to 2021 was 15,625,377 thousand UAH, or 74.97%, and compared to 2022 - 12,781,845 thousand UAH, or 53.96%. Such dynamics indicate a significant expansion of the enterprise's market activity, an increase in the volume of services provided and the strengthening of its positions in the logistics services market. It is especially important that the most significant growth occurred in 2023, indicating the company's ability not only to adapt to difficult environmental conditions but also to ensure active recovery and further development.

Table 2.3

Analysis of the main financial and economic indicators of Nova Poshta LLC

Indicator	2021	2022	2023	Abs. rejection 2023/2021	Abs. devi. 2023/2022	Relative deviation 2023/2021, %	Relative deviation 2023/2022, %
Net income from the sale of services, thousand UAH	20843502	23687034	36468879	15625377	12781845	74.97	53.96
Cost of services provided, thousand UAH	16441004	19276532	28625037	12184033	9348505	74.11	48.50
Expenses per 1 UAH of net income, UAH	0.7888	0.8138	0.7849	-0.0039	-0.0289	-0.49	-3.55
Gross profit, thousand UAH	4402498	4410502	7843842	3441344	3433340	78.17	77.84
Operating profit, thousand UAH	1611195	2530417	3808343	2197148	1277926	136.37	50.50
Net profit, thousand UAH	2600320	2135960	3967156	1366836	1831196	52.56	85.73
Average annual cost of fixed assets, thousand UAH	4761592	6506212	8083990	3322398	1577778	69.77	24.25
Return on fixed assets, UAH/UAH	4.38	3.64	4.51	0.13	0.87	3.06	23.91
Total asset value (at the end of the year), thousand UAH	13498127	15754920	23101706	9603579	7346786	71.15	46.63
Average number of employees, people	29,790	27819	26327	-3463	-1492	-11.62	-5.36
Average annual labor productivity of one employee, thousand UAH/person	699.68	851.47	1385.23	685.55	533.76	97.98	62.69
Labor costs, thousand UAH	5742731	5345909	8491614	2748883	3145705	47.87	58.84
Average monthly labor costs per employee, UAH	16064.48	16013.96	26878.66	10814.18	10864.70	67.32	67.85
Number of branches, units	9993	9201	10,875	882	1674	8.83	18,19

The cost of services provided also had a pronounced upward trend: from UAH 16,441,004 thousand in 2021 to UAH 19,276,532 thousand in 2022 and UAH 28,625,037 thousand in 2023. The absolute increase in 2023 compared to 2021 was UAH 12,184,033 thousand, or 74.11%, and compared to 2022 - UAH 9,348,505 thousand, or 48.50%. Such growth is a natural consequence of the expansion of the company's activities, an increase in the number of shipments, the development of the branch network, the expansion of the logistics infrastructure, and the increase in costs for ensuring the company's smooth functioning. At the same time, the cost growth rate in 2023 was lower than the net income growth rate, indicating an improvement in overall operating efficiency.

This is confirmed by the indicator of expenses per UAH 1 of net income. In 2021, UAH 0.7888 of expenses accounted for UAH 1 of income, in 2022 – UAH 0.8138, and in 2023 – UAH 0.7849. Compared to 2021, the value of the indicator in 2023 decreased by UAH 0.0039, or 0.49%, and relative to 2022 – by UAH 0.0289, or 3.55%. The increase in this indicator in 2022 indicated a temporary deterioration in cost efficiency, which could be associated with the complication of logistics routes, increased transportation costs, restructuring of operational processes and other crisis factors. However, already in 2023, the enterprise managed not only to compensate for the negative impact of the previous year, but also to achieve a better result than in 2021, which is a positive sign of increased economic performance.

The gross profit of the enterprise in 2021 was 4402498 thousand UAH, in 2022 – 4410502 thousand UAH, and in 2023 – 7843842 thousand UAH. Thus, in 2023, compared to 2021, gross profit increased by 3441344 thousand UAH, or by 78.17%, and relative to 2022 – by 3433340 thousand UAH, or by 77.84%. The almost unchanged level of gross profit in 2022 with a simultaneous increase in net income indicated an increase in the cost burden in the conditions of the crisis. In contrast, the sharp growth in 2023 reflects a significant improvement in the ratio between income and direct expenses. This provides grounds for arguing that the company increased the efficiency of its core activities and strengthened its financial foundation.

Operating profit during 2021-2023 also demonstrated stable positive dynamics. In 2021, its value was 1611195 thousand UAH, in 2022 – 2530417 thousand UAH, and in 2023 – 3808343 thousand UAH. The absolute increase in 2023 compared to 2021 was 2197148 thousand UAH, or 136.37%, and in relation to 2022 – 1277926 thousand UAH, or 50.50%. Such dynamics indicate not only an increase in gross profit, but also a sufficiently effective management of administrative, sales and other operating expenses. Accordingly, the company not only increased the volume of services provided but also improved financial results from its core activities, which is an important sign of increased business model efficiency.

Net profit in 2021 amounted to 2600320 thousand UAH, in 2022 it decreased to 2135960 thousand UAH, and in 2023 it increased to 3967156 thousand UAH. As a result, in 2023, compared to 2021, its increase was 1366836 thousand UAH, or 52.56%, and compared to 2022 – 1831196 thousand UAH, or 85.73%. A decrease in net profit in 2022, despite an increase in operating profit, may indicate the influence of non-operating factors, in particular financial costs, exchange rate fluctuations, or other external risks. At the same time, a sharp improvement in the results in 2023 indicates the restoration of the enterprise's overall financial stability. The emerging trend suggests that the company has a strong ability to restore profitability even after periods of significant external pressure.

The average annual cost of fixed assets for the analyzed period increased from UAH 4,761,592 thousand in 2021 to UAH 6,506,212 thousand in 2022 and UAH 8,083,990 thousand in 2023. The absolute increase in 2023 compared to 2021 was UAH 3,322,398 thousand, or 69.77%, and relative to 2022 - UAH 1,577,778 thousand, or 24.25%. Such growth indicates an active renewal and expansion of the company's material and technical base, which is natural for a logistics company that develops sorting capacities, transport infrastructure, a network of branches, ATMs and automated technological solutions. It is positive that the increase in the cost of fixed assets was accompanied not by a deterioration, but by an increase in performance indicators.

The efficiency of fixed assets is characterized by the return on assets. In 2021, it was 4.38 UAH/UAH, in 2022 it decreased to 3.64 UAH/UAH, and in 2023 it increased to 4.51 UAH/UAH. The deviation in 2023 relative to 2021 was 0.13 UAH/UAH, or 3.06%, and relative to 2022 – 0.87 UAH/UAH, or 23.91%. The temporary decrease in return on assets in 2022 can be explained by the outstripping of growth in the cost of fixed assets relative to income growth, which is typical during the period of structural restructuring of activities. However, in 2023, this indicator not only recovered, but also exceeded the level of 2021, which indicates an increase in the return on resources invested in the material and technical base.

The total value of assets at the end of the year had a clear upward trend: from UAH 13,498,127 thousand in 2021 to UAH 15,754,920 thousand in 2022 and UAH 23,101,706 thousand in 2023. The absolute growth in 2023 compared to 2021 was UAH 9,603,579 thousand, or 71.15%, and compared to 2022 - UAH 7,346,786 thousand, or 46.63%. This indicates an increase in the enterprise's economic potential, an expansion of its resource base, and an improvement in its investment opportunities. The growth of assets combined with the positive dynamics of profitability and income indicates an expansion of the scale of activities not formally, but on a real financial and economic basis.

The average number of employees over the period under review, on the contrary, decreased: from 29,790 in 2021 to 27,819 in 2022 and 26,327 in 2023. The absolute reduction in 2023 compared to 2021 was 3,463 people, or 11.62%, and compared to 2022 – 1,492 people, or 5.36%. At first glance, this trend may appear negative; however, combined with the simultaneous growth in income, profits, and labour productivity, it indicates an increase in the efficiency of labour resource use. The reduction in personnel could be due to organisational structure optimisation, automation of individual operations, changes in work modes, or the redistribution of functions within the logistics system.

The most indicative in this aspect is the increase in the average annual labor productivity of one employee. In 2021, this indicator was 699.68 thousand UAH/person, in 2022 - 851.47 thousand UAH/person, and in 2023 - 1385.23 thousand

UAH/person. The absolute increase in 2023 compared to 2021 was 685.55 thousand UAH/person, or 97.98%, and relative to 2022 - 533.76 thousand UAH/person, or 62.69%. An almost twofold increase in labor productivity over three years is one of the strongest positive trends in the company's activities. It indicates a significant increase in the efficiency of personnel use, improvement of labor organization, automation of processes, and an increase in the intensity of logistics operations. For the master's thesis topic, this indicator is particularly important, as it directly demonstrates the economic impact of technological improvements in logistics activities.

Labor costs in 2021 amounted to 5,742,731 thousand UAH, in 2022 decreased to 5,345,909 thousand UAH, and in 2023 increased to 8,491,614 thousand UAH. As a result, in 2023, compared to 2021, the increase was 2,748,883 thousand UAH, or 47.87%, and compared to 2022, it was 3,145,705 thousand UAH, or 58.84%. The reduction in the payroll fund in 2022 is consistent with the decline in the number of employees and the enterprise's difficult operating conditions. However, in 2023, a significant increase in this indicator indicates an intensification of activities, improvement of the company's financial capabilities, and a desire to ensure a competitive level of wages in conditions of high personnel workload.

This is also confirmed by the dynamics of average monthly labor costs per employee. In 2021, they amounted to UAH 16,064.48, in 2022 - UAH 16,013.96, and in 2023 - UAH 26,878.66. The absolute growth in 2023 compared to 2021 was UAH 10,814.18, or 67.32%, and compared to 2022 - UAH 10,864.70, or 67.85%. The indicator's practically unchanged level in 2022 and its sharp growth in 2023 indicate that the enterprise, after the cost-containment stage, has moved to more active material incentives for employees. This trend is positive, since under conditions of staff reduction and increased labor productivity, an increase in average payments can be considered as a tool for maintaining human resources and increasing employee motivation.

The number of branches in 2021 was 9,993 units, in 2022 it decreased to 9,201 units, and in 2023 it increased to 10,875 units. Thus, in 2023, compared to 2021, the network increased by 882 branches, or 8.83%, and compared to 2022, by 1,674

branches, or 18.19%. The decrease in the number of branches in 2022 was a consequence of external destructive factors, however, in 2023 the company not only restored the lost network potential, but also significantly increased it. This indicates a high level of adaptability of the logistics network, an orientation towards expanding client access to services, and the consistent implementation of the territorial development strategy.

Summarizing the results of the analysis, we can conclude that the activities of Nova Poshta LLC in 2021-2023 were characterized by a combination of large-scale growth, increased operational and resource efficiency, modernization of the material and technical base, increased labor productivity, and restoration of network infrastructure after the crisis period. The most significant positive trends are a significant increase in net income, gross, operating, and net profit, increased return on assets, a significant increase in labor productivity, and the expansion of the branch network. All this indicates the high stability of the enterprise, the effectiveness of its management decisions, and the presence of prerequisites for further digitalization of logistics processes as a means of minimizing economic risks.

Financial ratios of Nova Poshta LLC for 2021–2023 in three blocks: liquidity, solvency, and capital structure, are presented in Table 2.4.

Table 2.4

Financial ratios of Nova Poshta LLC

Indicator group	Indicator	Calculation formula	2021	2022	2023
Liquidity	Current liquidity ratio	Current assets / Current liabilities	1.02	0.63	0.52
	Quick liquidity ratio	(Current assets – Inventories) / Current liabilities	0.97	0.55	0.47
	Absolute liquidity ratio	Cash and cash equivalents / Current liabilities	0.16	0.12	0.13
Solvency	Autonomy coefficient	Equity / Balance sheet currency	0.33	0.41	0.41
	Debt concentration ratio	Liabilities / Balance sheet currency	0.67	0.59	0.59
	Funding ratio	Equity / Liabilities	0.50	0.71	0.70
Capital structure	Financial leverage ratio	Liabilities / Equity	2.01	1.42	1.43
	Long-term debt ratio	Long-term liabilities / (Equity + Long-term liabilities)	0.46	0.37	0.36

The results obtained indicate that the financial condition of Nova Poshta LLC in 2021-2023 was characterized by ambiguous dynamics. On the one hand, the company maintained a fairly stable capital structure and an acceptable level of financial independence, and on the other hand, liquidity indicators gradually deteriorated, which indicates increasing tension in the area of covering current liabilities with current assets.

The current liquidity ratio during the period under review decreased from 1.02 in 2021 to 0.52 in 2023, and the quick and absolute liquidity ratios also remained at a relatively low level. This indicates that the company had a limited supply of highly liquid resources for the timely repayment of short-term liabilities. Therefore, in the short-term aspect, the company's financial condition required increased control over cash flow, receivables, and current settlements.

At the same time, solvency and capital structure indicators give reason to assess the situation more positively. The autonomy ratio in 2022–2023 was 0.41, which indicates a sufficient share of equity in financing assets. Accordingly, the debt capital concentration ratio decreased compared to 2021, and the funding ratio increased, which indicates a certain strengthening of financial stability. The decrease in financial leverage in 2022 and its almost unchanged level in 2023 also confirm that the company's dependence on borrowed resources remained controlled.

The dynamics of the long-term debt ratio are also positive, as they have gradually decreased. This indicates that the role of long-term liabilities in the structure of financing sources has somewhat decreased, and the capital structure has become more balanced.

The results of the calculations allow us to conclude that in 2021-2023, Nova Poshta LLC maintained overall financial stability and an acceptable level of solvency, but at the same time had certain risks associated with a decrease in liquidity. This means that increasing the efficiency of current asset and cash flow management is of particular importance for the enterprise.

The analysis of financial ratios continues with the calculation of indicators of business activity and profitability of the enterprise under study (Tables 2.5-2.6).

Table 2.5

Business activity indicators of Nova Poshta LLC

Indicator	Calculation formula	2021	2022	2023
Asset turnover ratio, vol.	Net income / Average asset value	2.00	1.62	1.88
Current asset turnover ratio, vol.	Net income / Average cost of current assets	5.27	5.49	9.39
Return on fixed assets, UAH/UAH	Net income / Average annual cost of fixed assets	4.38	3.64	4.51
Inventory turnover ratio, vol.	Cost of services sold / Average cost of inventories	77.21	58.49	68.48
Duration of one inventory turnover, days	365 / Inventory turnover ratio	4.73	6.24	5.33
Accounts receivable turnover ratio, vol.	Net income / Average receivables for goods, works, services	30.15	28.32	34.61
Accounts receivable repayment period, days	365 / Accounts receivable turnover ratio	12.11	12.89	10.54
Accounts payable turnover ratio, vol.	Cost of services sold / Average accounts payable for goods, works, services	17.87	16.78	18.37
Accounts payable repayment period, days	365 / Accounts Payable Turnover Ratio	20.43	21.75	19.87

Table 2.6

Profitability indicators of Nova Poshta LLC in 2021–2023.

Indicator	Calculation formula	2021	2022	2023
Gross margin, %	Gross profit / Net income × 100	21.12	18.62	21.51
Operating profitability, %	Operating profit / Net income × 100	7.73	10.68	10.44
Net sales profitability, %	Net profit / Net income × 100	12.48	9.02	10.88
Return on assets (ROA), %	Net profit / Average cost of assets × 100	25.00	14.60	20.42
Return on equity (ROE), %	Net profit / Average equity × 100	77.88	38.81	49.51
Return on fixed assets, %	Net profit / Average annual cost of fixed assets × 100	54.61	32.83	49.07
Cost efficiency, %	Gross profit / Cost of services sold × 100	26.78	22.88	27.40

Analysis of the business activity indicators of Nova Poshta LLC in 2021-2023 gives reason to assert that the enterprise generally maintained a high level of resource intensity, although individual indicators in 2022 reflected the impact of adverse external conditions on the rate of capital turnover. Thus, the asset turnover ratio in 2021

was 2.00 turnovers, in 2022 it decreased to 1.62, and in 2023 it increased to 1.88. This indicates a certain slowdown in the total turnover of assets during the crisis period with the subsequent restoration of the efficiency of their use. Such dynamics indicate that in 2023 the enterprise managed to significantly restore the effectiveness of attracting assets to generate income.

The dynamics of current asset turnover is positive, which increased from 5.27 turnovers in 2021 to 5.49 in 2022 and to 9.39 in 2023. Such a change indicates a significant acceleration of the turnover of the mobile part of the enterprise's property, which is a sign of increasing the efficiency of current resource management. At the same time, the return on fixed assets, after decreasing in 2022 from 4.38 to 3.64 UAH/UAH, increased to 4.51 UAH/UAH in 2023, that is, it not only recovered, but also exceeded the baseline level. This allows us to conclude that the efficiency of using the enterprise's material and technical base has improved and the return on investment in fixed assets has increased.

The indicators of inventory turnover, receivables and payables also confirm a sufficiently high level of business activity of the enterprise. Although in 2022 the inventory turnover slowed down somewhat, and the duration of one turnover increased, in 2023 there was an improvement in the situation, which indicates more effective management of material resources. Similarly, the receivables repayment period in 2023 was reduced to 10.54 days, which is a positive trend, as it indicates an acceleration of the receipt of funds from counterparties. The payables repayment period also decreased slightly, which indicates the preservation of proper settlement discipline and a sufficient level of manageability of current liabilities.

The assessment of profitability indicators gives grounds to assert that in 2021-2023 the enterprise generally maintained a profitable nature of its activities, although 2022 was a period of a certain decrease in individual performance parameters. Gross profitability decreased from 21.12% in 2021 to 18.62% in 2022, but in 2023 it increased to 21.51%, i.e. exceeded the baseline value. This indicates the restoration of the efficiency of the main activity and an improvement in the ratio between income and direct costs. Operating profitability increased from 7.73% in 2021 to 10.68% in

2022, and in 2023 it remained at a high level of 10.44%, which characterizes sufficiently effective management of operating costs.

Net sales profitability in 2022 decreased to 9.02% compared to 12.48% in 2021, but increased to 10.88% in 2023. This dynamics indicates the restoration of net profitability of operations, although its level has not yet fully reached the value of the base year. At the same time, the indicators of profitability of assets and equity remained quite high throughout the period, despite their decrease in 2022 and partial recovery in 2023. This indicates the ability of the enterprise to generate a significant financial result both in terms of the total volume of resources and invested equity. The profitability of fixed assets also remained quite high, which confirms the effective use of the company's infrastructure and technological base.

Summarizing the results of the analysis, it should be noted that in 2021-2023, Nova Poshta LLC demonstrated a high level of business activity and profitability, and the temporary deterioration of individual indicators in 2022 was mainly situational in nature. Already in 2023, most indicators showed recovery or improvement compared to the base period. This allows us to conclude that the enterprise's business model is sufficiently stable, the efficiency of using assets, capital and working capital, as well as the presence of favorable prerequisites for further digitalization of logistics processes as a factor in increasing efficiency and minimizing economic risks.

The structure of the company's logistics processes determines the organizational basis of its operational activities and directly affects the level of costs, speed of customer service and resistance to external risks. For Nova Poshta, the logistics system is multi-level in nature and covers integrated processes of receiving, sorting, transporting, storing and delivering shipments throughout Ukraine and beyond.

The company's logistics model is built on the principle of a hub-and-spoke network, which involves the concentration of flows in central sorting terminals with further distribution to regional branches and post offices. This structure ensures the scalability of operations and allows for the optimization of transportation costs.

In general, the logistics processes of an enterprise can be divided into four main blocks: inbound logistics, internal processing, trunk transportation, and last mile delivery.

Inbound logistics includes receiving shipments at branches, post offices or through couriers. At this stage, the order is registered, an electronic consignment note is generated, initial labeling is performed, and the cargo is checked for compliance with established requirements. Automated systems allow for instant transmission of information to a central database, which creates a digital trail of each shipment.

The second stage – sorting and internal processing – is carried out in regional or central sorting centers. Here, automated scanning, routing and formation of transport batches take place. The use of conveyor lines and barcode or QR code scanning systems allows to significantly reduce the processing time of one shipment and reduce the probability of error. The productivity of sorting centers determines the throughput of the entire logistics system.

The third block – trunk logistics – is associated with transportation between regional hubs. For this, the company uses its own fleet and engaged carriers. Route planning is carried out taking into account the volume of shipments, distance, condition of road infrastructure and time constraints. Optimization of this stage is a key factor in reducing costs and minimizing transport risks.

The fourth stage – last mile logistics – involves delivering the shipment to the end consumer via a branch, post office or courier service. It is at this stage that the customer experience is formed and the quality of service is assessed. Given the high share of last mile costs, its optimization is a strategic task for the enterprise.

To systematize the structure of logistics processes, it is advisable to present them in Table 2.7.

From an organizational point of view, the logistics system of the enterprise is centralized with elements of regional autonomy. The central office sets the standards for processing and route planning, while regional divisions ensure adaptation to local conditions. This model allows combining the effect of scale with flexibility of response.

Table 2.7

Structure of the enterprise's logistics processes

Process stage	Basic operations	Key resources	Potential risks
Receiving shipments	Registration, marking	Department, IT system	Documentation errors
Sorting	Scanning, routing	Sorting centers	Technical failures
Long-distance transportation	Transportation planning	Fleet	Delays, damage
The last mile	Delivery to the customer	Couriers, postwomen	Delivery failures

An important characteristic of the structure of logistics processes is their information integration. All stages are accompanied by digital accounting of operations, which ensures transparency and the possibility of real-time monitoring. This creates the prerequisites for the implementation of analytical forecasting and risk minimization systems.

Analysis of the structure of logistics processes indicates a high level of organizational complexity and significant dependence on the coordination of information flows. That is why digital transformation plays a key role in increasing efficiency and reducing costs. Routing optimization, sorting automation and data integration between departments allow you to reduce delivery times and increase the competitiveness of the enterprise.

Therefore, the structure of the company's logistics processes is multi-level, integrated and focused on the speed of customer service. Its efficiency is determined not only by the material and technical base, but also by the level of digital coordination of operations.

2.2. Analysis of the level of digitalization of logistics processes

The level of digitalization of logistics processes is one of the determining factors of the efficiency of the functioning of a modern postal and logistics enterprise, since it is digital solutions that ensure the coordination of material, information and service flows within a single operating system. In the context of increased competition

in the logistics services market, increasing customer requirements for speed and quality of service, as well as the complexity of the external environment, digitalization ceases to be just a direction of technological renewal and turns into a basic condition for maintaining the competitiveness of the enterprise. For Nova Poshta LLC, the digitalization of logistics is not auxiliary, but system-forming in nature, since it covers almost all the main stages of the logistics cycle: registration of shipments, acceptance, sorting, transportation, delivery, issuance and support after the completion of the operation. In this regard, it is advisable to assess the level of digitalization of the enterprise through the analysis of digital infrastructure, automation of warehouse and transport processes, digital channels of interaction with customers, as well as the degree of integration of information services into the management of logistics activities.

The essence of digitalization of logistics processes is not only the implementation of individual software products or services, but also a comprehensive transformation of the methods of organizing logistics activities. In this context, digitalization means the transition from fragmented, mainly operational management to an integrated system in which all key logistics processes are combined in a single digital environment. For the enterprise under study, this is of particular importance, since the scale of the network, the intensity of shipment movement and the need for operational coordination of a large number of logistics nodes require a high level of information synchronization. It is thanks to digital solutions that it becomes possible to ensure the continuity of the logistics cycle, reduce the impact of the human factor, increase the accuracy of data processing and make timely management decisions in real time.

The digital infrastructure of Nova Poshta LLC is being formed as a multi-level environment, which combines services for customers, tools for business users, shipment tracking systems and technological solutions for managing internal processes. A practical manifestation of this is the functioning of a mobile application, business office, API integration for corporate clients, electronic invoices, online tracking, courier call services, forwarding and return of shipments. Thanks to such solutions, logistics operations are largely transferred to a digital format, which makes

it possible to reduce service time, increase the accuracy of order processing, reduce the number of manual operations and improve control over the passage of shipments at all stages of delivery. For business clients, an important element of digitalization is the ability to integrate logistics processes into their own information systems via API, which ensures the automatic creation of express invoices, delivery management, the formation of registers and tracking statuses within a single digital circuit. Criteria for evaluating the digital infrastructure of Nova Poshta LLC (Table 2.8).

Table 2.8

Criteria for evaluating the digital infrastructure of Nova Poshta LLC

Criterion	Manifestation in the activities of the enterprise	Analytical assessment
Functional richness of digital services	Using a mobile application, business office, electronic invoices, API integration, online tracking	High level
Integrating digital solutions into the logistics cycle	Combining the stages of registration, processing, transportation, delivery and issuance of shipments in a single information loop	High level
Automation of sorting infrastructure	Operation of automated sorting terminals, application of scanning and digital routing	High level
Analytical support for management decisions	Using digital tools for load forecasting, flow control and logistics process optimization	Sufficient level
Technological sustainability and scalability	The ability to maintain the operation of digital services and logistics infrastructure in the face of increasing load and changing routes	High level
Cyber resilience and business continuity	Data protection, information backup, maintaining the continuity of digital service channels	Sufficient level

The formation of such a digital infrastructure contributes to increasing the speed of information processing and improving interaction between all participants in the logistics process. The client gets the opportunity to independently initiate a significant part of the operations, monitor the status of the shipment and interact with the operator without the need to constantly contact physical service points. For the enterprise, this means reducing the load on the branch, optimizing employee time, reducing unproductive costs and more efficient allocation of resources. At the same time, the digital infrastructure performs the function of an information framework that combines front-office and back-office processes, creating conditions for continuous data exchange between reception points, sorting centers, transport nodes and shipment delivery channels.

An important sign of a high level of digitalization is also that the company's digital services are focused not only on information support for the client, but also on the transformation of the service provision model itself. The use of an electronic invoice enables transferring part of the operations from the front office to a remote format, thereby reducing the burden on branch personnel and shortening service time. Online tracking, parcel status management, calling a courier, and arranging delivery via an application or digital service provide continuous information access to the logistics service for the client. As a result, digitalization performs two functions at the same time: it increases the convenience of the service for the consumer and optimizes the company's internal operating costs. The combination of service and process digitalization is one of the characteristic features of the logistics model of Nova Poshta LLC.

At the same time, the importance of digital services goes beyond simply increasing service comfort. Their implementation directly reduces economic risks associated with delays in processing shipments, errors during registration, duplicate information, incomplete data, or staff overload during peak periods. The higher the degree of automation in the initial interaction with the client, the lower the probability of operational errors and the greater the predictability of the logistics service's outcome. In addition, digital service channels create additional opportunities for the enterprise to collect and analyze data on consumer behavior, the intensity of service use, the time structure of demand and problem areas of the logistics chain. This, in turn, strengthens the enterprise's analytical capabilities and lays the foundation for further improvement in management decisions.

An equally important area of digitalisation is the automation of sorting and transport operations. For Nova Poshta LLC, it is of fundamental importance, since the speed and accuracy of processing large volumes of shipments directly determine the level of service, infrastructure productivity, and the company's ability to minimize the risks of delays. The company officially emphasizes the development of its own infrastructure and investment in automated sorting terminals and depots. The presence of innovative terminals capable of processing 20-50 thousand parcels per hour

indicates a high level of technical equipment in logistics hubs and a transition from a predominantly manual sorting model to one in which automated technological lines play a key role (Table 2.9). For the enterprise under study, this is of fundamental importance, since sorting automation increases throughput, reduces the time shipments spend in terminals, and reduces the likelihood of operational errors.

Table 2.9

Assessment of the level of automation of logistics processes of Nova Poshta LLC in 2021–2023.

Indicator	2021	2022	2023	Trend
Automation of sorting operations	Sufficient level	Sufficient level	High level	Gradual growth
Automation of transportation planning	Sufficient level	Sufficient level	High level	Positive dynamics
Integration of warehouse and transportation processes	Sufficient level	Sufficient level	High level	Strengthening coordination
Digitalization of customer interaction	High level	High level	High level	Sustainable high-level conservation
Analytical support for logistics decisions	Sufficient level	Sufficient level	Sufficient/high level	Gradual improvement

The development of automated sorting solutions is not only operational, but also strategic for the enterprise. In a large-scale logistics system, even minor delays or inaccuracies at the sorting stage can cause a backlog of shipments, disruption of transportation schedules, additional costs for redistributing flows, and deterioration of the customer experience. That is why the automation of sorting processes allows to ensure the stability of the functioning of the logistics network in conditions of increasing transportation volumes. In addition, it creates the prerequisites for scaling the business without a proportional increase in labor costs, which is especially important in the context of increasing operational efficiency and containing cost pressure.

Automation in Nova Poshta LLC's logistics covers not only sorting nodes but also the coordination of transport operations. Digital planning and delivery support make it possible to synchronize the movement of shipments between branches, terminals, depots, post offices and courier delivery. Combined with an extensive

network of physical infrastructure, this creates conditions for more flexible routing management, operational reconfiguration of flows and more rational use of fleet resources. It is especially important that such digital coordination becomes critical in an unstable external environment, when the company must quickly adapt logistics routes, change sorting points and ensure continuity of customer service. In this context, digitalization is not only a means of increasing productivity, but also a tool for ensuring logistical sustainability.

The importance of digital coordination of transport processes is especially heightened in situations where the enterprise operates under spatially uneven demand, changes in logistics loads between regions, or the need for rapid redistribution of transport flows. Under such conditions, it is digital management tools that allow you to reduce the response time to changing situations, promptly make adjustments to routes, minimize unproductive transport runs and reduce the risk of disruption of delivery times. Thus, the digitalization of transport coordination is an important tool for maintaining not only the speed, but also the economic feasibility of logistics operations.

The role of digital channels in customer interaction deserves special attention. For Nova Poshta LLC, they are not just a service add-on but a full-fledged part of the logistics system through which a significant portion of operations is initiated, supported, and completed. The mobile application, business office, electronic invoices, online calculation of delivery costs, digital shipment registers, tracking services, and parcel management form a single digital service environment within which the client can perform most actions without the operator's physical involvement. This significantly reduces the load on the front-office infrastructure, reduces queues, speeds up document flow, and increases the predictability of service. For the corporate segment, the possibility of integrating with its own accounting and sales systems plays a special role, strengthening the connection between logistics, e-commerce, and the client's operational management.

In modern conditions, digital channels of interaction largely determine the client's perception of the quality of a logistics service. If the consumer can easily create

a shipment, quickly change delivery parameters, track the parcel in real time, and receive notifications at all stages of its movement, then the logistics service is perceived as more reliable and controlled. For the company, this creates an additional effect: strengthening customer loyalty, increasing the frequency of repeat visits, and reducing the load on traditional communication channels. In this sense, digital services become not only a technological but also a marketing and competitive advantage, since they directly affect the service's value in the eyes of the consumer.

An important characteristic of an enterprise's digital maturity is the presence of internal IT capacity to develop, support, and scale digital solutions. The NOVA group has a separate IT company, Nova Digital, which develops software products for heavy workloads and provides the technological basis for the digital transformation of logistics and related services. This approach shows that digitalization for an enterprise is not limited to the use of ready-made external software products, but is the company's own competence. From the perspective of strategic management, this means greater flexibility in implementing innovations, faster adaptation of IT solutions to changes in logistics processes and better integration capabilities of various digital platforms within a single management architecture.

The presence of internal IT competence is of long-term importance for the enterprise, as it allows not only to maintain the functionality of already implemented digital tools, but also to continually adapt them to new market requirements, changing customer expectations, and the internal needs of the logistics system. This is especially important for a company operating in a highly dynamic environment that requires constant process improvement. In this case, digitalization acquires the characteristics of a strategic competence, which provides the enterprise not only with operational efficiency, but also with innovative flexibility, the ability to quickly scale and resilience to external challenges.

In view of this, it is advisable to carry out a comprehensive assessment of the level of digitalization of logistics processes of Nova Poshta LLC not through arbitrary conditional coefficients, but through the generalization of several analytical blocks: the level of development of digital services, the degree of automation of the sorting

infrastructure, the integration of digital solutions into interaction with customers and the ability of the enterprise to provide flexible management of logistics flows in real time. In this case, the integral index of digital maturity can be used as an author's generalizing tool, built on an expert assessment of the specified parameters. It is advisable to present it not as an actual corporate indicator, but as the result of an analytical generalization performed within the framework of a master's research. This approach preserves scientific correctness, avoids artificiality in calculations, and at the same time allows you to compare the enterprise's digital development dynamics.

The feasibility of using such an approach is explained by the fact that the digitalisation of logistics processes is multidimensional and cannot be exhaustively characterised by one single indicator. It combines technical, organizational, service and management aspects, which only in aggregate form the real level of digital maturity of the enterprise. That is why, within the framework of the master's research, the most justified approach is one that considers the quantitative and qualitative characteristics othe f digital development in relation to each other. This allows you to form a more complete picture of the state of the digital transformation of the enterprise and identify those areas in which digitalization directly affects the growth of the efficiency of the logistics system and the reduction of economic risks.

To calculate the digital maturity index, an integrated approach was used, according to which the final indicator is determined as the weighted sum of partial scores according to individual criteria:

$$IDM = \Sigma (Wi \times Pi),$$

where Wi is the weight coefficient of the i-th criterion;

Pi is the analytical estimate of the ith criterion in the range from 0 to 1;

$\Sigma Wi = 1$.

Within the study's framework, it is advisable to highlight four basic criteria: digital infrastructure, automation of sorting and warehousing processes, automation of transport operations, and analytical and predictive capabilities. The choice of these criteria is due to the fact that they most fully reflect the specifics of the digital

transformation of logistics processes of Nova Poshta LLC and at the same time allow comparing the level of digital development of the enterprise in dynamics.

Table 2.10

Initial parameters for calculating the digital maturity index of Nova Poshta LLC

Criterion	Weight	2021	2022	2023
Digital infrastructure	0.30	0.75	0.80	0.85
Automation of sorting and warehousing processes	0.25	0.67	0.70	0.75
Automation of transport operations	0.25	0.67	0.70	0.80
Analytical and predictive capabilities	0.20	0.60	0.67	0.70

Based on the above parameters, the integral digital maturity index is:

IDM 2021 = 0.68

IDM 2022 = 0.72

IDM 2023 = 0.78

Table 2.11

Dynamics of the digital maturity index of Nova Poshta LLC in 2021–2023.

Year	Digital Maturity Index	Level
2021	0.68	Sufficient
2022	0.72	Sufficient
2023	0.78	Sufficient, close to high

The results indicate a gradual increase in the enterprise's digital maturity throughout the entire period under study. The index value in 2021 already reflected a sufficient level of digital development, driven by a robust digital infrastructure and customer interaction channels. In 2022, despite the complication of external operating conditions, the enterprise not only maintained the achieved level of digitalization, but also demonstrated further strengthening of its individual components. In 2023, the index increased to 0.78, indicating further strengthening of logistics automation, deeper digital integration, and expanded analytical management capabilities.

In summary, it should be noted that in 2021-2023, Nova Poshta LLC demonstrated a sufficiently high level of digitalization of logistics processes, which was manifested in the development of digital service channels, automation of sorting

infrastructure, integration of logistics services into the client's digital environment, and the formation of its own IT capabilities to support large-scale operations. This gives grounds to consider digitalisation not only as a tool for technological renewal of the enterprise, but also as one of the basic factors for increasing operational efficiency, strengthening competitive positions, and minimising economic risks in the company's activities. Thus, the further development of digital solutions in Nova Poshta LLC's logistics should be considered a strategic direction for improving the enterprise management system, aimed at ensuring long-term sustainability, flexibility, and competitiveness in a changing market environment.

2.3. Assessment of economic risks of logistics activities

Effective management of Nova Poshta LLC's logistics activities requires systematic identification and assessment of economic risks, as they determine the stability of material flows, the level of costs, the quality of service, and the enterprise's final financial results. For the company under study, the risk environment is multi-level in nature, which is explained by the scale of the logistics network, significant intensity of operations, a high level of digitalization, as well as functioning in an unstable macroeconomic and military environment. On the one hand, risks are formed within the logistics system itself and are associated with the organization of receiving, sorting, transporting and delivering shipments. On the other hand, the enterprise's activities are significantly influenced by external factors, in particular changes in transport routes, energy restrictions, fluctuations in resource costs, security threats, and increasing requirements for the continuity of digital services.

For Nova Poshta LLC, it is advisable to identify risks by the logistics cycle stages, as this approach allows for a more complete description of the sources of threats and their economic consequences. At the stage of acceptance and initial processing of shipments, the most typical risks are those associated with errors in the preparation of electronic invoices, incorrect labeling, inconsistency of the actual parameters of the shipment with the declared characteristics, as well as overloading of branches during

periods of peak demand. For a company with a high volume of daily operations, even minor errors at this stage can lead to additional time costs, document reprocessing, the need to clarify data, and, as a result, delays in the shipment's further passage through the logistics chain.

A special place in the system of economic risks is occupied by the risks of sorting centers, since they are key nodes of the entire logistics system of the enterprise. For Nova Poshta LLC, they include technical failures of automated lines, exceeding throughput capacity under uneven load conditions, power outages, and disruptions in the continuity of information systems on which the coordination of flows depends. In 2022-2023, infrastructure risks gained particular importance, as disruptions in energy supply, changes in the geographic distribution of load, and the need for rapid restructuring of logistics routes increased the sorting infrastructure's sensitivity to external shocks. For the enterprise, this means that any failure in the operation of the sorting node has not a local, but a systemic effect, as it leads to the accumulation of shipments, shifting transportation schedules, delivery delays, and an increase in indirect costs.

Transport risks for Nova Poshta LLC are among the most significant, as this component ensures the physical movement of shipments between elements of the logistics network. They include delivery delays due to route changes, deterioration of road infrastructure, accidents, vehicle technical malfunctions, loss or damage to shipments, and increased fuel and fleet maintenance costs. The economic effect of these risks is manifested in increased logistics service costs, delivery deadline violations, decreased customer satisfaction, and increased load on the compensation and re-service system.

At the final stage of the logistics cycle, "last mile" risks arise, which are particularly important for the studied enterprise given the scale of its network of branches, ATMs, and courier services. Such risks include untimely delivery, absence of the recipient, overloading of individual delivery channels, return of undelivered items, as well as an increase in the time to complete the transaction due to uneven client flow. These risks have not only an operational but also a direct economic dimension,

since returns, redelivery, additional storage, and processing of problem items increase the enterprise's costs and reduce the efficiency of infrastructure use.

A separate group is made up of financial and economic risks of logistics activities. For Nova Poshta LLC, these manifest as increased operating costs, changes in fuel costs, higher maintenance costs for logistics infrastructure, fluctuations in customer demand, and risks associated with investments in large-scale infrastructure and digital projects. Unlike purely operational risks, this group covers the impact on the enterprise's financial stability, the profitability of operations, and opportunities for further development. They became especially significant in 2022, when the logistics system needed to simultaneously maintain work continuity, adapt to new conditions, and maintain an acceptable level of profitability.

For an enterprise with a high level of digitalization, information and cyber risks are extremely important. They are associated with the likelihood of server infrastructure failures, interruption of online services, loss or damage to data, unauthorized access to information resources, and disruption of digital interaction between individual elements of the logistics system. For Nova Poshta LLC, this group of risks is critical, as digital services are integral to the registration, support, tracking, and issuance of shipments. Accordingly, any information failures can cause not only technical problems, but also direct economic losses due to the slowdown of logistics operations and deterioration of service quality.

To systematize the identified risks, it is advisable to present them in tabular form (Table 2.12).

The above systematization shows that the risks of logistics activities of Nova Poshta LLC are complex and cover both the physical infrastructure and the information and digital component of the enterprise's business model. The most critical for the company are sorting and infrastructure risks, transport and information risks, since they can simultaneously affect delivery times, quality of service, costs, and financial results.

Table 2.12

Key economic risks of logistics processes of Nova Poshta LLC

Risk group	Main manifestations	Potential economic consequences
Operational	Errors in processing, overload of branches, delays in initial processing	Lengthening of the maintenance cycle, increasing costs for adjusting operations
Sorting and infrastructure	Automated line failures, capacity overruns, power outages	Downtime, backlog of shipments, transportation delays, loss of revenue
Transport	Changes in routes, technical malfunctions of transport, rising fuel costs, damage to cargo	Cost increase, delivery delay, compensation costs
Last mile risks	Late delivery, return of items, overloading of post offices and courier channels	Additional costs for re-delivery, storage and handling
Financial and economic	Rising operating costs, declining effective demand, investment risks	Decreased profitability, increased financial burden
Information and cyber risks	Digital service failures, data loss, cyber threats	Disruption of business continuity, reputational and financial losses

After identifying risks, it is advisable to proceed to their quantitative assessment. For Nova Poshta LLC, it is advisable to measure risks quantitatively, not through conditionally specified losses, but through the analysis of real financial and economic indicators that reflect the logistics system's sensitivity to external and internal disturbances. Within the framework of this study, a quantitative assessment of economic risks can be carried out in three interrelated directions: through variations in costs, through changes in the effectiveness of resource use, and through changes in profitability dynamics.

The first indicator is the change in the cost intensity of logistics activities. The previously calculated indicators show that the costs per UAH 1 of net income amounted to UAH 0.7888 in 2021, UAH 0.8138 in 2022 and UAH 0.7849 in 2023. Therefore, in 2022 there was a deterioration in cost efficiency, while in 2023 this indicator not only stabilized, but also decreased to a level lower than the baseline. The coefficient of variation of this indicator for 2021–2023 is about 1.61%, which indicates a relatively low average variability of cost intensity, however, the jump in 2022 itself reflects the presence of risk pressure on the cost of logistics services.

The second important area of assessment is the analysis of changes in the network and the enterprise's operational stability. According to the calculated indicators, the number of branches of Nova Poshta LLC decreased from 9,993 in 2021

to 9,201 in 2022, and in 2023 it increased to 10,875. Such dynamics indicate that infrastructure risks in 2022 had not a theoretical, but a real manifestation, since they affected the scale of the network. At the same time, the further increase in the number of branches in 2023 confirms the high adaptability of the logistics system and the enterprise's ability to restore and expand network potential after the crisis period. In this context, changes in the network's scale can be considered an indirect quantitative indicator of the implementation of infrastructure risks.

The third direction is the assessment of the financial effects of risks arising from changes in profitability. The net profit of Nova Poshta LLC was UAH 2,600,320 thousand in 2021, decreased to UAH 2,135,960 thousand in 2022 and increased to UAH 3,967,156 thousand in 2023. Similarly, the net return on sales decreased from 12.48% in 2021 to 9.02% in 2022, and increased to 10.88% in 2023. This indicates that the greatest financial pressure from risk factors was exerted precisely in 2022, when the company, despite maintaining profitability, experienced a decrease in its net financial result. The restoration of profitability in 2023 gives reason to argue that the company managed to adapt its logistics system to new conditions and partially neutralize the negative impact of risks.

An additional indicator is the change in liquidity and solvency, since the economic risks of logistics activities are reflected not only in costs and profits but also in short-term financial stability. The decrease in the current liquidity ratio from 1.02 in 2021 to 0.63 in 2022 and 0.52 in 2023 indicates increased pressure on covering current liabilities with current assets. This means that even under conditions of restoring profitability, the enterprise continued to operate in an environment of increased financial risk, where cash flow management, resource turnover speed and accuracy of operating expense planning are of particular importance.

Thus, the quantitative assessment of the economic risks of Nova Poshta LLC allows us to establish that their most noticeable impact was manifested in 2022 due to the deterioration of cost efficiency, reduction of network presence, decrease in profitability and increased tension in liquidity indicators. At the same time, already in

2023, most indicators demonstrated positive dynamics, indicating the adaptation of the enterprise to the changed environment and the increase in its operational stability.

The logical continuation of the analysis is to determine the relationship between the level of digitalization of logistics processes and the risk profile of the enterprise. For Nova Poshta LLC, digital transformation has not only technological but also economic significance, since digital solutions serve as tools to increase transparency of logistics flows, reduce response time to failures, reduce the number of operational errors, and improve coordination between individual network elements. This means that digitalization can be considered as one of the key factors in reducing the risk burden on the enterprise.

The previously conducted assessment of the digital maturity index showed its growth from 0.68 in 2021 to 0.72 in 2022 and 0.78 in 2023. At the same time, financial and economic indicators indicate that 2023 has become a period of restoring profitability, increasing resource efficiency, expanding the network and improving individual parameters of business activity. Such dynamics allow us to conclude that the digital maturity of the enterprise has a stabilizing effect on the logistics system, although in the short term it does not completely eliminate the effect of external shocks. In other words, an increase in the level of digitalization does not mean the automatic disappearance of risks, but creates better conditions for their localization, faster response and reduction of the scale of economic consequences.

The structural impact of digitalization on the risk profile of Nova Poshta LLC can be presented in the form of a summary table 2.13.

The results presented give grounds to argue that the digitalization of logistics processes for Nova Poshta LLC performs not only the function of technological renewal, but also the function of a risk management tool. It helps reduce dependence on the human factor, increases data processing accuracy, improves coordination among elements of the logistics network, and creates conditions for a prompt response to disturbances in the system.

Table 2.13

The impact of digitalization of logistics processes on reducing economic risks of Nova Poshta LLC

Digitalization direction	Type of risk being impacted	Expected economic effect
Automation of sorting operations	Operational and infrastructure risks	Reducing processing delays, reducing unproductive costs
Digital route planning and transportation coordination	Transport risks	Route optimization, reduction of time and transportation costs
Electronic invoices, tracking, digital channels of interaction with the customer	Registration and last mile risks	Reducing errors, increasing delivery predictability
Integrated information services and analytical tools	Financial and economic risks	Improved cost control, faster response to changing demand
Development of cyber protection and data backup	Information and cyber risks	Reducing the likelihood of failures, maintaining service continuity

At the same time, digital transformation also creates new challenges, primarily related to information security and the continuity of IT services, which requires a parallel strengthening of the enterprise's cyber resilience.

In summary, the economic risks of Nova Poshta LLC's logistics activities are complex and manifest as changes in cost intensity, profitability, infrastructure stability, and financial tension. The most noticeable impact of risk factors was observed in 2022, however, already in 2023 the company demonstrated a significant recovery of key performance indicators. This allows us to consider the development of digitalization of logistics processes as one of the priority areas for strengthening the economic stability of the enterprise, minimizing risks and increasing the efficiency of its operation.

Conclusions to Chapter 2

In the second section of the master's thesis, a comprehensive study of the activities of Nova Poshta LLC was carried out with an emphasis on the analysis of the organizational and economic characteristics of the enterprise, its competitive position in the market of postal and logistics services, the level of digitalization of logistics processes, as well as the economic risks that accompany the functioning of the logistics

system. The study made it possible to establish that the enterprise under study occupies a leading position in the market, is characterized by a significant scale of the logistics network, high intensity of operational activities and the ability to adapt to changes in the external environment.

Analysis of the development of the enterprise and its market position showed that during the studied period, Nova Poshta LLC maintained a leading position in the express delivery segment due to the combination of an extensive network, high speed of service, service orientation and active use of digital tools. It was established that the competitive advantages of the enterprise are formed not only due to the scale of activity, but also due to the ability to integrate physical logistics infrastructure with digital services, automated sorting facilities and modern channels of interaction with customers. This allowed the company to maintain stable market positions even in the face of significant external challenges.

The financial and economic analysis showed that the company's activities in 2021-2023 were characterized by generally positive dynamics of the main performance indicators. In particular, a significant increase in net income from the sale of services, gross, operating and net profit was established in 2023 compared to both 2021 and 2022. At the same time, 2022 became a period of increased risk load, which was manifested in the deterioration of individual cost efficiency parameters, a decrease in net profit compared to 2021, a reduction in the number of branches and a decrease in individual indicators of resource efficiency. However, already in 2023, most of the studied indicators demonstrated recovery or improvement, which indicates the high adaptability of the company's business model and the effectiveness of the management decisions made.

The analysis of liquidity, solvency, business activity and profitability made it possible to establish that the enterprise maintained overall financial stability, although individual indicators of short-term liquidity tended to decrease. This indicates the need to increase attention to the management of current assets, cash flows and current liabilities. At the same time, the positive dynamics of business activity indicators and the restoration of profitability in 2023 confirm that the enterprise uses available

resources quite effectively, and its logistics system is able to ensure increased performance even after the crisis period.

The assessment of the level of digitalization of logistics processes showed that Nova Poshta LLC has a sufficiently high level of digital development. This is manifested in the functioning of digital customer service channels, the use of a mobile application, a business office, electronic invoices, API integration, online tracking, as well as in the development of an automated sorting infrastructure. The work established that digitalization covers both front-office and internal logistics processes, ensuring a reduction in shipment processing time, increased accuracy of operations, increased coordination between elements of the logistics network, and improved overall manageability of material and information flows. The digital maturity index calculated within the framework of the study confirmed the trend towards a gradual increase in the level of digital integration of the enterprise during 2021-2023.

The study identified key economic risks of the logistics activities of Nova Poshta LLC, among which the most significant were operational, sorting and infrastructure, transport, financial and economic, as well as information and cyber risks. It was found that the most significant impact of risk factors was observed in 2022, when they manifested themselves through a deterioration in cost efficiency, a reduction in network presence, a decrease in individual profitability indicators and an increase in liquidity tensions. At the same time, the results of 2023 indicate a significant increase in the operational stability of the enterprise, the restoration of network infrastructure, increased productivity and improved financial results. This gives reason to argue that the enterprise managed to partially neutralize the negative impact of external shocks and create the prerequisites for further development on a more sustainable basis.

The results of the analysis substantiate that the digitalization of logistics processes for Nova Poshta LLC is not only a means of technological renewal, but also an important tool for reducing the risk load. Digital solutions contribute to increasing the transparency of logistics flows, reducing the number of operational errors, optimizing routing, accelerating the processing of shipments and improving the quality of service. That is why it is advisable to consider further deepening of digital

transformation as one of the priority areas for increasing the efficiency of logistics activities and minimizing economic risks.

Thus, the results of the second section confirm that Nova Poshta LLC has sufficient organizational, financial and technological potential to implement the strategy of digitalization of logistics processes. At the same time, the preservation of certain financial and operational risks, as well as the increased sensitivity of the logistics system to external disturbances, necessitate a systemic approach to the enterprise's further digital transformation. Such an approach should focus not only on increasing the technological level of logistics, but also on ensuring the long-term sustainability, flexibility, and economic security of the enterprise's activities.

CHAPTER 3 FORMATION AND ECONOMIC JUSTIFICATION OF THE STRATEGY FOR DIGITALIZATION OF THE ENTERPRISE'S LOGISTICS PROCESSES

3.1. Development of a strategy for digitalization of logistics processes

The formation of strategic goals for digital transformation is a key stage in developing a strategy for digitizing the company's logistics processes. For Nova Poshta, digital transformation should be considered not as an isolated technological project, but as a comprehensive management initiative aimed at minimizing economic risks, increasing operational efficiency, and strengthening competitive positions.

1. Strategic logic of digital transformation

Based on the analysis in Section 2, the enterprise has a sufficient level of digital maturity (IDM = 0.78), but the risk load associated with transport, infrastructure, and information factors remains. Therefore, strategic goals should be focused on:

– reducing the share of risk losses in income;

– increasing the speed and stability of logistics processes;

– reduction of operating cost variations;

– strengthening cyber resilience.

The digital strategy should align with the enterprise's overall corporate mission — ensuring fast, reliable, and technologically integrated delivery.

2. Quantitative strategic goals (for 3 years)

To ensure the measurable progress of digital transformation, it is advisable to set specific targets.

Table 3.1

Strategic goals of digital transformation for 2024–2026.

Indicator	Current value (2023)	Target value	Expected effect
Digital Maturity Index	0.78	≥ 0.88	Moving to a high level
Share of risk losses in income	1.1%	≤ 0.6%	Reducing financial losses
Average shipment processing time	4.9 min	≤ 4.0 min	Productivity improvement
Share of automated warehouse operations	75%	≥ 90%	Error reduction
Share of digital route planning	95%	100%	Minimizing delays

Thus, the strategy has a clear focus on economic impact and risk management.

3. Strategic directions of digital transformation

Based on the defined goals, it is proposed to highlight four key strategic directions:

1. Deepening the automation of logistics operations involves the implementation ofrobotic sorting systems, automatic quality control and digital twins of hubs.

2. The intellectualization of transport management requires the use of artificial intelligence algorithms to predict load and optimize routes taking into account risks.

3. The development of real-time risk analytics involves the creation of modulesRisk Analytics for rapid detection of deviations and automatic process adjustments.

4. IncreaseCyber resilience and system redundancy requires the implementation of multi-layered protection systems and cloud data duplication.

4. Formation of the target economic effect

Strategic goals must have a clear financial justification. According to preliminary calculations:

– reducing risk losses from 1.1% to 0.6% will save approximately 0.5% of income;

– with a conditional income of UAH 100 billion, this amounts to UAH 0.5 billion annually;

– reducing processing time by 18% can reduce personnel costs by 5–7%.

The total potential economic effect of the digital strategy is estimated at UAH 0.8–1.2 billion per year after full implementation.

5. Alignment with risk minimization strategy

It is important that the strategic goals of digital transformation are directly related to minimizing economic risks:

– automation reduces operational risks;

– digital route planning reduces transport risks;

– data analytics reduces financial variability;

– cyber protection minimizes information risks.

Thus, digital strategy becomes a tool for managing the enterprise's risk profile.

The implementation of digital transformation's strategic goals requires a well-founded choice of tools that directly reduce the economic risks of logistics activities. For Nova Poshta, the key criterion for selecting digital solutions is their ability to simultaneously increase operational efficiency and reduce losses from failures, delays and cost variations.

1. Tools for minimizing operational risks

Operational risks are associated with errors in processing shipments, overloading of sorting centers, and dependence on the human factor. To minimize them, it is advisable to implement:

– robotic sorting modules with automatic scanning and routing;

– automatic quality control systems (Quality Control AI);

– Digital Twins of logistics hubs for load modeling.

The expected effect is a 20–30% reduction in operational errors and a 4-minute reduction in shipment processing time.

2. Tools for minimizing transport risks

Transport risks are the most costly for the company. They can be reduced by:

– intelligent transport management system (Advanced TMS);

– dynamic routing algorithms using AI;

– integration of GPS monitoring with real-time road condition analytics;

– predictive maintenance for predicting technical malfunctions of the fleet.

Estimated economic effect:

Reduction in average delivery time by 5–7%

Reduction in fuel costs by 4–6%

Reduction of the proportion of delays from 4.1% to ≤ 3%

3. Financial risk reduction tools

To stabilize cost variations and improve financial planning, it is proposed to implement:

– Big Data analytics modules for demand forecasting;

– dynamic tariff management systems;

– automated budgeting of logistics units;

– Risk Analytics modules with Value-at-Risk calculation.

If the operating cost variation is 7%, implementing analytics will reduce it to 4–5%, resulting in savings of about UAH 1–1.5 billion over a three-year horizon.

4. Tools for reducing information and cyber risks

Given the high dependence on digital infrastructure, the following are necessary:

– multi-level cyber defense systems (Zero Trust Architecture);

– cloud data backup;

– automated cyberattack monitoring systems;

– blockchain technologies for supply chain control.

Increasing fault tolerance from 99.8% to 99.95% will reduce the risk of critical downtime by 30–40%.

5. Prioritizing the implementation of digital tools

To optimize resources, it is advisable to use the “effect – complexity of implementation” matrix (Table 3.2).

Table 3.2

Prioritizing digital tools

Tool	Expected economic effect	Implementation complexity	Priority
Advanced TMS	High	Medium	High
AI demand forecasting	High	Medium	High
Digital Twin hubs	Average	High	Average
Warehouse Robotization	High	High	Average
Blockchain	Average	High	Low/strategic

The most appropriate tools for the first stage are those with high economic impact and medium implementation complexity — in particular, intelligent routing and demand analytics.

6. Synergistic effect of digital solutions

Combining tools can yield a multiplicative result. For example:

AI-forecasting + Advanced TMS → reducing delays and optimizing routes;

WMS + robotics → reduction of errors and reduction of processing time;

Risk Analytics + Big Data → cost stabilization and increased financial predictability.

The total potential economic effect of implementing a set of digital tools is estimated at UAH 0.8–1.2 billion annually after full implementation of the strategy.

Thus, the choice of digital tools for minimizing economic risks should be based on their ability to provide a measurable financial effect, reduce cost variation, and increase the sustainability of the enterprise's logistics system. The next stage is to develop a phased roadmap for implementing these solutions.

The effectiveness of the strategy for digitalizing logistics processes depends not only on correctly formulated goals and the choice of tools, but also on the sequence of their implementation. For Nova Poshta, the implementation of the digital strategy should be carried out in stages, taking into account financial capabilities, organizational readiness, and the risks of technological transformation.

The Roadmap involves defining time horizons, resource provision, responsible units, and implementation benchmarks.

1. Stages of strategy implementation (2024–2026)

A three-year implementation horizon is proposed, divided into three key phases:

Phase I – stabilization and analytical (2024)

Goal: reduce cost variation and minimize the most critical risks.

Main activities:

– implementation of Advanced TMS;

– integration of AI demand forecasting modules;

– strengthening cyber defense;

– launch of the Risk Analytics system.

Expected result: reduction of the share of risk losses from 1.1% to 0.9% of income.

Phase II – automation and integration (2025)

Goal: increase the level of automation of warehouse and transport operations.

Main activities:

– robotization of sorting processes;

– implementation of Digital Twin for central hubs;

– full integration of WMS and TMS;

– digital redundancy of critical infrastructure.

Expected result: reduction of delivery delays to ≤ 3%, reduction of processing time to 4 minutes.

Phase III – intelligent and adaptive (2026)

Goal: transition to proactive risk management and full digital integration.

Main activities:

– implementation of Predictive Maintenance of the fleet;

– using AI to model risk scenarios;

– integration of ESG metrics into the digital platform;

– scaling big data analytics.

Expected result: reducing risk losses to ≤ 0.6% of revenue and achieving a digital maturity index ≥ 0.88.

2. Resource provision

To implement the roadmap, it is necessary to determine the investment volume. Approximate investment structure:

Direction Share of investments, %

IT infrastructure 35

Warehouse automation 30

Transportation systems 20

Cybersecurity 10

Analytics and staff training 5

With a conditional investment budget of UAH 3 billion for 3 years, the average annual investment will be about UAH 1 billion, which is economically justified taking into account the projected effect of UAH 0.8–1.2 billion per year after completion of implementation.

3. Strategy implementation control system

Monitoring the implementation of the roadmap involves setting key performance indicators (KPIs):

– digital maturity index;

– share of risk losses;

– average delivery time;

– warehouse automation coefficient;

– fault tolerance coefficient of IT systems.

Monitoring is carried out quarterly with adjustments to plans in case of deviations.

4. Change Management

Successful implementation of a digital strategy requires staff training and the formation of a digital culture. It is envisaged:

– training programs for logistics personnel;

– improving digital management competencies;

– creation of an internal digital innovation center.

5. Implementation risk assessment

Potential risks of implementing the roadmap include:

– budget overrun;

– technical failures during system integration;

– personnel resistance to change;

– cyber threats.

To minimize them, a reserve fund (10% of the budget) and phased testing of new digital solutions are provided.

3.2. Economic justification of the proposed measures

The economic justification of the measures proposed in section 3.1 for the digitalization of logistics processes of LLC Nova Poshta involves determining the direct and indirect financial effect of their implementation. To ensure consistency between the analytical and project parts of the study, it is advisable to use the enterprise's actual performance indicators for 2023, established in the second section, as the basis for calculations. This approach makes it possible to assess the economic feasibility of digital transformation not on a conditional basis, but on the real financial and economic basis of the enterprise.

The first direction of economic effect formation is the reduction of operating costs. Since the cost of services sold by Nova Poshta LLC in 2023 amounted to 28,625,037 thousand UAH, this figure serves as the basis for assessing direct savings from implementing digital solutions. Given that the transport component accounts for a significant share of the company's costs, the introduction of intelligent route management, load forecasting, and digital transportation coordination is expected to reduce transport costs by 4%. Under such conditions, annual savings will amount to about 343.5 million UAH. Additionally, it is necessary to take into account the reduction in the share of risk losses associated with delivery delays, re-processing of shipments, irrational use of resources and compensation costs. Provided that the share of such losses decreases from 1.1% to 0.6% of net income, the annual effect will

amount to about 182.3 million UAH. Therefore, the total direct effect of reducing costs and risk losses can be estimated at UAH 525.8 million per year.

The second direction of the economic effect is the reduction of delivery time and the increase in the turnover of the transport system. In the second section, it was established that the speed of delivery is one of the key competitive advantages of Nova Poshta LLC, and therefore, its further improvement has not only service but also economic significance. The introduction of AI models for forecasting flows, dynamic route-planning systems, and digital monitoring of logistics node load creates the prerequisites for reducing the average delivery time by 7%. The practical result of such a reduction is to increase the intensity of use of transport resources, improve flight distribution, reduce downtime, and enable more efficient use of the existing fleet. In terms of cost, this effect is readily estimated as equivalent to 2% of the transport component of the cost, amounting to about UAH 171.8 million per year. Thus, the digitalisation of transport planning provides an additional lever to increase the efficiency of the logistics system.

The third area of economic effect is the increase in labor productivity. According to the results of the second section, it was established that in 2023 the company processed 412 million shipments, and the average monthly labor costs per employee amounted to UAH 26,878.66. Assuming that, thanks to the automation of sorting operations, improvement of electronic document management and digitalization of client services, the average processing time of one shipment will be reduced from 4.9 min to 4.0 min, the total saving of working time will be about 6.18 million hours per year. At an average cost of one working hour of approximately UAH 162, the potential gross effect of increasing labor productivity can reach UAH 1.0 billion. At the same time, taking into account the fact that part of the released resource will be directed to servicing the growing volume of operations, reserving capacity and maintaining the quality of service, it is advisable to take into account only 40% of this potential in the calculations. In this case, the realistic annual effect of increasing labor productivity will be about UAH 400.3 million.

The generalization of the above calculations gives grounds to assert that the total annual economic effect from the implementation of the proposed measures for the digitalization of logistics processes of Nova Poshta LLC may amount to about UAH 1.10 billion. Its formation is ensured by three main sources: a decrease in operating costs and risk losses - UAH 525.8 million, an increase in the turnover of the transport system - UAH 171.8 million and an increase in labor productivity - UAH 400.3 million. This result is consistent with the general logic of the strategy defined in subsection 3.1, and at the same time is based on the actual performance indicators of the enterprise analyzed in the second section.

When assessing the feasibility of investments, it should be noted that the total investment for the implementation of the digital transformation program is UAH 3.0 billion over three years. Under such conditions, the annual effect of UAH 1.10 billion does not provide an instant coverage of investments in the first year of full implementation, but allows us to consider digital transformation as an economically justified medium-term project. The ratio of the annual effect to the total amount of investments is about 0.37, indicating significant potential for the return of invested resources over the multi-year operational cycle of digital solutions.

For a more thorough justification of the effectiveness of the measures, it is advisable to use investment analysis tools. The assessment horizon is 5 years. It is assumed that investments will be made in stages in 2024-2026, totalling UAH 1.2 billion, UAH 1.0 billion, and UAH 0.8 billion, respectively. The economic effect will also increase gradually: in 2024 - UAH 0.2 billion, in 2025 - UAH 0.6 billion, and from 2026, after the completion of the main phase of implementation, - UAH 1.10 billion annually. At a discount rate of 18%, the project's net present value remains positive at about UAH 0.10 billion. The internal rate of return is at the level of 21-22%, i.e. it exceeds the accepted discount rate. The simple payback period of the project is about 4 years, and the discounted one is almost 5 years. Therefore, the proposed measures can be assessed as economically feasible and investment-friendly.

At the same time, the investment analysis results indicate that the project's financial efficiency is sensitive to changes in key parameters. If the annual economic

effect is lower by 20%, the net present value goes into the negative zone. A similar result is observed when the planned investment budget is exceeded by 20% or the discount rate is increased to 25%. This means that the success of the digitalization program will largely depend on meeting the implementation deadlines, controlling investment costs and actually achieving target performance indicators. That is why it is advisable to implement the proposed measures in stages, with continuous monitoring of intermediate results and adjusting management decisions based on the effects observed.

The scenario-based assessment also confirms the project's economic feasibility, provided its implementation is of adequate quality. Under an optimistic scenario, which assumes faster achievement of target effects, stable functioning of the logistics infrastructure and high efficiency of digital solutions, the net present value of the project can increase to about UAH 0.64 billion. In the baseline scenario, it remains positive at about UAH 0.10 billion. In a pessimistic scenario, which combines a decrease in the expected effect, an increase in the implementation cost, and a delay in implementing measures, the NPV becomes negative and can be about -0.55 billion UAH. This indicates that the strategy of digitalization of logistics processes is viable, but requires a high level of organizational discipline, clear planning and continuous monitoring of the achievement of target parameters.

Thus, the conducted economic justification allows us to conclude that the implementation of the proposed measures for the digital transformation of Nova Poshta LLC's logistics processes is economically justified. The main effect is expected to be a reduction in operating costs, reduction of risk losses, increase in labor productivity and more efficient use of the transport system. At the same time, the project has a moderate margin of financial stability, therefore its effectiveness largely depends on the practical quality of implementation. This gives grounds to consider the digitalization of logistics processes not only as a tool for technological renewal, but also as a strategic factor for increasing economic efficiency, minimizing risks and ensuring the long-term competitiveness of the enterprise.

3.3. Assessment of the impact of the strategy on the economic sustainability of the enterprise

Assessing the impact of the digitalization strategy of logistics processes on the economic sustainability of the enterprise requires the formation of a general indicator that reflects the change in the level of risk load after the implementation of digital solutions. For Nova Poshta, such a tool is the integrated indicator of economic risk minimization (IEMRI).

1. Methodological basis for forming the indicator

IPRED is based on the aggregation of normalized indicators that characterize key risk groups:

1. Operational risks.
2. Transport risks.
3. Financial risks.
4. Information risks.

The formula for the integral exponent:

IPMER = Σ (Wi × Ri),

where Wi is the weighting factor of the risk group;

Ri – normalized value of the risk reduction indicator;

ΣWi = 1.

2. Determination of weighting factors

Given the enterprise's risk structure, transport and financial risks carry the greatest weight.

Risk group	Weight (Wi)
Operational	0.25
Transport	0.30
Financial	0.30
Informational	0.15

3. Normalization of indicators

To compare indicators before and after the implementation of the strategy, index normalization is used:

Ri = (Base value – New value) / Base value

Calculation by main indicators:

Operational risks:

- reduction of average shipment processing time:

(4.9 min – 4.0 min) / 4.9 min = 0.18

- reducing the share of non-automated warehouse operations:

(25% - 10%) / 25% = 0.60

Average value by operational risk group:

Rop = (0.18 + 0.60) / 2 = 0.39

Transport risks:

- reduction of average delivery time:

(23.0 h – 21.4 h) / 23.0 h = 0.07

- reducing the proportion of routes requiring manual adjustment:

(5% - 0%) / 5% = 1.00

Average value by transport risk group:

Rtr = (0.07 + 1.00) / 2 = 0.54

Financial risks:

- reducing the share of risk losses in income:

(1.1% - 0.6%) / 1.1% = 0.45

- reduction in the coefficient of variation of costs:

(1.63% - 1.00%) / 1.63% = 0.39

Average value by financial risk group:

Rf = (0.45 + 0.39) / 2 = 0.42

Information risks:

- reducing the share of critical downtime of IT services:

(0.10% - 0.05%) / 0.10% = 0.50

Therefore:

Group	Ri
Operational	0.39
Transport	0.54
Financial	0.42
Informational	0.50

4. Calculation of the integral indicator

IPMER = (0.25 × 0.39) + (0.30 × 0.54) + (0.30 × 0.42) + (0.15 × 0.50)

IPMER = 0.098 + 0.162 + 0.126 + 0.075 = 0.461

IPMER ≈ 0.46

The resulting value of 0.46 means a reduction in the total risk burden of approximately 46% compared to the baseline.

5. Interpretation of the result

For interpretation, we will use the rating scale:

IPMER	Risk minimization level
0–0.2	Low
0.21–0.4	Average
0.41–0.6	High
over 0.6	Very high

A value of 0.46 corresponds to a high level of risk minimization. The greatest effect is achieved in the areas of automation of warehouse operations, digital route management, and reduction of risk losses in income.

6. Impact on economic sustainability

A 46% reduction in risk burden means:

– stabilization of cash flows;

– reduction of variability of financial results;

– increasing revenue predictability;

– strengthening investment attractiveness.

IPRED can be integrated into the enterprise's strategic monitoring system as a key indicator of economic security.

Thus, the formation of an integral indicator of economic risk minimization allows us to quantitatively assess the impact of a digital strategy on the economic sustainability of an enterprise.

Forecasting financial and economic results allows you to assess the long-term impact of the strategy of digitalization of logistics processes on the company's performance indicators. For Nova Poshta, digital transformation should ensure not only risk reduction, but also sustainable growth in revenue, profitability, and profitability.

The forecast is made for the period 2024-2028 using a trend approach and taking into account the expected economic effect of digitalization.

1. Revenue forecast

The basic net income in 2023 was UAH 36,468.9 million. Taking into account the effect of digitalization, an average growth rate of 9% per year is expected.

Year	Revenue, UAH million
2023	36468.9
2024	39751.1
2025	43328.7
2026	47228.3
2027	51478.8
2028	56111.9

Over five years, income growth will be about 53.9%.

2. Operating expense forecast

In 2023, the company's operating profitability was 10.44%, which corresponds to an operating expense ratio of 89.56%. Thanks to digitalization, the operating expense ratio is expected to gradually decrease to 86.5% in 2028.

Year	Share of operating expenses in revenue, %	Operating expenses, UAH million
2023	89.56	32661.5
2024	89.0	35378.5
2025	88.4	38302.5
2026	87.8	41466.4
2027	87.2	44889.5
2028	86.5	48536.8

Although the absolute amount of expenses increases as the business scales, their relative share decreases, indicating improved operational efficiency.

3. Profitability forecast

Operating profit is forecasted taking into account revenue growth and a gradual decrease in the share of operating expenses.

Year	Operating profit, UAH million	Operating profitability, %
2023	3808.3	10.44
2024	4372.6	11.0
2025	5026.1	11.6
2026	5761.8	12.2
2027	6589.3	12.8
2028	7575.1	13.5

Therefore, operating profitability increases from 10.44% to 13.5%, which is the result of reducing risk losses, increasing productivity, and optimizing logistics processes.

4. Cash flow forecast

Given the results of section 3.2, it is advisable to forecast the additional net cash flow from implementing the digital strategy rather than the enterprise's conditional total cash flow.

Year	Additional net cash flow from the strategy, UAH billion
2024	0.2
2025	0.6
2026	1.1
2027	1.1
2028	1.1

After the completion of the main implementation phase, a stable annual additional effect of about UAH 1.1 billion is expected, thereby increasing the predictability of financial results and enhancing the enterprise's investment attractiveness.

5. Impact on financial sustainability

Through the implementation of the digital strategy, it is expected that:

– reduction of the cost variation coefficient from 1.63% to about 1.0%;

– reducing the share of risk losses to ≤ 0.6% of income;

– increase in the current liquidity ratio from 0.52 to 0.70–0.75;

– improvement of the asset turnover ratio from 1.88 to 2.07–2.11.

Reducing the risk burden by 46% will help stabilize financial results even in conditions of external uncertainty.

6. Integrated impact assessment

The cumulative economic effect of digitalization is manifested in:

– income growth of almost 54% over 5 years;

– an increase in operating profitability by 3.1 percentage points;

– almost doubling operating profit;

– the formation of a stable additional annual economic effect of about UAH 1.1 billion after the completion of the main phase of implementation.

These results indicate that a digital strategy not only minimizes economic risks, but also builds the long-term financial sustainability of the enterprise.

Conclusions to Chapter 3

In the third section of the master's thesis, the strategic principles of digitalization of logistics processes of LLC "Nova Poshta" as a tool for minimizing economic risks and increasing the long-term sustainability of the enterprise are developed and substantiated. It is determined that the digital transformation of logistics should be carried out not in a fragmented manner, but as a holistic strategy focused on the synchronous improvement of transport, sorting and warehousing, and analytical, information, and communication processes. The proposed strategy is based on a combination of technological renewal, development of digital infrastructure, strengthening cyber resilience, implementation of analytical forecasting tools, and the formation of an internal system to monitor the effectiveness of digital changes.

The study formulated quantitative strategic guidelines for digital transformation for 2024–2026, among which the key ones are increasing the enterprise's digital maturity index to a level of at least 0.88, reducing the share of risk losses in revenue to 0.6%, reducing the average shipment processing time to 4 minutes, increasing the share of automated warehouse operations to 90%, and fully covering routes with digital planning. It is substantiated that achieving these goals is possible subject to the phased implementation of a strategy that includes the stabilization and analytical, automation and integration, and intellectual and adaptive phases. This approach enables the enterprise to align the pace of digital change with its resource capabilities and reduce implementation risks.

The economic justification of the proposed measures confirmed that the digitalization of logistics processes of Nova Poshta LLC is financially feasible. It was

established that the main sources of economic effect are a decrease in operating costs, a reduction in risk losses, an increase in labor productivity and an increase in the efficiency of the transport system. The total expected annual economic effect after completion of the main phase of implementation is estimated at about UAH 1.1 billion, consistent with the general framework for the strategy's projected effect. With investments of UAH 3.0 billion over three years, the project is characterized by a positive net present value, an internal rate of return exceeding the discount rate, and acceptable payback periods, which indicates its economic justification in the medium term.

An important result of the section was the proof that the digital strategy is not only innovative, but also risk-reducing in nature. Based on the proposed integral indicator of economic risk minimization, it was established that the implementation of digital solutions is able to provide a high level of risk reduction. The most tangible effects are expected in the areas of automated warehouse processes, digital route management, reduced cost variability, reduced delivery delays, and increased reliability of the information infrastructure. This allows us to consider digitalization not only as a means of increasing efficiency, but also as a component of the economic security system of the enterprise.

Forecasting financial and economic results enabled the conclusion that implementing the strategy will have a positive long-term impact on the enterprise's results. It is expected that net income will increase during the forecast period, the relative share of operating expenses will gradually decrease, operating profitability will increase and a stable additional cash flow will be formed after the completion of the main implementation phase. At the same time, it is substantiated that the strategy's financial performance significantly depends on the quality of its implementation, compliance with the investment budget, and the actual achievement of target performance indicators. This confirms the feasibility of phased implementation of measures, systematic monitoring of KPIs and timely adjustment of management decisions.

Scenario analysis showed that under basic conditions, the strategy remains economically feasible, and under favorable environmental conditions, its effect increases significantly. At the same time, if the actual economic effect decreases, investment costs increase, or implementation delays occur, the project's financial return decreases significantly. This indicates the need for high organizational discipline during the implementation of the digital strategy, increased cost control, and concentration on those digital tools that provide the best balance between the expected effect and the complexity of implementation.

Thus, the results of the third section confirm that Nova Poshta LLC has sufficient financial, organizational and technological potential to implement the strategy of digitalization of logistics processes. The proposed strategy is economically justified, focused on reducing the risk burden, increasing operational efficiency, strengthening financial stability, and ensuring the enterprise's long-term competitiveness. Its implementation creates the basis for the transition from reactive management of logistics processes to a proactive model, in which digital technologies become a key tool for sustainable development and minimizing economic risks.

CONCLUSIONS

The work carried out a comprehensive theoretical, methodological, and applied study of the formation of a strategy for the digitalisation of an enterprise's logistics processes as a factor in minimising economic risks. The purpose of the study was to substantiate the strategic directions for the digital transformation of logistics activities and to assess their impact on the enterprise's economic sustainability and competitiveness. The study focused on the logistics enterprise Nova Poshta.

The first section summarises the theoretical foundations of the digitalisation of logistics processes, systematises the economic risks of logistics activities, and defines methodological approaches to the formation of a digital strategy. It is proven that the digital transformation of logistics is an evolutionary process that includes the automation of operations, the integration of information systems, and the implementation of big data analytics. It is established that digital technologies are an effective tool for risk management, reducing cost variability, and increasing the transparency of logistics processes.

According to the results of the study of the activities of Nova Poshta LLC, it was established that the company occupies a leading position in the Ukrainian postal and logistics services market and is characterized by high intensity of operational activities, a significant scale of the network, a developed logistics infrastructure and a sufficiently high level of digital integration. The analysis of the main technical and economic indicators for 2021–2023 showed generally positive dynamics of the company's development. In particular, in 2023, compared to previous years, there was a significant increase in net income, gross, operating and net profit, an increase in return on assets, labor productivity and an expansion of the branch network. At the same time, 2022 was a period of increased risk load, manifested in deteriorating individual cost-efficiency parameters, a decrease in net profit compared to 2021, a reduction in network presence, and increased tension in individual liquidity indicators. This led to the conclusion that the company's logistics system is sufficiently resilient, but sensitive

to external shocks, and therefore requires further strengthening of digital adaptation mechanisms.

The conducted analysis of the enterprise's financial condition showed that Nova Poshta LLC maintained overall financial stability and an acceptable level of solvency, but faced certain limitations in short-term liquidity. At the same time, the indicators of business activity and profitability demonstrated a sufficiently high level of efficiency in the use of assets, working capital, fixed assets and labor potential. Particularly indicative is the significant increase in labor productivity and restoration of profitability in 2023, which indicates the effectiveness of management decisions and the high potential of the enterprise for structural renewal. On this basis, it was concluded that further digitalization of logistics processes has not only technological, but also clearly expressed economic sense, since it is able to strengthen positive trends and at the same time reduce the risks of losses, delays and inefficient use of resources.

The assessment of the level of digitalization of logistics processes of Nova Poshta LLC showed that the company has already formed a sufficiently developed digital environment, which includes a mobile application, a business office, API integration, electronic invoices, online shipment tracking, digital customer interaction services and automated sorting infrastructure. The work proves that digitalization for the studied company covers both front-office customer service processes and internal logistics operations related to sorting, routing, flow processing and load planning. The calculated digital maturity index increased from 0.68 in 2021 to 0.78 in 2023, indicating a gradual strengthening of digital integration and a sufficiently high level of digital development for the company. At the same time, it was found that the potential for further improvement is concentrated in developing analytical support for management decisions, intelligent load forecasting, digital route coordination, and increasing cyber resilience.

The study identified key economic risks in Nova Poshta LLC's logistics activities, among which the most significant were operational, sorting and infrastructure, transport, financial and economic, and information and cyber risks. It was established that the most significant impact of risk factors was observed in 2022,

due to deterioration in cost efficiency, a reduction in network scale, a reduction in individual profitability indicators, and the complication of liquidity conditions. At the same time, the results of 2023 showed the restoration of most of the activity's effective parameters, confirming the enterprise's high adaptability in its logistics system. On this basis, it is justified that the further development of digital solutions should be considered as one of the priority areas for minimizing economic risks, since digitalization contributes to reducing the number of operational errors, increasing the transparency of logistics flows, reducing the response time to failures and better cost control.

In the applied part of the work, a strategy for the digitalization of logistics processes of Nova Poshta LLC was developed, focused on the phased improvement of transport planning, automation of sorting and warehousing operations, development of analytical services and strengthening of information security. Target parameters of the strategy were determined, including increasing the digital maturity index to a level of at least 0.88, reducing the share of risk losses in income to 0.6%, reducing the average shipment processing time to 4 minutes, increasing the share of automated warehousing operations to 90% and full coverage of routes with digital planning. It was substantiated that the implementation of the strategy should be carried out in stages, which allows to coordinate digital changes with the financial capabilities of the enterprise and reduce implementation risks.

The economic justification of the proposed measures showed that their implementation is financially feasible. It was established that the main sources of economic effect are a reduction in operating costs, a reduction in risk losses, an increase in labor productivity and an increase in the efficiency of the transport system. The total expected annual effect after the completion of the main phase of implementation is estimated at about UAH 1.1 billion. With an investment of UAH 3.0 billion over three years, the project is characterized by a positive net present value, an acceptable payback period and an internal rate of return exceeding the discount rate. This allows us to assert that the digitalization strategy is economically justified and can be implemented as a medium-term investment project.

Based on the proposed integral indicator of economic risk minimization, it is proven that the digital strategy is capable of providing a significant reduction in the total risk load. The greatest effect is expected in the areas of automated warehouse processes, digital route management, reduced cost variability, and increased reliability of information services. Forecasting of financial and economic results confirmed that the implementation of the strategy will have a positive impact on revenue growth, increased operating profitability, the generation of stable additional cash flow, and the strengthening of the enterprise's long-term economic sustainability. At the same time, it was established that the effectiveness of the project largely depends on the quality of implementation, compliance with the investment budget, achievement of target KPIs, and the enterprise's ability to promptly respond to changes in the external environment.

Thus, the goal of the master's thesis has been achieved: a strategy for digitizing the logistics processes of an enterprise as a factor in minimizing economic risks has been theoretically substantiated and practically developed using the example of Nova Poshta LLC. The results obtained confirm that the digital transformation of logistics is one of the most promising areas for increasing an enterprise's efficiency, sustainability, and competitiveness. The practical significance of the work lies in the possibility of using the proposed approaches, indicators, and calculations in the strategic management of logistics activities, the planning of digital investments, and the development of a risk-oriented system for enterprise development.

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