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QUALIFICATION PAPER

(EXPLANATORY NOTES)

OF SEEKER OF ACADEMIC DEGREE

«MASTER»

THEME: «*Innovative development of logistics processes at the enterprise*»

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*I certify that in this qualification paper
there are no borrowings from the research of other authors
without appropriate references*

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Kyiv 2024

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ДЕРЖАВНЕ НЕКОМЕРЦІЙНЕ ПІДПРИЄМСТВО
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NATIONAL AVIATION UNIVERSITY
Faculty of Transport, Management and Logistics
Logistics Department

Academic Degree Master

Specialty 073 «Management»

Educational and Professional Program « Logistics »

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«26» August 2024

TASK

FOR COMPLETION THE QUALIFICATION PAPER OF SEEKER

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1. Theme of the qualification paper: «Innovative development of logistics processes at the enterprise» was approved by the Rector Directive №1559/ст. of August 26, 2024.

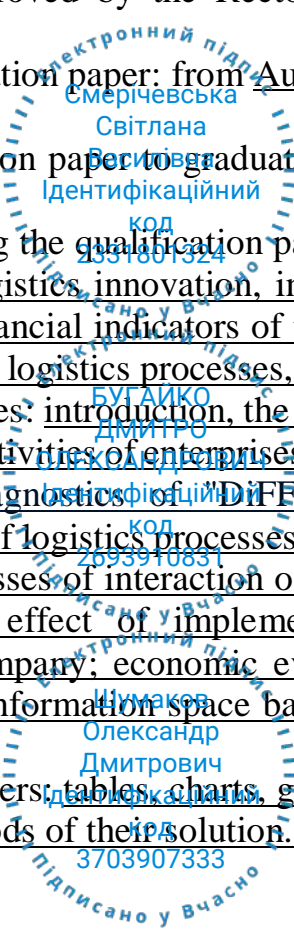
2. Term performance of qualification paper: from August 26, 2024 to December 15, 2024.

3. Date of submission qualification paper to graduation department: November 20, 2024.

4. Initial data required for writing the qualification paper: general and statistical information about market trends in logistics innovation, information of the company «DiFFreight» LLC, production and financial indicators of the company «DiFFreight» LLC, literary sources on innovations in logistics processes, Internet source.

5. Content of the explanatory notes: introduction, the essence and significance of innovations for ensuring the logistics activities of enterprises; research on market trends in logistics innovation; financial diagnostics of "DiFFreight" LLC; analysis of innovative activity in the organization of logistics processes of the company; formation of an innovative approach to the processes of interaction of a transport company with external contractors; socio-technical effect of implementing a unified logistics information space at the transport company; economic evaluation of the project of implementation of a unified logistics information space based on cloud technologies; conclusions and appendix.

6. List of obligatory graphic matters: tables, charts, graphs, diagrams illustrating the current state of problems and methods of their solution.



7. Calendar schedule:

№	Assignment	Deadline for completion	Mark on completion
1	2	3	4
1.	Study and analysis of scientific articles, literary sources, normative legal documents, preparation of the first version of the introduction and the theoretical chapter	26.08.24-20.09.24	Done
2.	Collection of statistical data, timing, detection of weaknesses, preparation of the first version of the analytical chapter	21.09.24-13.10.24	Done
3.	Development of project proposals and their organizational and economic substantiation, preparation of the first version of the project chapter and conclusions. Editing the first versions of qualification paper	14.10.24-03.11.24	Done
4.	Preparing the final version of the qualification paper, checking by standards inspector	04.11.24-14.11.24	Done
5.	Approval for a qualification paper with supervisor, getting of the report of the supervisor, getting internal and external reviews, transcript of academic record	15.11.24-19.11.24	Done
6.	Submission qualification paper to Logistics Department	20.11.24	Done

Seeker _____

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Supervisor of the qualification paper _____

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8. Consultants of difference chapters of qualification paper:

Chapter	Consultant (position, surname and initials)	Date, signature	
		The task was given	The task was accepted
Chapter 1	Professor, Bugayko D.O.	26.08.24	26.08.24
Chapter 2	Professor, Bugayko D.O.	21.09.24	21.09.24
Chapter 3	Professor, Bugayko D.O.	14.10.24	14.10.24

9. Given date of the task August 26, 2024.

Supervisor of the qualification paper: _____ **Dmytro BUGAYKO**

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Task accepted for completion:

_____ **Oleksandr SHUMAKOV**

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ABSTRACT

The explanatory notes to the qualification paper «Innovative development of logistics processes at the enterprise» comprises of 99 pages, 38 figures, 7 tables, 1 appendix, 65 references.

KEY WORDS: INNOVATION, LOGISTICS PROCESS, TRANSPORT COMPANY, TECH TRENDS, LOGISTICS TREND RADAR, CUSTOMER RELATIONSHIP MANAGEMENT, UNIFIED LOGISTICS INFORMATION SPACE

The purpose of the qualification work is to develop theoretical approaches and practical recommendations for improving logistics processes at the enterprise through the implementation of innovative technologies and solutions to increase efficiency, competitiveness, and sustainable development.

The subject of the qualification work is methods, technologies, and tools for the innovative development of logistics processes aimed at their optimization, automation, and efficiency improvement.

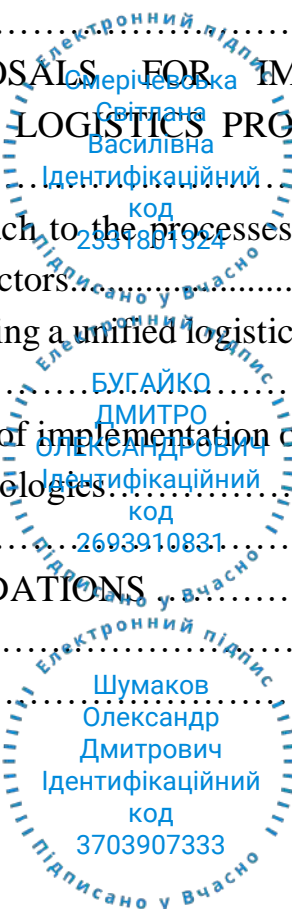
The object of the qualification work is the logistics processes of the enterprise, which require improvement by implementing innovative technologies and solutions.

The following research methods were used in the process of writing the qualification work, such as analysis and synthesis; abstraction and generalization; classification and comparison; statistical analysis and investment analysis.

Materials of the qualification paper are recommended for applying during scientific research, in the educational process and the practical activities of logistics department specialists.

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NOTATION

AI	– Artificial intelligence
AMR	– Autonomous mobile robot
AGC	– Automated guided carts
AGV	– Automated guided vehicles
CF	– Cash flow
CRM	– Customer Relationship Management
CV	– Computer Vision (Computer Vision
DPP	– Discounted payback period
IoT	– Internet of Things
IRR	– Internal rate of return
KPI	– Key Performance Indicators
LLC	– Limited liability company
ML	– Machine learning
NPV	– Net present value
PI	– Profitability index
ULIS	– Unified logistics information space



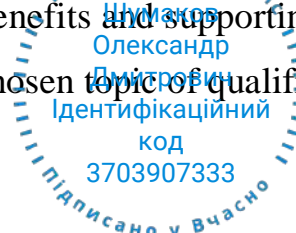
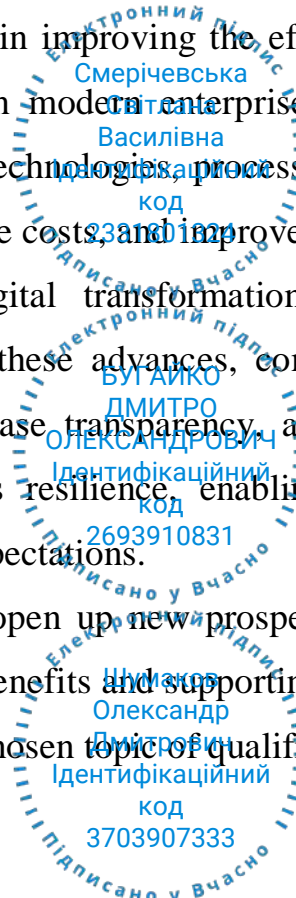
INTRODUCTION

Technology and innovation are key factors in the development of many industries, including logistics. Their impact on the supply chain is significant, as they have opened up new opportunities for improving logistics processes. All stages of product creation and delivery have undergone positive changes thanks to innovation: both the physical processing of materials and the digital processing of orders have been improved. This has allowed companies to significantly reduce operating and transaction costs, although it has also led to an increase in energy consumption.

In addition, innovation is an important element of the transition to sustainable logistics. Investments in environmentally friendly technologies contribute to the introduction of "green" practices at all stages of the logistics process. This helps to minimize the negative impact on the environment, while ensuring the long-term profitability of the industry and increasing the national share of global added value.

Innovation plays a critical role in improving the efficiency, effectiveness, and adaptability of logistics operations in modern enterprises. In logistics, innovation involves the implementation of new technologies, processes, and business models to optimize supply chain activities, reduce costs, and improve customer satisfaction. Key innovations include automation, digital transformation, and the integration of sustainable practices. By leveraging these advances, companies can respond more effectively to market demands, increase transparency, and maintain a competitive advantage. Innovation also increases resilience, enabling businesses to adapt to disruptions and changing customer expectations.

Thus, innovative technologies open up new prospects for increasing logistics efficiency, contributing to economic benefits and supporting sustainable development. This determines the relevance of the chosen topic of qualification work.



Literature review. The phenomenon of innovation, its meaning, and its application in innovative approaches, including in the management of logistics processes, and supply chains have been widely studied by numerous scholars and researchers. The main contributors to the definition of these concepts include: Bhasin K., Skillikorn N., and Bergung S. have researched and provided important information on the definition and understanding of innovation as a concept. The term “innovative approach” has been analyzed and defined by Fontana L. and Dwyer J., who have emphasized its application in various fields and contexts.

Researchers such as Flint D.J., Birkinshaw J., Hamel G., Mole M.J., Lopienski K., Evangelista P., McKinnon A., Sweeney E., and Gong J. have focused on how innovation is applied to supply chain management, identifying strategies and models that increase efficiency, adaptability and sustainability in this field.

The purpose of the qualification work is to develop theoretical approaches and practical recommendations for improving logistics processes at the enterprise through the implementation of innovative technologies and solutions to increase efficiency, competitiveness, and sustainable development.

To achieve the goal, the following tasks were set and solved:

- to determine the essence of innovations to support the logistics activity of the enterprise;
- to investigate market trends in innovative logistics;
- to investigate international experience in the implementation of innovative technologies in the field of logistics;
- to provide general characteristic of “DiFFreight” LLC;
- to conduct a financial diagnosis of “DiFFreight” LLC;
- to analyze the company's innovative activity in the organization of logistics business processes;
- to substantiate the concept of a unified logistics information space as an innovative approach to the processes of interaction of the company with customers;

- determine the social and technical effect of the implementation of a unified logistics information space in a transport company;
- conduct an economic assessment of the project for the implementation of a unified logistics information space.

The subject of the qualification work is methods, technologies, and tools for the innovative development of logistics processes aimed at their optimization, automation, and efficiency improvement.

The object of the qualification work is the logistics processes of the enterprise, which require improvement by implementing innovative technologies and solutions.

The scientific novelty of the qualification work is an innovative approach to the processes of interaction of a transport company with external contractors based on the creation of a unified logistics information space, which is a fundamentally new approach to the implementation of a new integrated transport process management system in the transport market.

The following research methods were used in the process of writing the qualification work, such as analysis and synthesis for studying scientific literature, regulatory framework, and existing approaches to innovative development of logistics; abstraction and generalization for formulating theoretical propositions and generalizing data on innovations in logistics; classification and comparison for analyzing various innovative approaches, technologies, and practices in logistics; statistical analysis for conducting financial diagnostics of the company's activities; analysis of cost data, investment analysis - for assessing the economic efficiency of project solutions.

The information base of the qualification work is materials from the official website and open annual reports of DiFFreight™ LLC, articles and materials of scientific periodicals on the selected topic, posted on the Internet, as well as other reference and information sources.

The qualification work consists of an introduction, three sections, conclusions and proposals, a list of sources used, and appendices.



CHAPTER 1

THEORETICAL FOUNDATIONS OF INNOVATIVE DEVELOPMENT OF LOGISTICS PROCESSES AT THE ENTERPRISE

1.1 The essence and significance of innovations for ensuring the logistics activities of enterprises

One of the main factors of the effective work of the enterprise is the process of searching for new forms and improving existing ones, improving technologies, materials, or products, which ensure constant growth of demand and increase of profitability. The latest technologies, materials, and products are standardized under the dynamism and strategic orientation of innovation processes, which precede the development of logistics companies' economic and managerial, production and economic activities.

According to the Law of Ukraine "On Innovative Activity" (Article 1. Definition of Terms), the terms are used in the following meaning (see fig.1.1) [50]:

- a) innovations - newly created (applied) and (or) improved competitive technologies, products, or services, as well as organizational and technical solutions of a production, administrative, commercial, or other nature, which significantly improve the structure and quality of production and (or) the social sphere;
- b) innovative activity - activity aimed at the use and commercialization of the results of scientific research and development and leading to the release of new competitive goods and services on the market;
- c) innovative product - the result of scientific research and (or) research and design development that meets the requirements established by this Law;

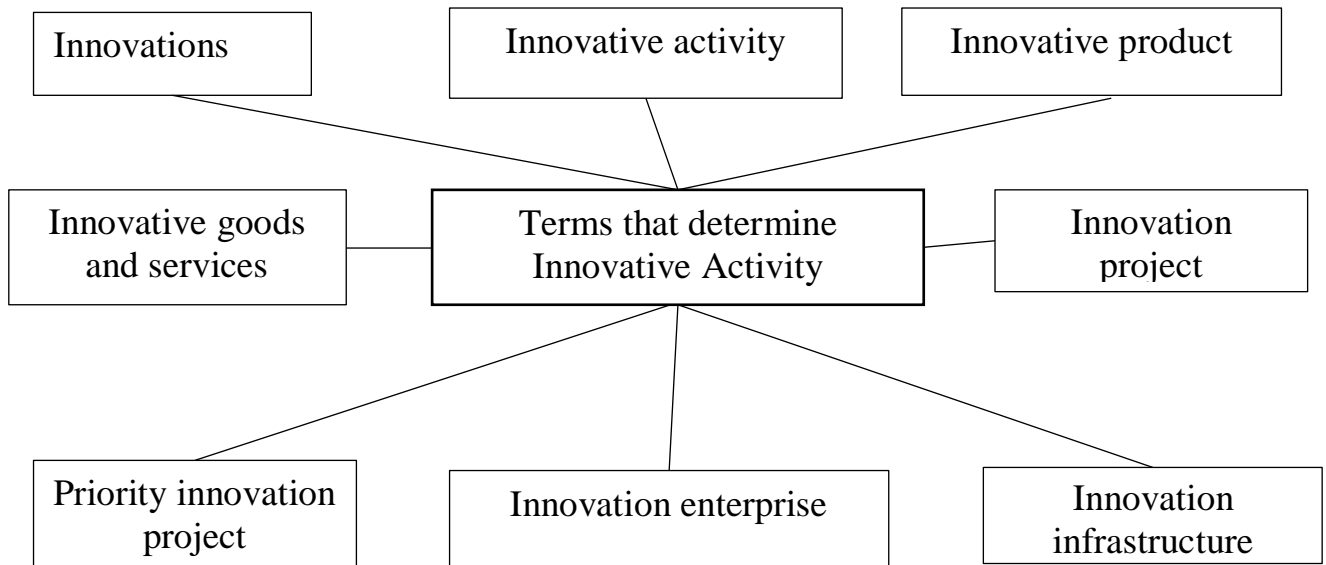


Figure 1.1 - Terms that determine Innovative Activity according to the Law of Ukraine "On Innovative Activity"

Source: developed by the author based on [50]

d) innovative goods and services - new competitive goods or services that meet the requirements established by this Law;

e) innovation project – a set of documents that defines the procedure and complex of all necessary measures (including investment) for the creation and implementation of an innovative product and (or) innovative products;

e) priority innovation project – an innovation project that belongs to one of the priority areas of innovation activity approved by the Verkhovna Rada of Ukraine;

g) innovation enterprise (innovation center, technopark, technopolis, innovation business incubator, etc.) – an enterprise (association of enterprises) that develops, produces, and sells innovative products and (or) products or services, the volume of which in monetary terms exceeds 70 percent of its total volume of products and (or) services;

g) innovation infrastructure – a set of enterprises, organizations, institutions, associations, or associations of any form of ownership that provide services to ensure

innovation activity (financial, consulting, marketing, information and communication, legal, educational, etc.).

The term "innovation" originates from the Latin word "novo," meaning "change" or "addition." A more common interpretation comes from the English word "innovation," combining "in" (introduction) and "novation" (new), which translates to "introducing something new." This definition is widely accepted in both domestic and international academic contexts [32].

Austrian economist J. Schumpeter was the first to introduce the concept of "innovation," initially describing it as a "new combination." By this, he referred to a qualitative transformation in production achieved not just through minor improvements to existing tools but by incorporating entirely new methods or organizational systems. Schumpeter argued that innovation does not evolve from existing systems but arises independently, ultimately replacing outdated practices. Over time, he replaced the term "new combination" with "innovation."

The theory of innovation has been significantly advanced by researchers like K. Knight, L. More, H. Barnett, and G. Zaltman. K. Knight focused on introducing new elements into organizations or their environment. H. Barnett emphasized the qualitative impact of such changes, while G. Zaltman took a broader perspective, defining innovation as any idea, activity, or practice perceived as new by the entity implementing it [40].

Various approaches to defining the concept of "innovation" can be categorized into several perspectives (see fig.1.2). One such perspective views innovation as a process. Under this process-oriented approach, innovation is seen as a multifaceted sequence that encompasses the development, implementation in production, and commercialization of new consumer values—such as products, technologies, organizational structures, and more. Scholars like V. I. Gromeka, V. I. Antonyuk, and O. I. Prigozhin support this viewpoint. For instance, V. I. Gromeka describes innovation as the process by which a scientific idea or technical invention is applied in practice to

generate economic benefits. Similarly, O. I. Prigozhin interprets innovation broadly, defining it as a purposeful change that introduces new and relatively stable elements into an operational environment. He emphasizes that innovation represents the essence of change, marking a system's transition from one state to a qualitatively different one.

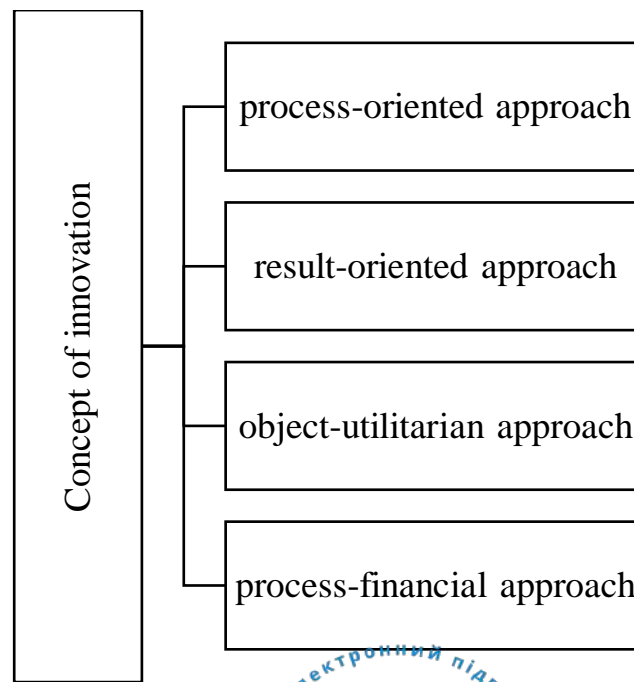


Figure 1.2 – Approaches to definition the concept of innovation

Source: developed by the author

Another perspective, represented by O. E. Varshavsky, Yu. V. Yakovets, and others, considers innovation as the outcome of an innovation process. This object-utilitarian approach focuses on two key aspects: first, innovation as a tangible entity—a new consumer value derived from scientific and technological advancements; and second, its utility—emphasizing its capacity to fulfill social needs with significant positive impact. For example, Yu. V. Yakovets defines innovation as the result of qualitative transformations in production, while O. E. Varshavsky describes it as a scientific or technological breakthrough at the level of specific processes, projects, or organizational methods.

Foreign scholars also offer unique interpretations. F. Valenta, for example, sees innovation as a structural change within a production system, signifying its transition to a new internal state. Other researchers approach innovation from the perspective of its application within enterprises, defining it as a deliberate transformation in the enterprise's functioning as a cohesive system.

In Germany, several approaches to defining the category of "innovation" have emerged. For example, G. Mayer and G. D. Hausstein define innovation as the ultimate outcome of aligning needs with new solutions. Similarly, F. Haberland views the innovation process as encompassing scientific, technical, technological, economic, and organizational changes that arise during the process of reproduction [30].

In the United States, new perspectives on innovation are associated with scholars like P. Drucker and R. Foster. P. Drucker, for instance, characterizes innovation as a specialized tool for entrepreneurs, enabling them to leverage change as an opportunity to develop new types of businesses or services. This perspective, known as the process-utilitarian approach, conceptualizes innovation as a comprehensive process involving the creation, dissemination, and application of new practical tools, distinguishing it from the object-utilitarian approach, which emphasizes innovation as a tangible outcome.

R. Foster, on the other hand, focuses on the competitive and profit-driven aspects of innovation. He describes it as a market-based duel between innovators, who seek to disrupt the status quo for financial gain, and incumbents, who aim to protect their established interests.

One of the most comprehensive definitions of innovation comes from P. Lemerle, who expands the concept to include new products or services, methods of production, and novelties in organizational, financial, and research domains. Lemerle's approach, classified as process-financial, emphasizes improvements that lead to cost savings or create conditions for financial efficiency. Within this framework, innovation is seen as

the act of investing in new technologies, equipment, and scientific research to drive advancements.

The analysis of the presented definitions and approaches allows the authors [32] to conclude that most researchers base their understanding of "innovation" on the concept proposed by J. Schumpeter. He viewed the discovery or invention of a new device or technology as the starting point and its implementation as the ultimate goal.

Innovation is primarily analyzed from the perspective of economic application, involving either the creation of new resources or the innovative use of existing ones. The majority of researchers characterize innovation as a process, though differences arise regarding the essence of this concept, its components, and its phases.

Another approach treats innovation as an object or outcome, achieved through the commercialization of scientific research. Additionally, some researchers consider innovation to be an idea embodying novelty and serving as the focus of innovative activity.

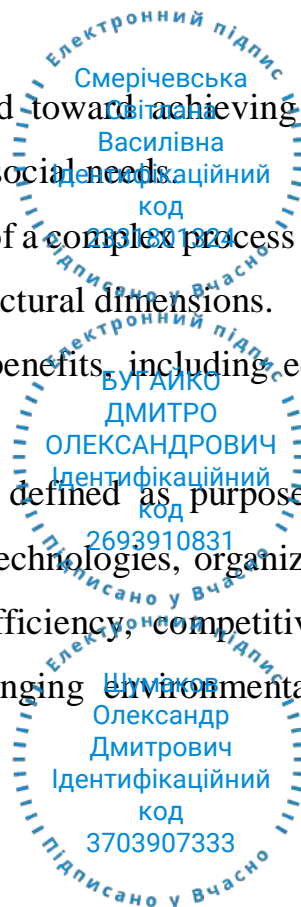
The analysis of various definitions reveals commonalities regarding the concept of "innovation":

1. Innovation is clearly oriented toward achieving a tangible result, such as generating market profits or fulfilling social needs.

2. It can be viewed as the result of a complex process involving systemic changes in technical, economic, social, and structural dimensions.

3. Innovation delivers diverse benefits, including economic, social, scientific, and technical impacts.

Innovation in logistics can be defined as purposeful changes based on the implementation of new or improved technologies, organizational methods, processes or solutions that ensure increased efficiency, competitiveness and adaptability of logistics systems in response to changing environmental conditions and growing consumer needs.



This approach takes into account several key aspects:

Novelty - the implementation of original solutions that improve logistics processes.

Focus on the result - innovation should bring economic, social, environmental or other effect.

Integration of technologies - in particular, digital, automated, environmentally friendly.

Systemicity - the impact of innovation on the entire logistics system, including transportation, storage, information processing and interaction with partners.

This definition emphasizes that innovations in logistics are not limited only to technological improvements, but also cover managerial, operational and strategic aspects aimed at creating a new quality of logistics processes and services.

Based on this, it should be noted that this approaches determine the role of innovation in the economy at the macro and micro levels, including playing a key role in the logistics sector, acting as a driver of efficiency, competitiveness, and adaptation to changing market conditions. By its nature, innovation involves the introduction of new ideas, methods, technologies, or processes to improve existing systems or create completely new approaches. In the context of logistics, this can range from advances in supply chain management software to the introduction of automated warehouse systems and ecological logistics.

The main factors of the low level of innovative activity of logistics companies include the following:

1) at the state level, there is an ineffective state system of support and development of innovative activity of business entities, which combines many institutions that formally perform their functions; insufficient level of legislative regulation of innovative activity in transport regarding instruments for stimulating such activity; low level of financial incentives in the field of taxation, co-financing, acquisition, and implementation of innovations.

2) at the level of transport enterprises, there is an insufficient level of financial resources allocated for the development, acquisition, and implementation of innovations (determined by the size of the enterprise), the interest of owners in obtaining maximum benefit in the short term, reluctance to divert financial funds to innovative activity; insufficient attention to issues of strategic development of the enterprise and the importance of the innovative foundation; lack of incentives for employees to be innovative [26, p. 116].

Based on the existing literature, several classical factors that influence the development of innovation processes are distinguished and summarized in fig. 1.3.

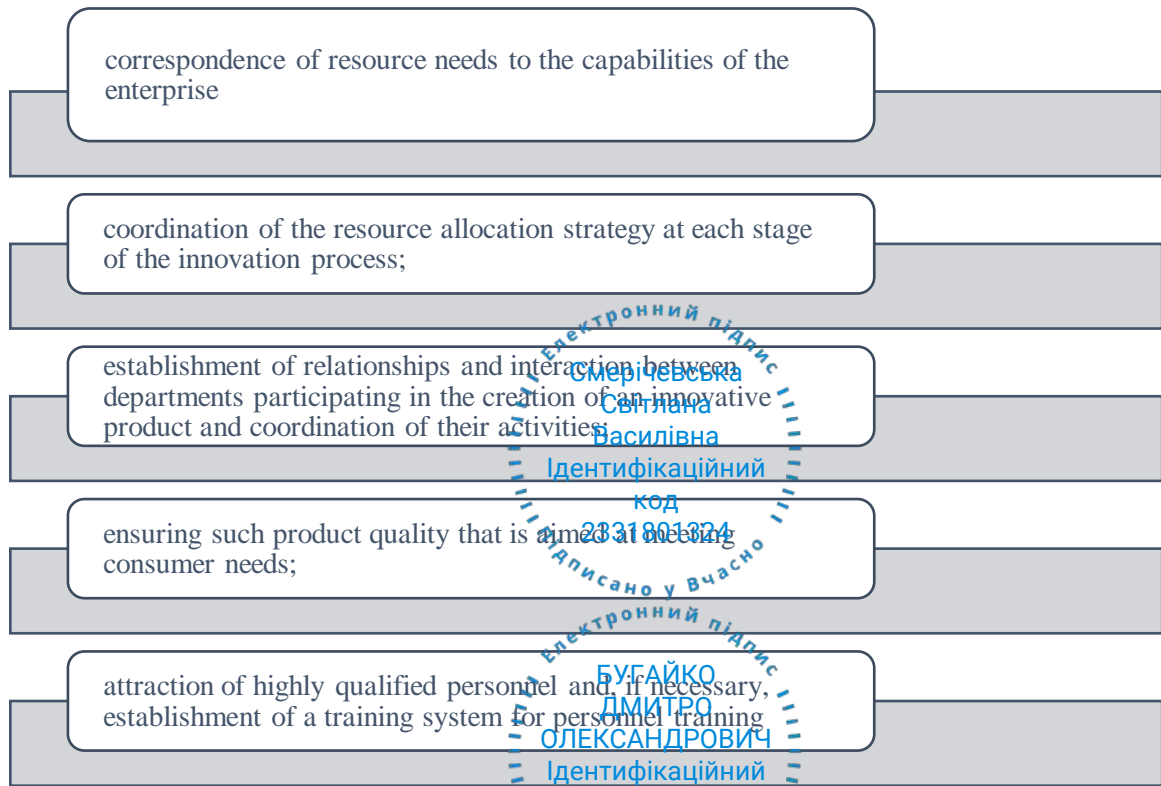


Figure 1.3 - Factors that influence the development of innovation processes in logistics industry

Source: developed by the author based on [41]

Innovations in logistics can be categorized into several types that are presented in fig.1.4.

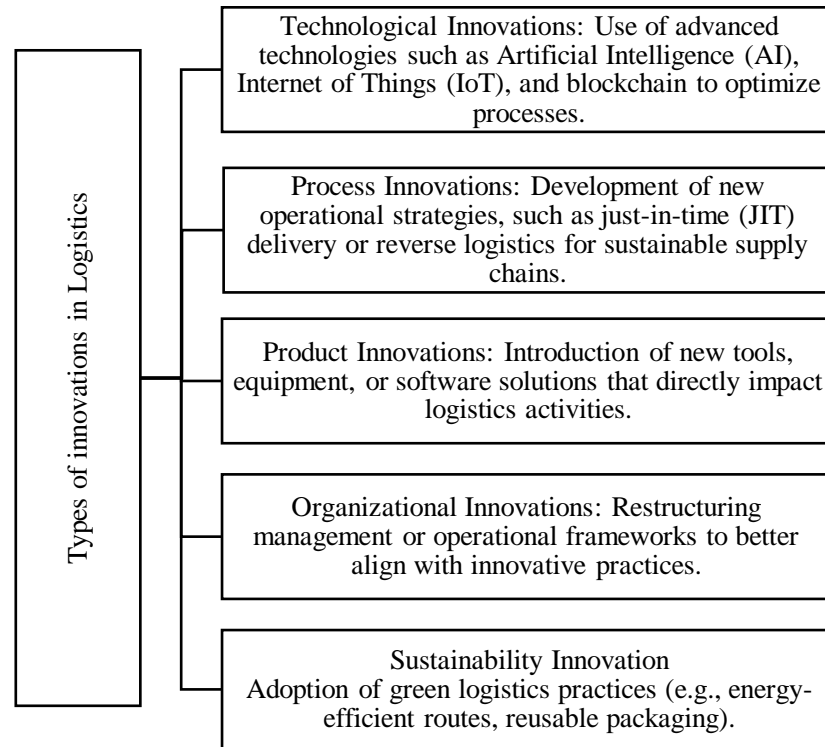


Figure 1.4 - Types of innovations in Logistics

Source: developed by the author

Based on the literature review and taking into account the identified types, a scheme of logistics innovation that outlines the interconnected processes, technologies, and strategies that integrate innovative practices into logistics operations was developed. The key components of the framework are inputs - key processes - outputs, and feedback (see fig.1.5).

Inputs determine the factors that influence the development of innovations. Key processes determine the combination of types of innovations in logistics with solutions that can be developed and implemented within the defined types of innovations. Outputs are the results that a logistics company can obtain as a result of implementing recognized types of innovations.

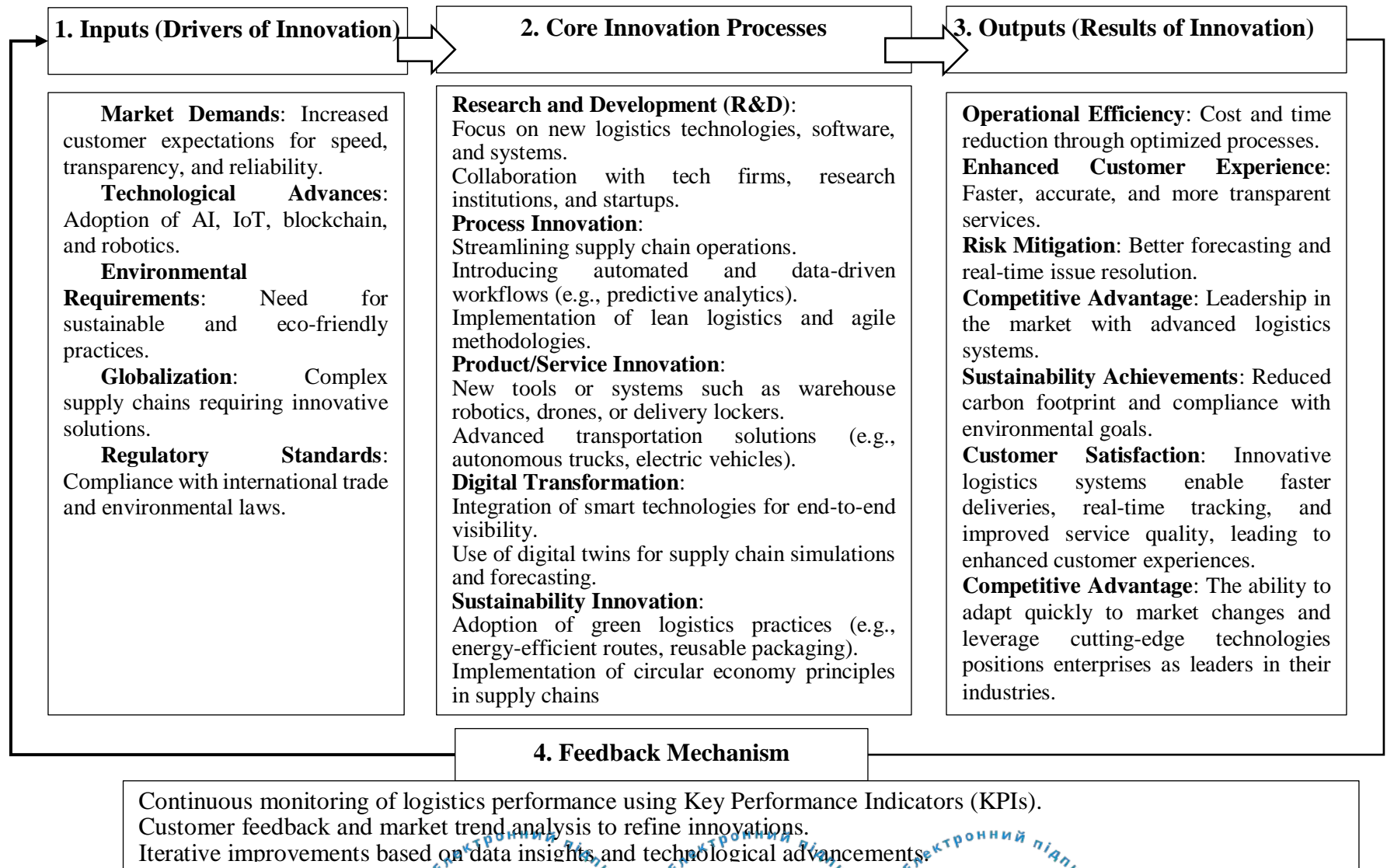


Figure 1.5 Scheme of logistics innovation



Source: developed by the author

A mandatory element is a feedback system that allows you to adjust innovation processes depending on customer requests and requirements, and the development of innovative technologies in logistics.

In conclusion, innovations in logistics are not merely tools for improvement but are fundamental to the sustainable growth and competitiveness of enterprises. They enable companies to address contemporary challenges, optimize resource use, and create value for stakeholders. As such, fostering a culture of innovation within logistics operations is a strategic imperative for any enterprise seeking long-term success.

1.2 Research on market trends in logistics innovation

The global logistics market, valued at USD 3,794.4 billion in 2023, is projected to grow at a compound annual growth rate (CAGR) of 7.2% from 2024 to 2030. This market exemplifies a dynamic and fast-evolving sector integral to global trade and commerce. It encompasses a broad spectrum of services and technologies designed to optimize the movement of goods, ensuring seamless transitions from production to consumption across diverse industries and regions [8].

The logistics industry is on the brink of transformative growth, with technology playing a pivotal role in reshaping operations. By 2024, the sector is poised for significant changes, as highlighted by the projected increase in market valuation from \$9407.5 billion in 2023 to \$15978.2 billion by 2032, reflecting a compound annual growth rate (CAGR) of 6.4%. This remarkable growth underscores the profound impact of technological advancements and shifting consumer behaviors on logistics [4].

The degree of innovation in the target market is high (see fig.1.6). The target market exhibits a high degree of innovation due to several transformative factors, such as the integration of cutting-edge technologies like artificial intelligence, IoT, and

blockchain, which enhances operational efficiency and transparency. Automation and robotics are revolutionizing warehouse operations and delivery systems, reducing costs and increasing speed. Companies are investing heavily in automation technologies to stay ahead of the competition and drive production cycles [10].

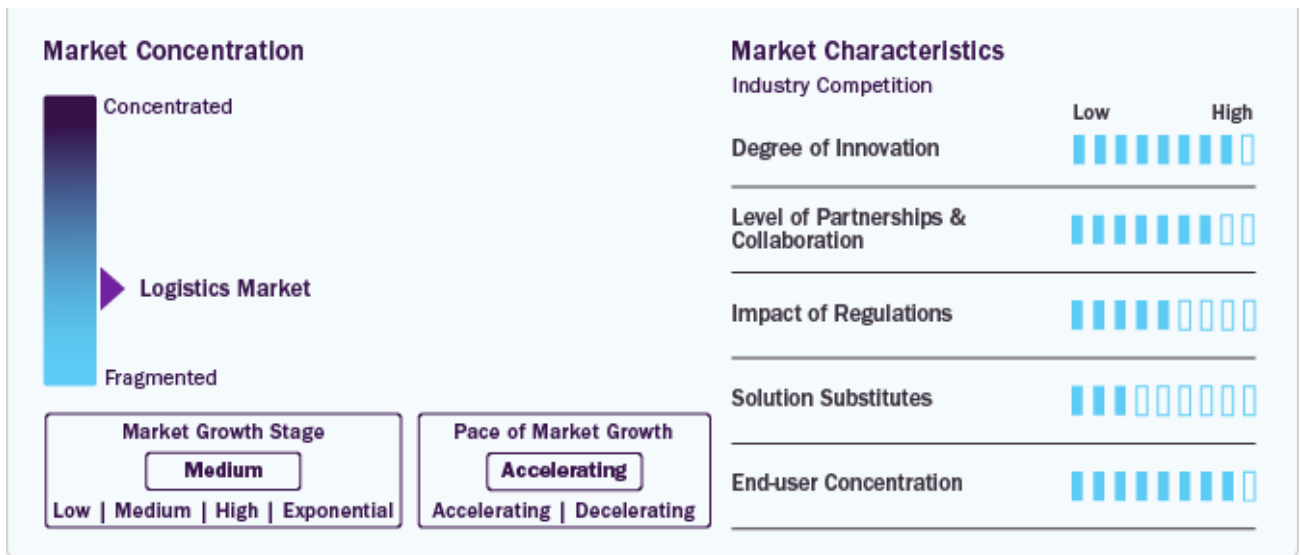


Figure 1.6 – Logistics market research by market characteristics

Source: [8]

The logistics company DHL develops key innovations that determine the future development of the logistics industry, which updates its Logistics Trend Radar (see Appendix A) every two years - a strategic tool for monitoring innovation trends that affect the logistics industry. It is formed based on market analysis, company experience, and expert interviews. The tool covers innovations already being implemented, as well as new trends that will affect logistics in the future.

Logistics Trend Radar identifies two groups of innovations in logistics that are driven by social and business trends as well as technological advances. As an industry that was one of the most resistant to change, logistics has a lot of catching up to do. According to recent research [12] (fig. 1.7), the top five most promising technologies

that are boosting innovation in logistics are IoT, AI, robotics, warehouse automation, and Blockchain.

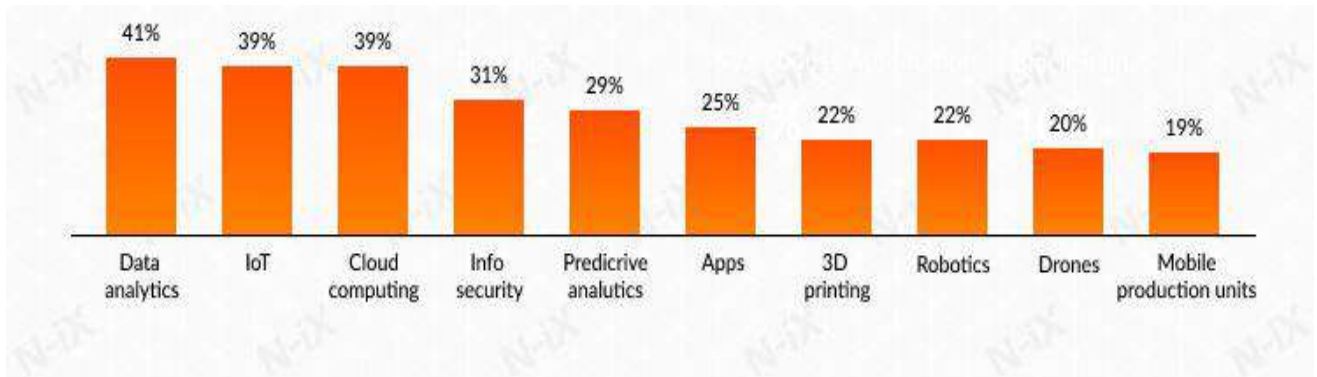


Figure 1.7- Top technologies that are becoming a priority in logistics

Source: [16]

According to Figure 1.7, the most promising technologies that can drive innovation in logistics are:

IoT (Internet of Things) is a huge thing in the digital world. It helps companies increase visibility into their supply chains. Some companies are equipping their fleets with sensors to get real-time updates on shipping and delivery. They can also improve location and route management. In warehouses, IoT solutions can improve visibility into inventory management, storage conditions, and predictive maintenance. With the advent of 5G, this technology trend seems to be the most promising.

Cloud technologies have been gaining popularity for quite some time, and logistics is finally embracing them. The cloud allows companies to scale up or down depending on demand or market conditions. Whether companies choose a cloud or hybrid environment, it also serves as the foundation for implementing almost any modern technology. One of the main advantages of implementing the Cloud is the ability to centralize analytics while decentralizing data collection and availability.

Due to the rapid development of machine learning, computing power, and big data analytics, artificial intelligence (AI) is gaining widespread adoption in the industry. When applied correctly, AI helps companies improve the functionality of operations, find possible problems, and suggest solutions. According to research [4], the implementation of AI in logistics can increase companies' profits by 5-10% per year. Market leaders are increasing investments in AI technologies to save money and time in the future (see fig.1.8).

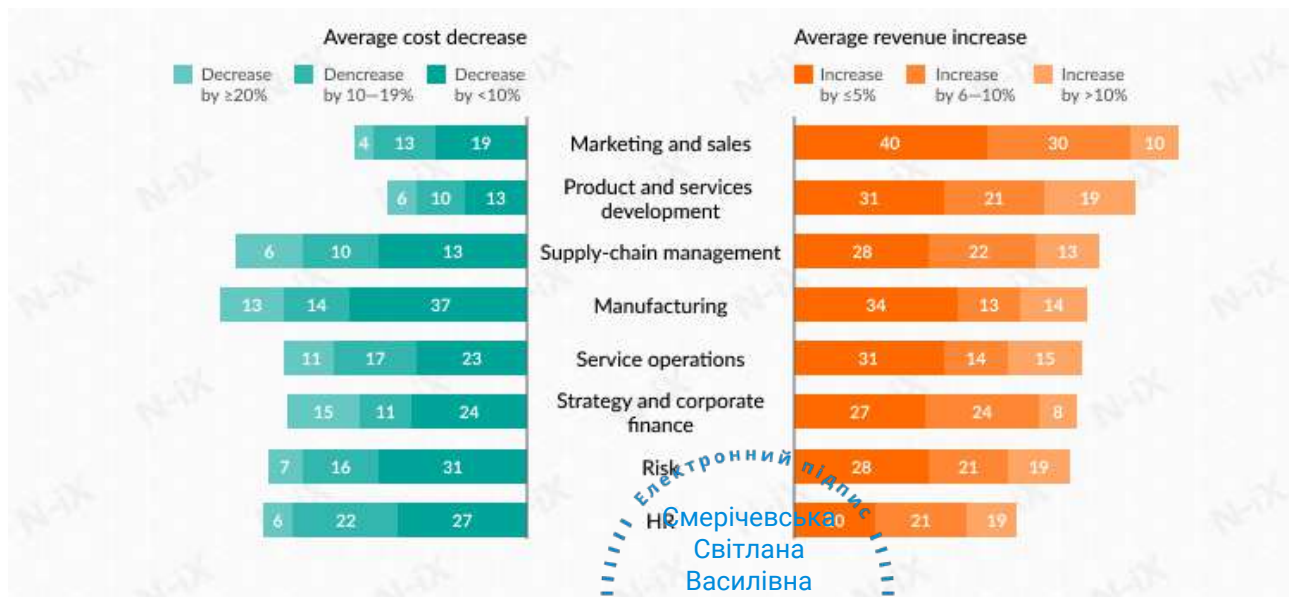
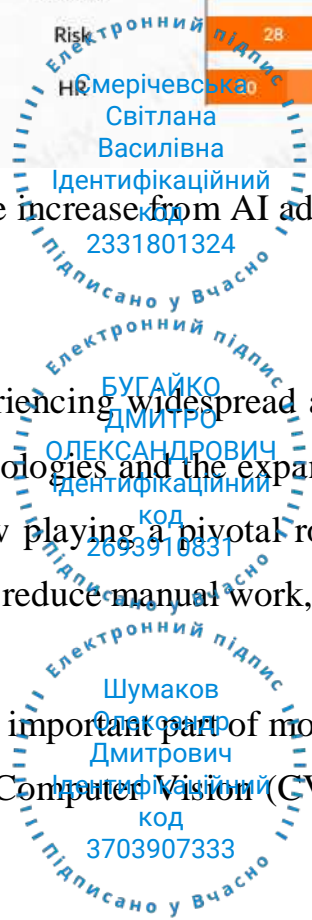


Figure 1.8 – Cost decrease and revenue increase from AI adoption, % of respondents
 Source: [16]

Machine learning (ML) is experiencing widespread adoption across industries, thanks to advancements in cloud technologies and the expansion of computing power. This transformative technology is now playing a pivotal role in logistics and supply chain management. It helps companies reduce manual work, optimize costs, and enable intelligent decision-making.

Barcode scanning is certainly an important part of modern logistics, but with the development of technologies such as Computer Vision (CV), the process of tracking



goods has become much more efficient. Using CV allows to read not only printed barcodes, but also damaged, deformed, or poorly printed labels, which is a great advantage compared to traditional laser scanners.

In addition, through integration with other advanced technologies such as artificial intelligence and machine learning, the accuracy and speed of processes can be significantly improved. Such systems can automatically correct data errors, optimize delivery routes, and even predict possible delays. As a result, companies can reduce costs, improve customer service, and increase the overall efficiency of logistics operations.

Solutions based on computer vision open up new opportunities for businesses, allowing them to automate more processes and achieve high results in the field of logistics and distribution (see fig.1.9).

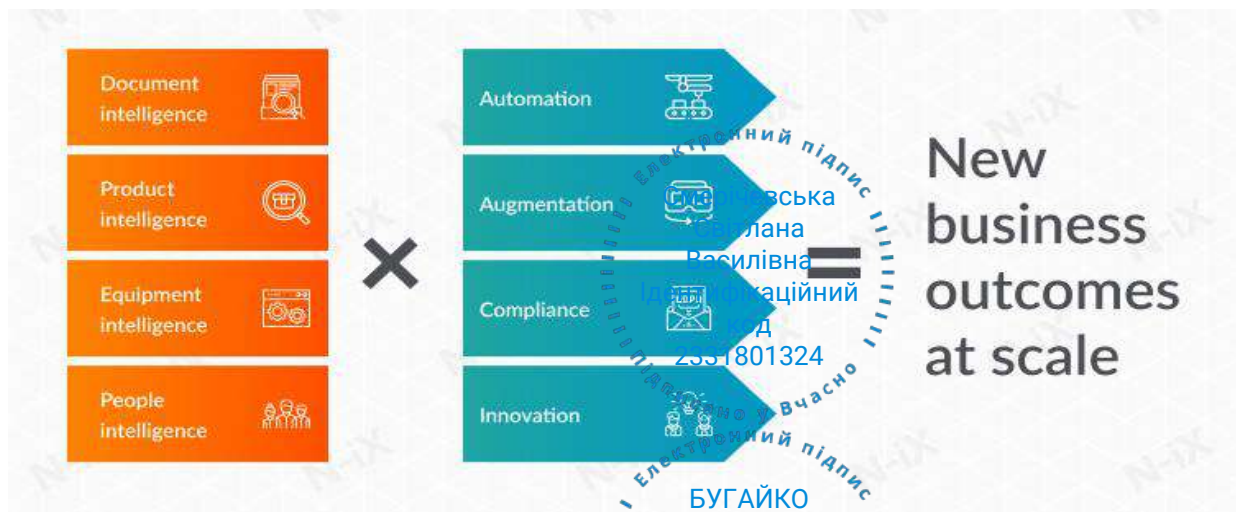


Figure 1.9 – Computer vision unlocks new intelligence and drives outcomes at scale

Source: [16]

Robotic process automation (RPA) is indeed experiencing significant development, especially in the logistics industry. With technological advances and the

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decline in the cost of robotic solutions, automation is gradually penetrating warehouse and logistics processes, making routine and heavy-duty tasks easier to perform.

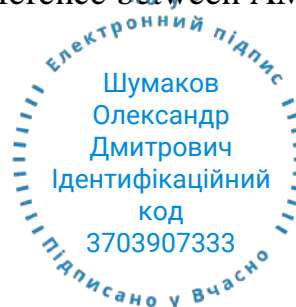
Autonomous mobile robots (AMRs) are used to store and unload inventory, assisting humans in performing physical operations. Such robots can adapt to different environmental conditions, efficiently transporting items around the warehouse. In addition, automated guided vehicles (AGVs) and automated guided carts (AGCs) are important elements in managing internal transport in warehouses, moving goods from one place to another without human intervention.

Drones for “last mile” delivery are another innovation that many companies are testing to accelerate the delivery of goods directly to the end consumer. The use of drones can significantly reduce delivery times, especially in urban areas or hard-to-reach places where traditional transportation may be less efficient.

Automated Mobile Robots (AMRs)	Automated Guided Vehicles (AGVs)
Trackless navigation	Requires tracks
Can go around obstacles	Obstacles stop it
Can be easily re-mapped	Difficult to re-map
No depots needed	Needs depots
Delivers to users location	Delivers to a pre-programmed place
Travels around people	Travels in dedicated areas
Easy to expand or change	Difficult to expand

Figure 1.10 – Difference between AMR and AGV

Source: [16]



The logistics industry is increasingly moving toward a tech-driven, automated, and sustainable future. These trends are not only reshaping how goods are transported, stored, and delivered but also how companies interact with customers and manage their supply chains. The integration of next-generation technologies is expected to continue at an accelerated pace, with innovations aimed at improving efficiency, sustainability, and the overall customer experience becoming integral to business success.

In conclusion, the logistics sector is undergoing a digital transformation, and companies that embrace these trends will be better positioned to thrive in an increasingly competitive and fast-evolving marketplace. Consider innovative technologies that can significantly increase efficiency, reduce labor costs, and speed up tasks in logistics processes. They help create more flexible and scalable operations, increasing the competitiveness of companies in the market. Logistics companies independently determine the priority of implementing specific innovations to solve strategic and tactical tasks.

1.3 International experience in implementing innovative technologies in the field of logistics

International experience in implementing innovative technologies in the logistics sector shows the rapid development and adaptation of new technologies that help increase efficiency, reduce costs, and improve customer service. Many countries and companies are actively implementing innovations, focusing on automation, digitalization, and resilience to change. Here are some of the main trends and examples are summarized in Table 1.1.

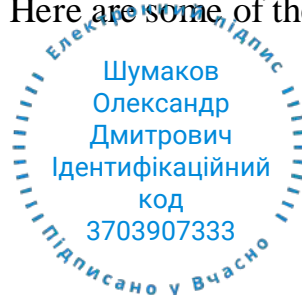
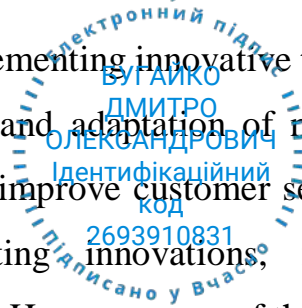


Table 1.1 -Examples of development and implementation of innovations in the logistics sector

№	Logistics Innovation	Company - technology developer	Outcomes from Implementation
1	2	3	4
1	Automation is a collection of technologies designed to improve efficiency. Its main purpose is to reduce human input while creating a seamless transition across several areas: sales, suppliers, planning, procurement, and distribution.	<p>Exotec – Automated Storage & Retrieval System ASRS helps handle product and material storage in automated warehouses, increasing floor space usage and avoiding manual labor. This lowers costs and improves safety.</p> <p>Addverb Technologies – Automated Guided Vehicles AGVs assist in the automation of product movement. When processing products, AGVs can take the place of manual labor.</p>	<p>Exotec created the Skypod, an automated robot that helps e-commerce warehouses run more efficiently. The technology improves storage capacity by using vertical storage solutions to raise warehouse ceilings by up to ten meters</p> <p>Dynamo, an AGV for transferring loads in the warehouse, was developed by Addverb Technologies.</p>
2	Internet of Things (IoT) helps businesses improve their supply chains. Some companies put sensors in their vehicles to track shipments. They can also help with route and location management.	<p>Ambrosus – Real-Time Supply Chain Visibility Ambrosus created an IoT network for the food and pharmaceutical supply chains.</p> <p>Fleetroot – Fleet Management Companies can use Fleetroot’s IoT platform to manage their fleets.</p>	<p>The network provides tools for analyzing data exchanged between sensors, distributed ledgers, and databases for supply chain management.</p> <p>Using sensors and devices implanted in the vehicle, the platform helps monitor the vehicle’s functioning and alerts the system. The information is then reviewed, along with past data, to plan fleet maintenance. Further, it provides route optimization and delivery solutions.</p>
3	Cloud Computing allows businesses to scale up or down in response to market changes. It also supports the implementation of almost any modern technology, regardless of whether companies choose a cloud or hybrid setup	<p>Linker – Cloud Platform Linker has created a platform that offers third-party logistics services to e-commerce companies.</p> <p>Alpega – Cloud TMS Belgian firm Alpega has developed a logistics system for end-to-end transportation services.</p>	<p>The platform provides tools to improve product labeling and delivery services. Linker also offers logistics technology for warehouses and fulfillment centers. In addition, it is based on a pay-per-use model.</p> <p>It allows manufacturers and logistics service providers to communicate in real time. It also improves logistics processes by integrating transportation requests into a single system. The software also includes tracking via a mobile app.</p>

Continuation of Table 1.1

1	2	3	4
4	Artificial Intelligence is gaining traction in the industry due to the rapid development of machine learning, computing power, and big data analytics.	<p>Adiona – Process Optimization Adiona is an Australian firm that has created an AI-based optimization-as-a-service (OSaaS) software that helps businesses improve logistics processes while reducing costs.</p> <p>Insite – Demand Forecasting Insite primarily serves the retail industry with AI-based software solutions for price forecasting and process optimization.</p>	<p>Using machine learning, the system helps predict factors such as demand, weather, and traffic. Overall, this approach reduces the number of people needed for manual input.</p> <p>The platform includes tools to collect and aggregate process data in real time. As a result, when it comes to replenishing a product, managers are well-equipped to maintain relevant information.</p>
5	Digital Twins The physical and digital worlds can now be merged into one, allowing us to interact with a digital model of a real product or part just as we would with their real-world counterparts for the first time	<p>Datumix – Equipment Condition Monitoring Datumix, a startup from the United States, offers a virtual 3D simulation of key equipment.</p> <p>Cognition Factory – Warehouse Simulation Companies can use digital twins to test new systems and help optimize operations before making actual changes</p>	<p>They used machine learning to create a digital twin that can be used to track equipment performance in real time before installing an algorithm. The 3D model data, combined with artificial intelligence (AI), is then used to service the equipment.</p> <p>CognitiveFlow, an AI-based digital twin solution for warehouse simulation, is offered by German company Cognition Factory. The software is used in warehouses to plan, design, and control mobile robots and material handling systems. The system incorporates data from both local and external sources.</p>
6	Blockchain can be used as a digital ledger. This method will allow multiple networks to share important data without the risk of it being leaked or corrupted. However, companies must be good at collecting and organizing their data.	<p>ShipChain – Cargo Tracking ShipChain is a logistics technology that uses blockchain to assist in delivery.</p> <p>Steamchain – Smart Contracts Through the World Trade Logistics (WTL) smart contract system, Steamchain provides a blockchain platform that simplifies payment methods</p>	<p>The technology allows for real-time tracking of shipments. The software also updates information about estimated delivery times. Once the delivery is complete, the site uploads evidence and documentation, increasing transparency of products in transit.</p> <p>By providing a permanent record of all transactions, WTL smart contracts enable B2B payments and prevent fraud. They also help reduce currency fluctuations and avoid currency conversion costs.</p>

End of Table 1.1

1	2	3	4
7	Advanced Data and Analytics	FACTIC – Prescriptive Analytics FACTIC, a company from the United States, provides predictive analytics solutions through a SaaS platform for the food and beverage industry. It analyzes information from multiple sources using data mining and artificial intelligence techniques to predict future sales.	To automate purchasing, the platform predicts changes in demand and makes data-driven decisions. The platform also includes options for managing inventory levels through automatic replenishment
8	Robotics Warehouse operations have changed dramatically in recent years, and warehouse robots are one of the most notable advancements.	Handle – Robotics	The handle has created an autonomous robot with a tiny size, extended reach, and a vision system that allows it to unload trucks, pick pallets, and transport boxes throughout any warehouse.
9	Augmented Reality powered wearables provide instant access to data, increasing productivity and reducing errors. Additionally, AR improves safety by tracking shipments and ensuring quick resolution of issues, ultimately increasing customer satisfaction.	DHL – Augmented Reality for Inventory Management DHL is using augmented reality (AR) in logistics through its Vision Picking pilot project. This initiative integrates AR smart glasses into warehouse operations, providing employees with digital picking lists and optimized routes to reduce travel times.	With barcode scanning capabilities, the smart glasses increase efficiency by guiding employees to the right locations and products on the shelves. This implementation has resulted in a 25% increase in picking efficiency, increased productivity, and a reduction in errors.
10	Advanced Geolocation Technologies	SOLUM-IoT-based Tracking Advances in IoT, such as low-power wide area networks (LPWANs), are improving logistics and supply chain operations. LPWAN-enabled IoT devices provide efficient tracking and communication, reducing the need for dedicated trackers	They can monitor goods indoors using Electronic Shelf Label (ESL) systems, and use GPS and LPWAN for outdoor tracking, improving asset management and streamlining logistics processes.

Source: developed by the author based on [10]

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Global adoption of innovative technologies in logistics demonstrates significant advancements in operational efficiency and customer service. Examples include:

United States: Amazon's use of AMRs and AI-driven logistics management exemplifies the integration of automation and AI to optimize operations.

UPS is developing a system that uses autonomous electric vehicles for deliveries in densely populated urban areas, in particular through a partnership with Waymo to test self-driving cars.

China: JD.com and Alibaba employ autonomous robots and drones to enhance warehouse efficiency and ensure faster delivery.

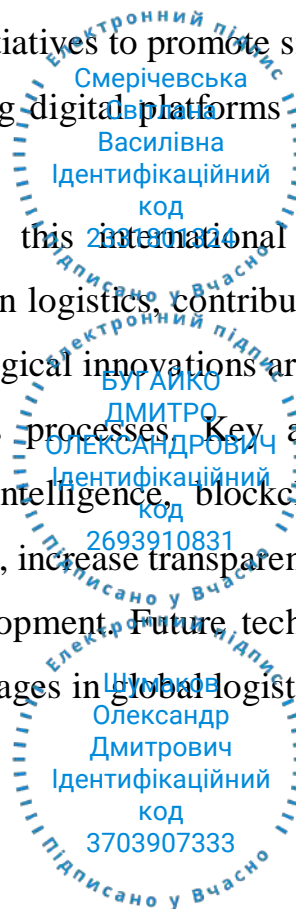
Europe: DHL is pioneering the use of green technologies like electric delivery vehicles and smart logistics platforms to reduce emissions and improve efficiency.

In the Netherlands, PostNL has launched a program to use electric trucks and drones to deliver parcels within cities, helping to reduce air pollution and ensure sustainable development in the logistics industry.

Singapore: Drones and autonomous vehicles are being deployed for last-mile delivery, supported by government initiatives to promote smart logistics.

India: Companies are leveraging digital platforms and IoT for real-time asset tracking and inventory management.

Thus, it is worth noting that this international experience highlights the transformative impact of technology on logistics, contributing to competitiveness and sustainability, and shows that technological innovations are significantly changing the structure and efficiency of logistics processes. Key areas such as automation, digitalization, the use of artificial intelligence, blockchain, and environmentally friendly technologies help reduce costs, increase transparency and efficiency, and meet the requirements of sustainable development. Future technologies are becoming the basis for achieving competitive advantages in global logistics.



Chapter 1 Summary

The theoretical chapter of the qualification work explores the concept of innovation in the context of logistics and its role in ensuring the efficiency of supply chain management.

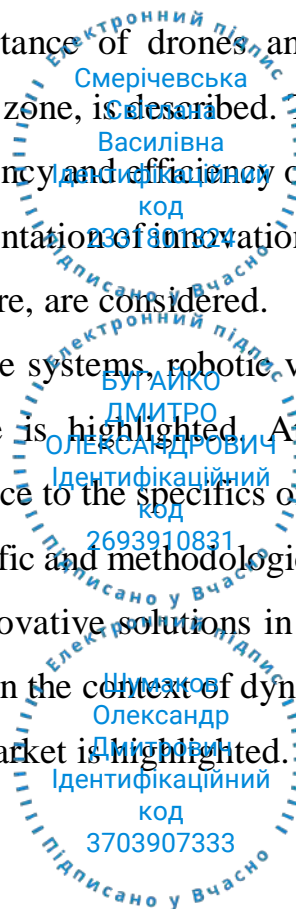
The main types of innovations in logistics processes are identified, including technological (automation, digitalization), organizational (optimization of business models), and environmental (green logistics). The impact of innovations on reducing costs, increasing the speed and accuracy of operations, and improving customer service is determined. A logistics assessment scheme is developed that illustrates key components, technologies, and their relationships in stimulating innovation in logistics processes.

Global trends that determine the development of logistics processes are studied, in particular automation, integration of artificial intelligence, implementation of IoT, and Blockchain. The growing importance of drones and autonomous vehicles in delivery, particularly in the "last mile" zone, is described. The role of digital platforms and big data in increasing the transparency and efficiency of supply chains is analyzed.

Examples of successful implementation of innovations in various countries, such as the USA, China, Germany, Singapore, are considered.

The use of automated warehouse systems, robotic vehicles, drones, blockchain technologies in international practice is highlighted. Attention is focused on the importance of adapting world experience to the specifics of domestic enterprises.

Thus, the chapter forms a scientific and methodological basis for further analysis of the practical implementation of innovative solutions in the logistics of a particular enterprise. The relevance of the study in the context of dynamic changes and increased competition in the logistics services market is highlighted.



CHAPTER 2

ANALYSIS OF INNOVATIVE ACTIVITY OF THE COMPANY

2.1 General characteristics of the “DiFFreight” LLC



DiFFreight was created in July 2020 as a result of the merger of two companies. The new company combines more than 12 years of experience in the world of import and export. The geography of service includes more than 23 countries.

The cumulative experience accumulated by employees in various directions of transportation allowed to create the most convenient and transparent service, focused on the client.

The mission, essence of the brand and values of the company are summarized in Fig. 2.1.

The key events of the company's formation are shown in Fig. 2.2. Operational results are shown in Fig. 2.3.

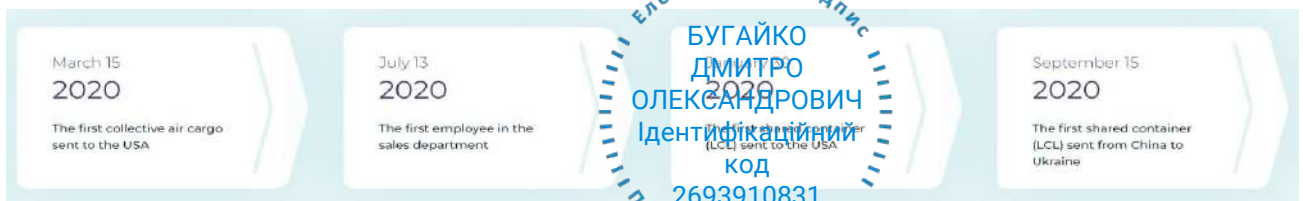


Figure 2.2 – Roadmap of development of the company

Source: [14]

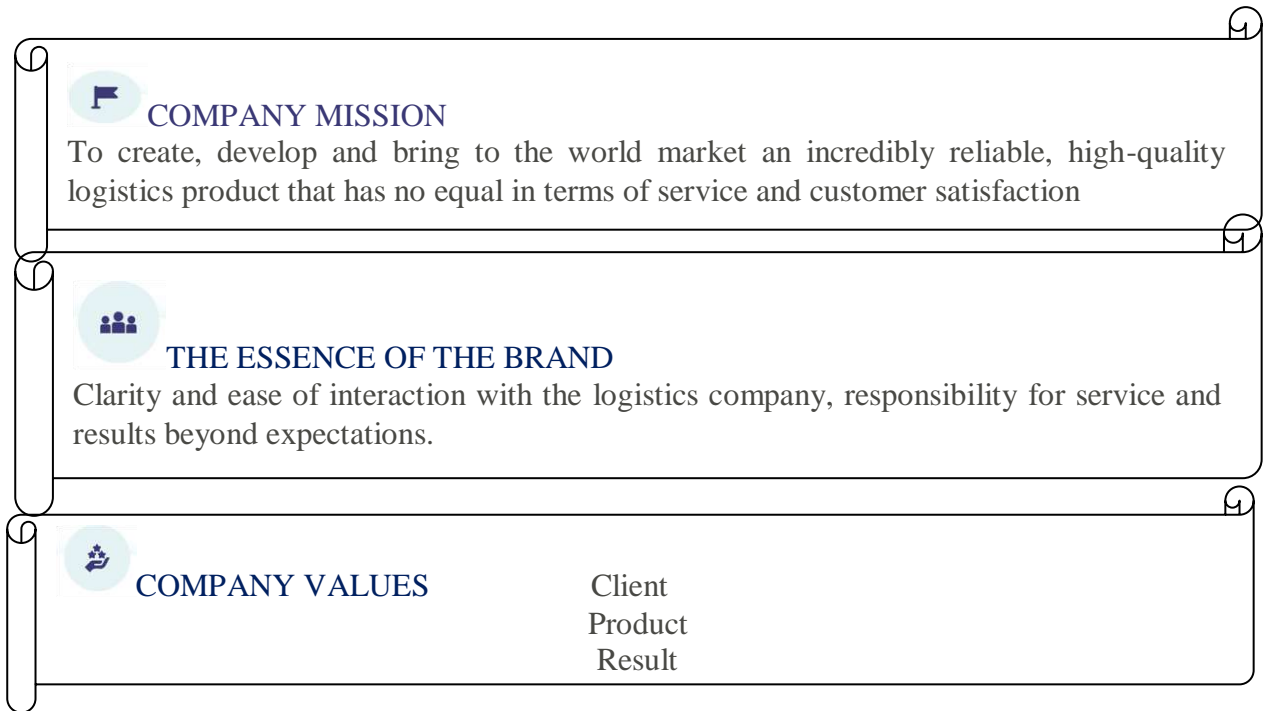


Figure 2.1 - The mission, essence of the brand and values of the company

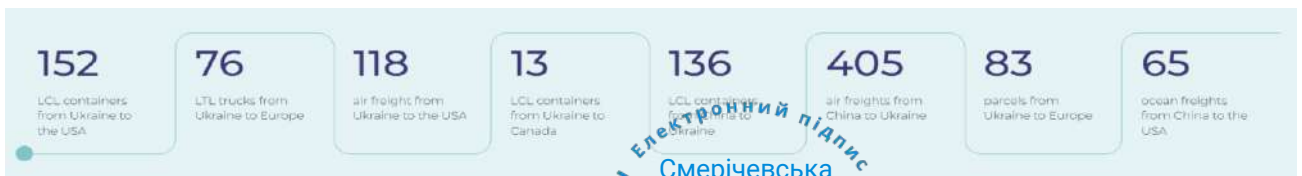


Figure 2.3 - Operational results of the company

The geography of the company's services, which is shown in Fig. 2.4, allows to determine the main transport directions of service, namely:

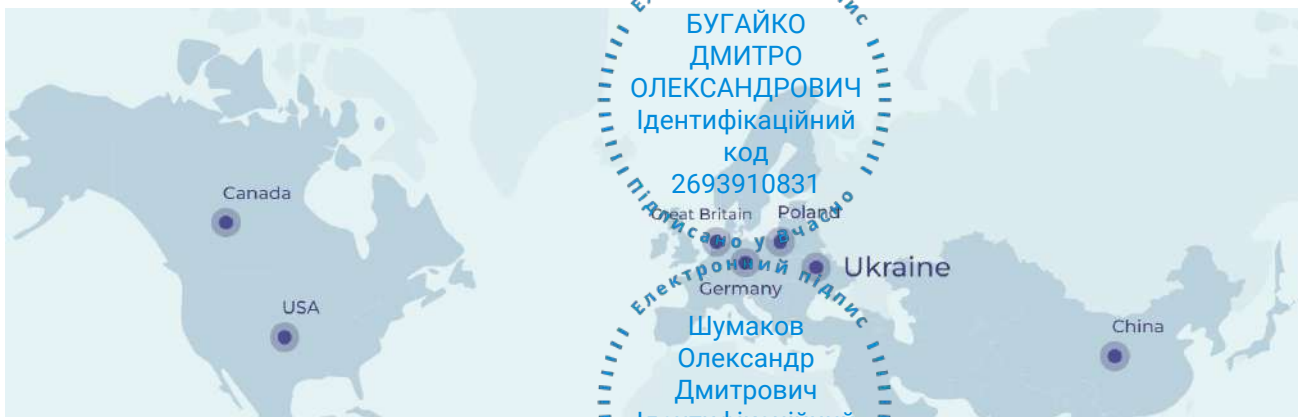


Figure 2.4 - The geography of the company's services

The company provides the following types of services, which are shown in Fig. 2.5, combining services with regions of their provision.



Figure 2.5 - The range of the company's services

Source: [14]

Let's consider the specified services in the context of direction of services.

Delivery of goods from China to Ukraine. Recently, the demand for cargo delivery from China to Ukraine has increased significantly, which has led to an increase in the number of logistics companies that offer such services. Chinese goods have gained great popularity among Ukrainian consumers thanks to a wide assortment and affordable prices. This trend has prompted many Ukrainian retail companies to establish strategic partnerships with Chinese manufacturers.

Responding to market needs, the company offers delivery of various cargoes from China to Ukraine. The company's specialists carefully develop routes and schedules for each stage of the delivery process, ensuring reliable and timely transportation.

The most common types of goods are dealing with include:

- 1) electronics and household appliances;
- 2) apparel, footwear, and accessories (jewelry, bags, etc.);
- 3) cosmetics and personal hygiene products;
- 4) household items (tableware, towels, bedding);
- 5) components for industrial equipment, agricultural machinery, and more.

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Company offers two types of transportation options to its clients [14]:

1. Ocean Freight - Although ocean shipping from China is not the fastest mode of transportation, it remains highly in demand due to its cost-effectiveness. It is particularly advantageous for small online retail stores and other representatives of small businesses who can benefit from the delivery of consolidated cargo from China to Ukraine. The cargo comes to Ukraine through Poland.

When carrying out sea transportation, the company uses the Forshan sea port as a starting point for cargo delivery. The delivery route is as follows: Foshan - Shenzhen - Gdansk/Gdynia/Lodz - Shargorod (see Fig. 2.6). Cargo from Chinese ports is delivered to Polish ports in 70-75 days.



Figure 2.6 – Route of cargo transportations from China to Ukraine

Source: [14]

The company offers two types of container transportation to best meet customer needs and provide cost-effective logistics solutions. For large consignments of cargo, we provide FCL (Full Container Load) service for the transportation of oversized cargo from China to Ukraine. LCL (partial container loading) service is available for the delivery of smaller lots, which allows you to significantly reduce logistics costs. Types of Sea Shipping from China to Ukraine is shown in fig. 2.7.



Figure 2.7 - Types of Sea Shipping from China to Ukraine [14]

2. Air shipping from China is typically three times faster than sea shipping, making it ideal for time-conscious customers. However, it should be noted that air delivery is accompanied by significantly higher costs. The cargo is delivered to the airport in Warsaw, from where it is transported by road to a warehouse in Kyiv.

The process of organizing cargo delivery from China to Ukraine is shown in Fig. 2.8.

The process of cargo delivery from China to Ukraine consists of several key stages. First, the client's suppliers deliver the product to the company's warehouse in China, where it is received by a specialist. The specialist checks the quality, quantity and volume of the product on the spot. In addition, marking, sorting, repacking and joint packaging services are offered in the warehouse.

When all batches are prepared, the goods are loaded into a container and sent to Poland using sea or air transport. The company offers cargo insurance services to ensure protection against possible risks or losses.

At the stage of crossing the Ukrainian border, the company takes care of all the necessary documentation and customs clearance, which is included in the cost of delivery. The company's specialists take responsibility for the preparation of documents at all stages of transportation, from declaration to customs control, in order to avoid delays. When the client's cargo reaches the warehouse in Kyiv, it will be fully ready for handover to the client.

1. Consultation, cost calculation, contract signing, and transportation quote. Company will provide a shipping price proposal based on delivery terms within 2 hours. Once we agree on the price, we sign a shipping contract and provide instructions and information for marking your cargo before shipment.

2. Arrival of the cargo at the warehouse

We pick up the cargo, or your supplier delivers it to our warehouse. We receive the cargo, measure its volume, weigh it, and record the final transportation cost, which may change only if the initial information about the goods is incorrect.

3. Sea transportation

Your cargo is loaded into an LCL container, transported to the departure port in Shenzhen, and shipped to the port in Poland.

4. Transit through Poland.

The consolidated cargo passes through customs for compliance with legislative requirements.

5. Arrival at the Multimodal Logistics Center in Ukraine for further customs clearance and release

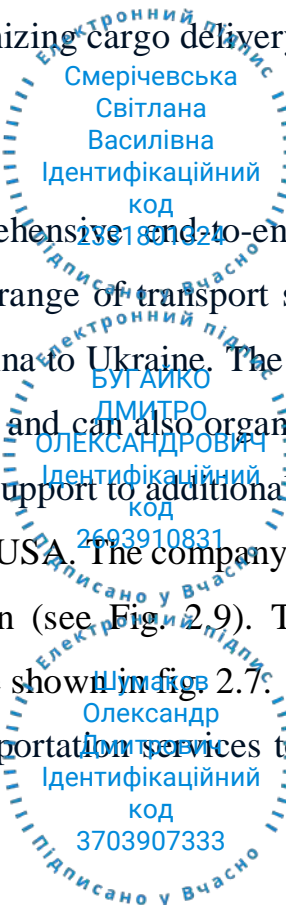
Figure 2.8 - The process of organizing cargo delivery from China to Ukraine

Source: [14]

Offering the service of comprehensive end-to-end delivery from China to Ukraine, the company provides a full range of transport services for fast and timely delivery of commercial cargo from China to Ukraine. The company is responsible for all stages of the transportation process, and can also organize the search and purchase of goods in China, extending logistics support to additional stages.

Delivery of goods from China to USA. The company offers cargo delivery in this direction by sea and air transportation (see Fig. 2.9). The requirements for cargo transported by sea are identical to those shown in fig. 2.7.

The company provides sea transportation services to the USA of such types of cargo as:



- metal structures and products of the metallurgical industry;
- household goods and interior items (lamps, dishes, blankets, etc.);
- handmade clothes, jewelry, accessories;
- cosmetics with quality certificates and import permits;
- wood products and wood processing products;
- souvenir products and other goods.



Figure 2.9 – Route of cargo transportations from China to USA

Source: [14]

The process of organizing cargo delivery from China to USA is presented in fig.2.10.

If we compare the process of organizing cargo delivery by sea and air from China to Ukraine, which is shown in fig. 2.8 and the process of organizing the delivery of goods from China to the USA, it can be concluded that they are standardized, with the possibility of making adjustments in accordance with the wishes of the client regarding the provision of further services.

The advantages of sea transportation of goods to the USA include:

1. Affordable cost. Sea transportation is much cheaper than air transportation, which makes it the best option for transporting large consignments of goods.
2. Versatility. Modern ships have a high carrying capacity, which makes it possible to transport almost any type of cargo, including oversized ones that cannot be transported by plane.

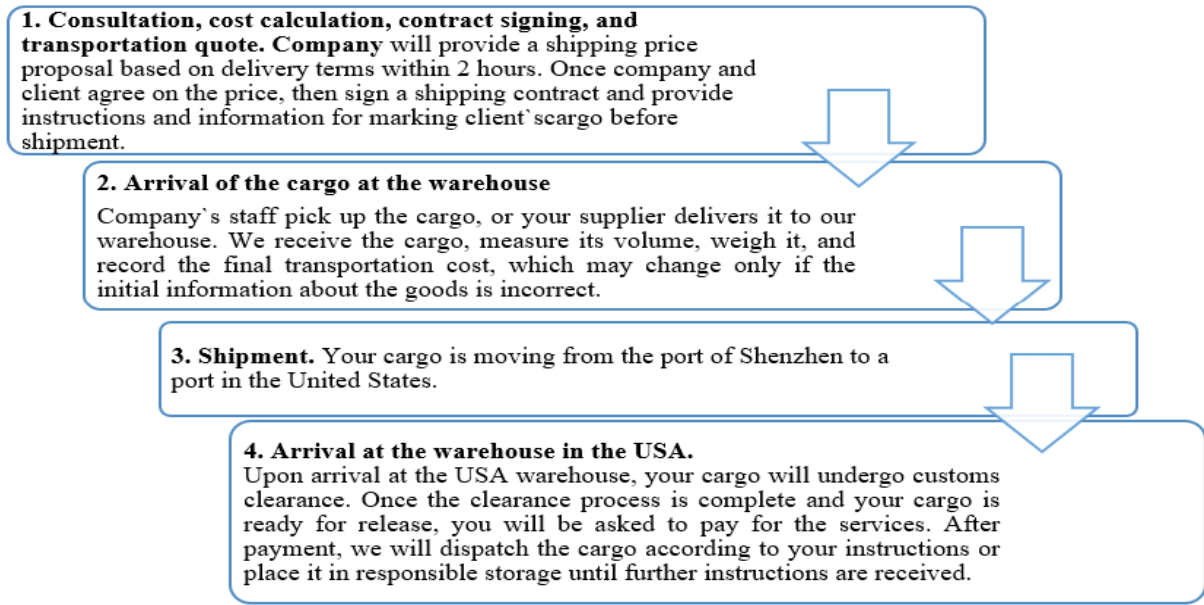


Figure 2.10 - The process of organizing cargo delivery from China to USA

Source: [14]

3. Reliability and security. All cargo is insured, and marine disasters are extremely rare, which reduces the risk of loss of goods to a minimum.

4. Variety of delivery methods. Sea transportation can be carried out by container transportation, tankers, refrigerators, bulk carriers for bulk cargoes and roller ships for the transportation of cars.

5. Full customs clearance. The company provides support and payment of all customs duties, providing comprehensive support in the transportation process.

6. The possibility of storing cargo in the USA. After arrival at the port, the goods can be temporarily stored in our own or commercial warehouses until they are ready for further shipment.

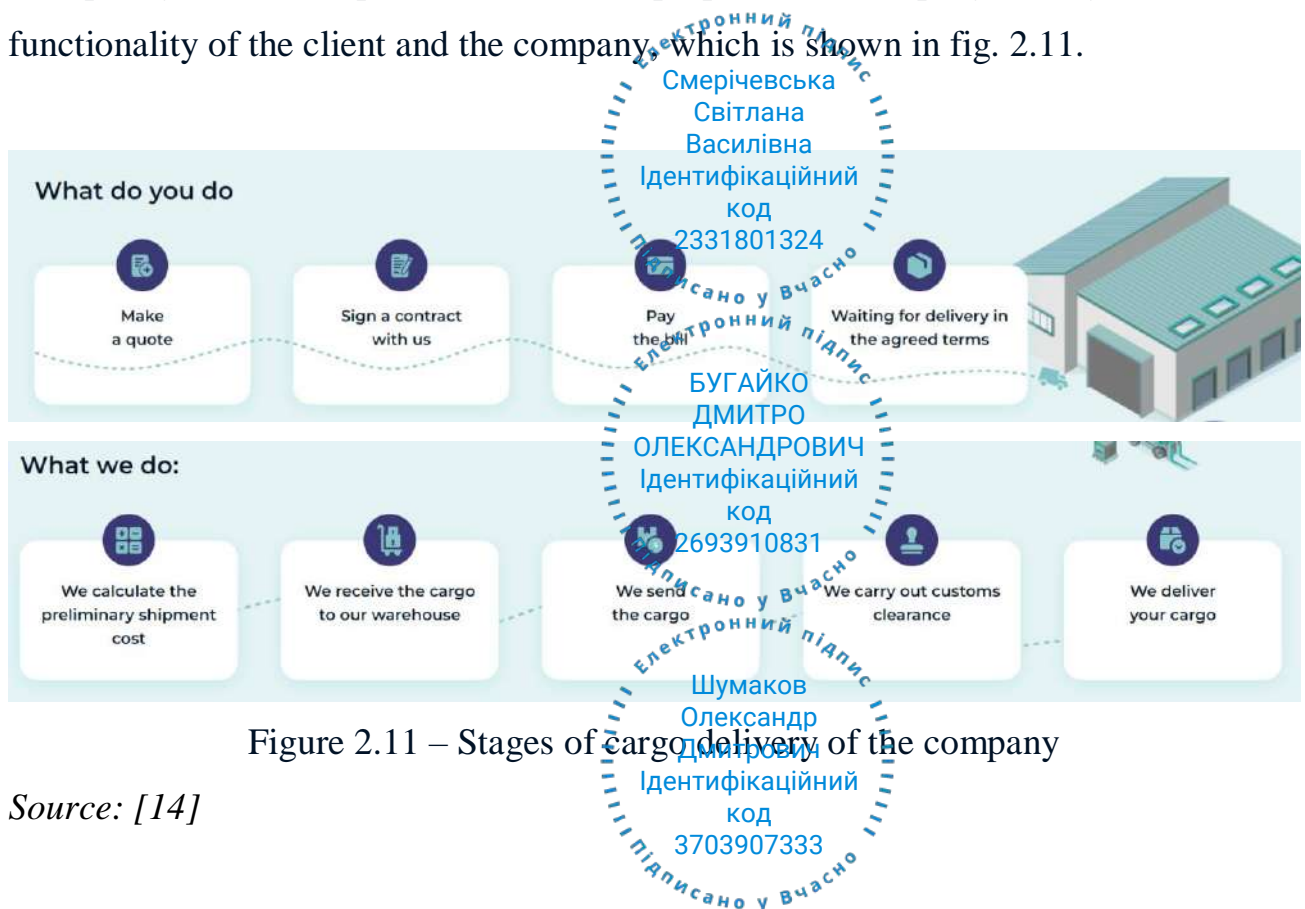
These factors make sea transportation a convenient and cost-effective solution for transporting various cargoes to the United States.

If we consider the next direction of delivery of goods from China to Europe, then it is almost identical to the route of delivery of goods from China to Ukraine, which is

shown in Fig. 2.6, only without the "shoulder" of delivery to Ukraine. The range of goods delivered from China to Europe is as follows:

1. Electronics. Smartphones, computers, electronic components and other equipment.
2. Textile products. Clothes, shoes, textiles for home and production.
3. Home goods. Household goods, kitchen utensils, personal hygiene items and other everyday goods.
4. Furniture. Furniture for home, office, garden and other interior items.
5. Building materials. Materials for construction and decoration, tools and equipment.
6. Industrial equipment. Machines, machines, tools and other production equipment.

As already noted, the company is trying to standardize cargo delivery processes by means of transport in order to optimize time and money costs, improve the efficiency and quality of service provision. For this purpose, the company clearly delimits the functionality of the client and the company which is shown in fig. 2.11.



Source: [14]

The company uses a similar approach to the organization and execution of road transportation, the main purpose of which is to provide a "shoulder delivery" of goods to and from Ukraine. Due to the full-scale invasion of Russia, the airspace over Ukraine was closed, so air transportation "moved" beyond the territory of Ukraine, for which Polish airports are used. That is why the main road transport routes are Ukraine – Poland, Poland – Ukraine.

The next group of company services is the provision of a wide range of warehouse services (see fig. 2.12), which include:

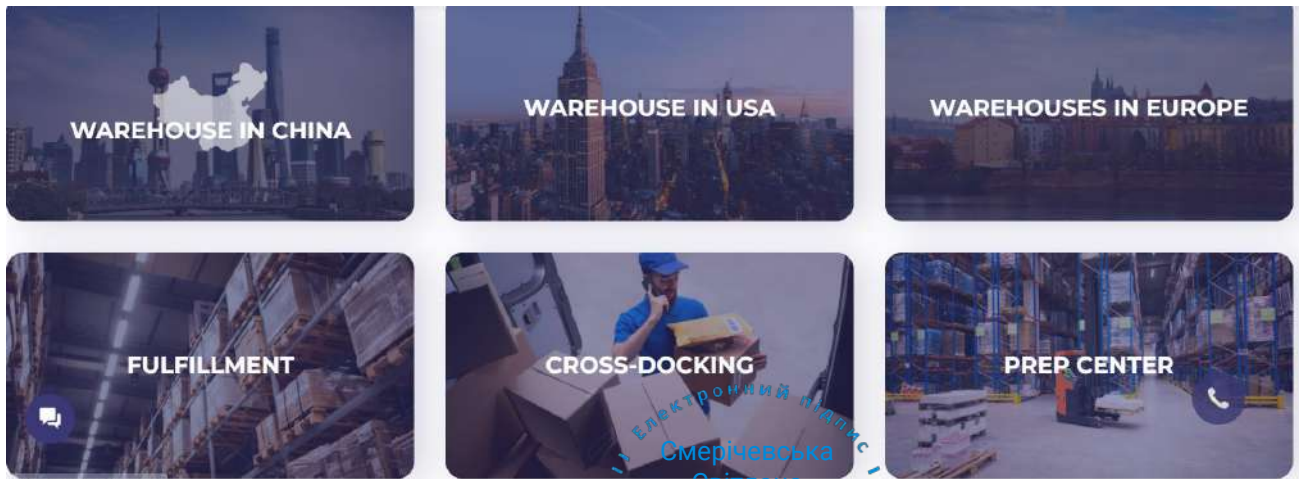


Figure 2.12 – Range of warehousing services

Source: [14]

1. Warehousing services in Europe: includes storage, repackaging, labeling, cross-docking, etc. This allows to optimize logistics flows and ensure effective inventory management.
2. Cross-docking: enables direct movement of goods from one vehicle to another, reducing storage time and minimizing logistic costs.
3. Warehousing services in China: providing facilities and services for the storage and distribution of goods in China, facilitating inventory management and logistics operations in Asian markets.

4. US Warehouses: Offers packing, repacking, sorting and stocking to help streamline operations in North America.

5. Prep Center in the USA: order preparation center to optimize logistics processes, ensure fast and high-quality order fulfillment.

6. Order Fulfillment: The company undertakes all order processing operations, including receiving, packaging, labeling, shipping and distribution of goods to end customers.

The services discussed above are a basic set of transport and warehousing services offered by many logistics companies. To be competitive in the market, it is necessary to have such services that distinguish the company from competitors. One of these services is Search for supplier in China.

Since every fifth product on the Ukrainian market comes from China, this stimulates significant business interest in finding Chinese suppliers. Entrepreneurs, regardless of the size of their business, are actively looking for partners in China. Some turn to intermediaries, but building direct, mutually beneficial relationships with suppliers, especially with professional help, can be more profitable.

Before starting the search for a supplier, it is important to decide on the type of company with which you need to cooperate and take into account the conditions of sea transportation and other nuances of cooperation. The main types of suppliers in China are:

1. Large wholesalers: specialize in large recurring orders and provide discounts for regular customers.

2. Manufacturers with their own factories: this category deals with a wide range of products, but the quality of the products must be carefully checked.

3. Small batch production: optimally suited for the purchase of small batches, for example, souvenirs or accessories.

4. Middlemen: buy from large companies and sell goods abroad, but their services may be more expensive due to commissions.

This service is useful for any business, regardless of its scale - from startups to large companies looking for more favorable purchasing conditions. Entrusting this task to professionals allows you to save time and resources, concentrating on the strategic goals of the business. DiFFreight experts carry out a thorough analysis of suppliers, taking into account the following criteria:

- Reputation on marketplaces.
- Experience of cooperation with European clients.
- Prices and availability of discounts.
- Availability of quality certificates.
- Terms of delivery.

The company offers professional assistance in finding reliable suppliers from China. A team of experts who are well-versed in Chinese language and culture will help customers establish beneficial partnerships. The company selects the best suppliers with an excellent reputation and favorable conditions, providing warehouse services and organizing the delivery of goods to Ukraine with full customs clearance.

Working in a highly competitive market, the company offers a fairly wide range of both standardized and personalized services, creating benefits for customers from cooperation with the company, adjusting cargo supply chains to changes in the external environment. To confirm the effectiveness of change management, it is necessary to examine the financial condition of the company.

2.1 Financial diagnostics of "DiFFreight" LLC

The financial diagnosis of the company is carried out on the basis of the Report on financial results, which determines the main sources of income and expenses of the company, and the sequence of formation of net profit.

Table 2.1 presents an analysis of the main financial performance indicators for 2021-2023.

Table 2.1 – Analysis of key performance indicators of LLC "DiFFreight"

№	Indicators, UAH ths.	2021	2022	2023	Dynamics,%	
					2022/2021	2023/2022
1	Revenue	162317	198338	282388	22,19	42,38
2	Other operating income	321,9	317,8	2947	-1,27	827,31
3	Cost of services sold	144384	180894	254585	25,29	40,74
4	Gross profit	18254,6	17761,6	30750	-2,70	73,13
5	Other operating expenses	14402,3	16450,4	29263,7	14,22	77,89
6	EBIT	3852,3	1311,2	1486,3	-65,96	13,35
7	Interest expenses	15,1	11,1	12,7	-26,49	14,41
8	EBT	3837,2	1300,1	1473,6	-66,12	13,35
9	Taxes	681,8	233,2	261	-65,80	11,92
10	Net profit	3155,4	1066,9	1212,6	-66,19	13,66

Source: developed by the author based on [47]

According to the preliminary calculations of the dynamics of key indicators, the following conclusions can be drawn:

1. Revenue, as the main indicator that determines that the company's services are in demand on the market, shows an upward trend. Thus, in 2022, revenue increased by 22.2% compared to 2021, and in 2023 – by 42.4% compared to 2022.

2. The cost of services also showed growth, with the value increasing by 25.3% in 2022 compared to 2021. It should be noted that the growth rate of the cost price this year was greater than the growth rate of revenue, which is a negative phenomenon,

since revenue should grow faster than direct costs. But in 2023, as a result of cost optimization, the cost price grew at a lower rate than revenue.

3. The company has a very high value of other operating expenses, the growth of which in 2023 compared to 2022 was 77.9%. An increase in costs is always a negative phenomenon, because it leads to a decrease in profit.

4. As a result of the phenomena discussed above, the net profit of the company in 2022 decreased by 66.2%, and in 2023 the value stabilized and the profit increased by 13.7%.

A schematic representation of the dynamics of key indicators is shown in Fig. 2.13.

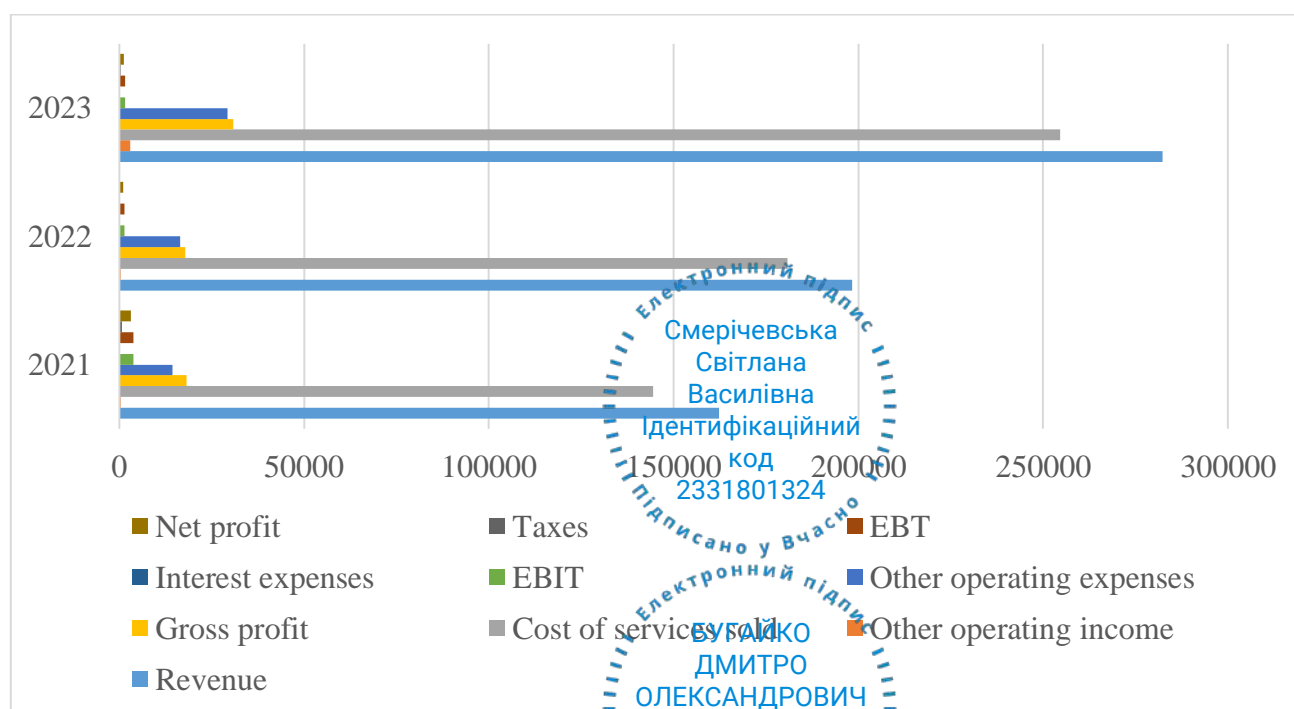


Figure 2.13 - Dynamics of key indicators of LLC "DiFFreight"

Among the indicators considered are indicators that are intermediate performance indicators and reflect different levels of profit (see fig.2.14). First of them is gross profit, which is calculated as the difference between revenue and cost (direct

costs), determines the company's profit before operating expenses, interest payments and taxes. The higher this indicator is, the base for covering other indirect costs, other costs and the formation of net profit. The value of gross profit in 2023 increased by 73.13% after a decrease in 2022, due to a slowdown in the growth of cost of services sold.

The next indicator is EBIT (Earnings Before Interest and Taxes) or Operating profit, a very important indicator because it is an indirect indicator of efficiency. The higher the operating income, the more profitable the company's core business. Several things can affect operating income (such as pricing strategy, raw material prices, or labor costs), but because these elements are directly related to the day-to-day decisions that managers make, operating income is also a measure of managerial flexibility and competence, especially in tough economic times.

Like gross profit value, operating profit in 2023 showed a growth of 13.35% after a significant decline in 2022 by 66% compared to 2021.

The next intermediate result is EBT (Earnings Before Taxes), which determines the financial result before taxes. This is the base for calculating income tax. The larger the tax base, the greater the amount of tax, the smaller the amount of net profit.

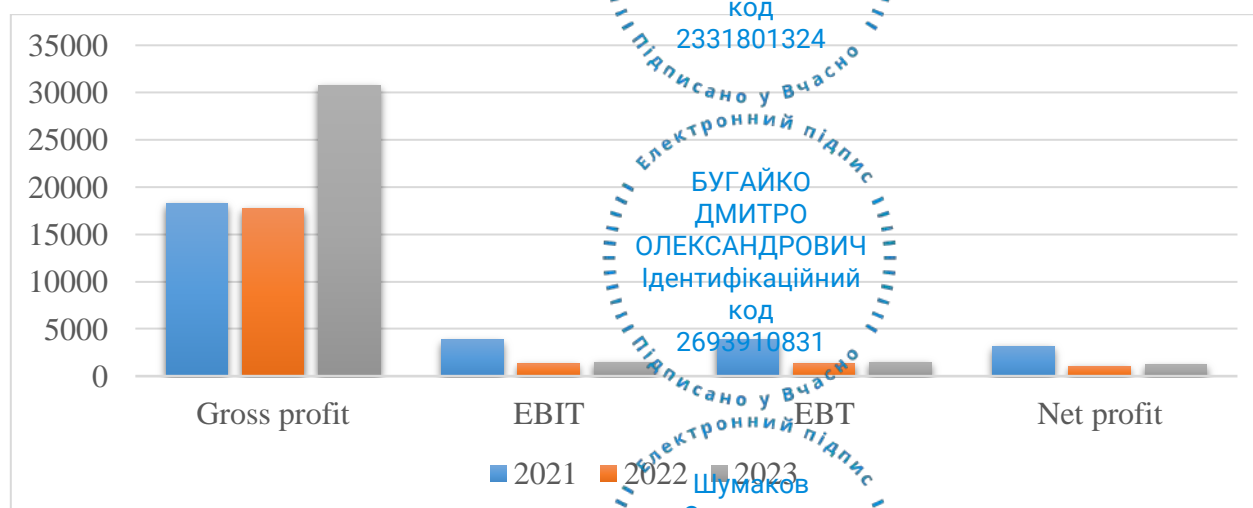


Figure 2.14 - Dynamics of different types of profits

Source: developed by the author

The indicators discussed above can be used as a basis for conducting marginal analysis that is presented in Table 2.2. Profit margin is a key measure of profitability that shows how much of sales revenue a company keeps as profit. It is used by management, investors, and analysts to assess the financial performance of a business.

Different margin ratios show how much profit the company receives from each hryvnia of sales, and helps to assess how effectively it manages its expenses and income.

Table 2.2 – Marginal analysis of LLC "DiFFreight"

Indicators	2021	2022	2023	Dynamics	
				Δ	Δ
Gross profit margin	11,25	8,96	10,89	-2,29	1,93
EBIT margin	2,37	0,66	0,53	-1,71	-0,13
Net profit margin	1,94	0,54	0,43	-1,41	-0,11

A 2023 gross profit margin of 10.9% indicates that nearly 11% of revenue is available to cover all other operating expenses, including selling and distribution, administration, financing, and taxes. This means that for every 1 hryvnia of sold services, the company received an average of 0.11 hryvnia of gross profit. Gross profit must tend to increase and at least equal all operating expenses to continue the business.

The operating profit margin, equal to 0.53%, shows that 0.53% of the revenue was transformed into the amount of the operating profit. This is a very low indicator, it is caused by the fact that on the size of the operating profit, the article of other operating expenses was of little importance. It was this expense item that led to a sharp drop in operational efficiency, the difference in gross profit profitability and operating profit profitability.

Net profit margin is a financial ratio used to calculate the percentage of profit a company earns from revenue. As can be seen from the calculations, the difference between the profitability of the operating profit and the profitability of the net profit in

2023 is insignificant, so the value of the profitability of the operating profit is 0.53%, and the value of the net profit is 0.43%, which indicates that the amount of the tax had an insignificant impact on formation of net profit. A decrease in profitability indicators during the studied period is a negative trend for the company.

The dynamics of the company's marginal indicators are shown in Fig. 2.15.

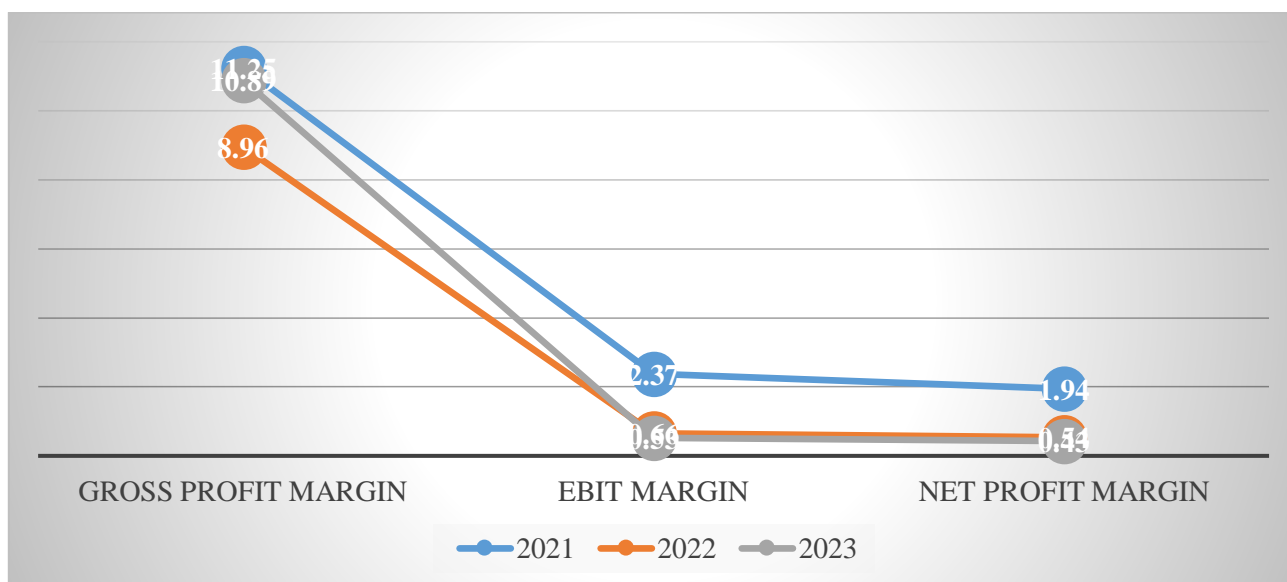


Figure 2.15 - Dynamics of the company's marginal indicators

Source: developed by the author

The conducted financial diagnostics of the company showed that the performance indicators show both positive and negative trends, but in general, the company was able to stabilize the situation, which was reflected in the improvement of the values of the main performance indicators. But to ensure sustainable growth, the company needs to pay special attention to cost optimization, namely to the reduction of other operating costs, since these costs had a significant negative impact on the formation of operating profit and net profit, and the performed margin analysis only confirmed this statement.

2.2 Analysis of innovative activity in the organization of logistics processes of the company

Customers of a logistics company are the main driving force for improving the company's operational activities, so company is constantly in the process of development, striving to meet the growing demands of the logistics services market and always be a few steps ahead of its competitors. The company tries to introduce innovative technologies into the customer service process to make cooperation with customers as effective, fruitful, and convenient as possible, which contributes to the development of not only the company but also the logistics services market as a whole. As a result of the introduction of innovations, the company's internal processes and resources are optimized to improve efficiency, productivity, and the level of customer service.

One of these tools is an information product - a customer relationship management system. Realizing the ambitious goals of improving the level of service, the efficiency of providing logistics services to customers, and the speed of response to customer requests, the company started implementing an innovative, unique product in the work of the logistics department - a logistician's office based on its own CRM system.

The reason for the implementation of this project was the identification of deficiencies in the already existing functionality of the CRM system within the framework of DiFFreight activities, so it did not cope with the set tasks and also did not meet the needs of customers and the goals of the company.

The company started the implementation process of this innovative project 2.5 years ago, it was divided into several smaller steps and stages. During this time, the company tested various systems, purchased software licenses, and searched for a product that would fully meet the requirements and meet the development directions

and needs of DiFFreight. As a result, a course was taken to implement a large-scale project on the development of our own CRM system. At the current stage of project implementation, the client office is actively developing and undergoing testing. The nearest plans are to create offices for financiers and buyers.

The interface of the client's personal account, developed by the company, is shown in Fig. 2.16.

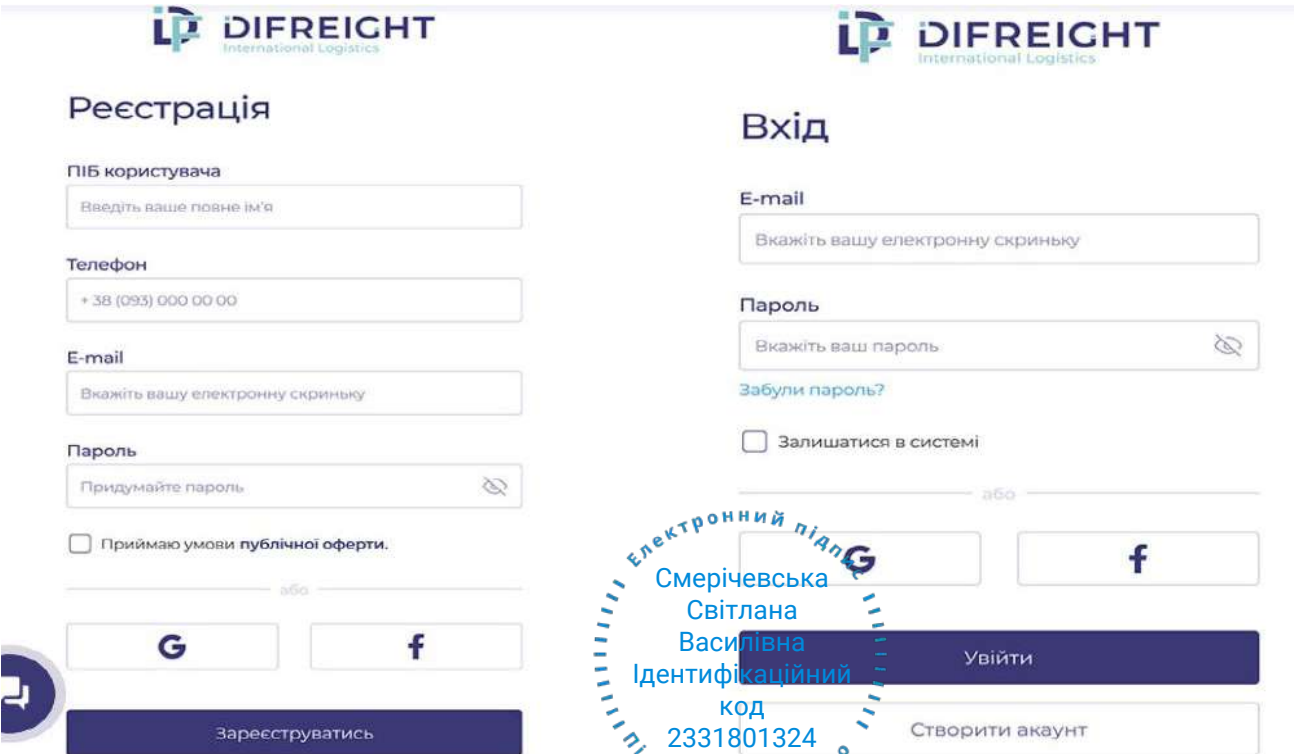


Figure 2.16 – Personal Client Cabinet interface

Source: [14]

This will bring the efficiency of the logistics department to a fundamentally new level because its capabilities are carefully thought out and implemented by professionals.

It is worth emphasizing that the logistician's office is a unique product that has no analogs in the logistics services market. The company has developed an innovative



service that will allow it to automate and significantly improve the quality of tasks, ensuring the growth of employee productivity for a significant improvement in customer service. The implementation of own CRM system, and especially the logistician's office, is the way to leadership positions on the market and the opportunity to be several steps ahead of your competitors.

Now specialists are actively developing the client's office based on their own CRM. The client's office based on its own CRM is one of the stages of realizing an ambitious goal - creating the most convenient, high-tech system that will ensure the efficient operation of a logistics company. The first step on this path was the creation of a logistician's office, which is currently in the testing stage. Thus, by breaking large-scale tasks into small projects, the company develops step by step and achieves the set goals.

Potential functionality of the Client Cabinet is presented in fig. 2.17.

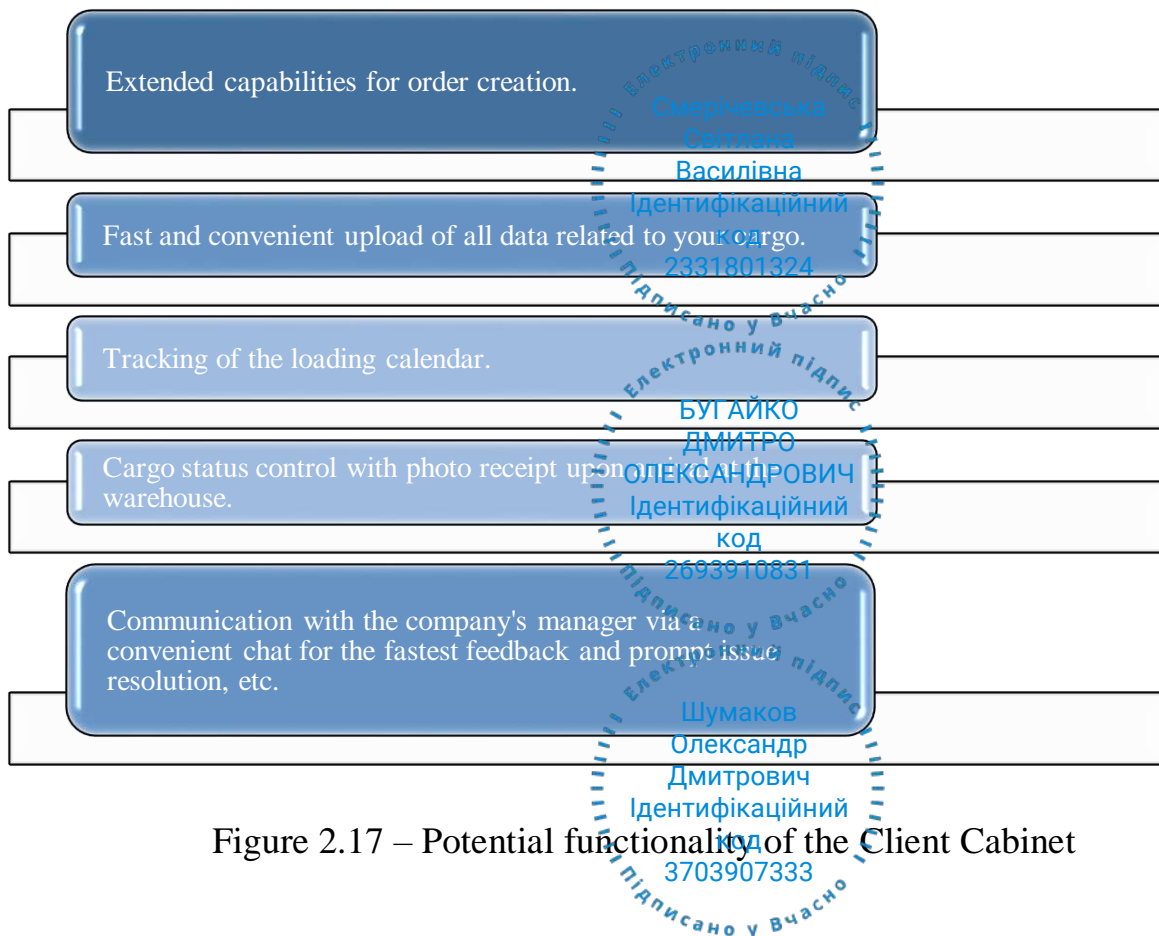


Figure 2.17 – Potential functionality of the Client Cabinet

This is a product that has no analogs in the logistics services market. This is a unique development of the company, which will be able to bring the process of customer service to a fundamentally new level. After all, in his own office, the client will receive all the information about the stages of order fulfillment, personally communicate with the manager, and promptly receive answers to any questions.

Implementing a CRM system can bring significant benefits to a business, contributing to improved customer relations, increased sales and increased efficiency. Here are the main benefits you will get from implementing a CRM:

1. Customer Service and Retention: CRM allows you to manage customer data, improving service and driving customer return. It stores all important customer information, making it accessible to every team member, which improves service and loyalty.

2. Increase sales: CRM helps structure the sales process and automate important tasks, allowing businesses to analyze data and set up effective strategies to increase sales.

3. Analytics: CRM provides tools to analyze customer data, helping businesses better understand customer behavior and optimize marketing strategies.

4. Higher productivity: CRM automates routine processes, allowing employees to focus on working with customers. Built-in dashboards help track and improve business processes.

5. Cultivating new leads: CRM helps to effectively manage communication with potential customers, which leads to successful relationship development and new customer acquisition.

6. Increased profitability: CRM enables businesses to identify the most profitable customers and work with them in the most efficient way, optimizing costs and increasing overall profitability.

Thus, the implementation of CRM can be a powerful tool for the development and success of company`s business.

Chapter 2 summary

The analysis of the company's business portfolio allowed to establish that "DiFFreight" LLC works in the field of forwarding and logistics in Ukraine. The company focuses on facilitating the transportation of goods both domestically and internationally. Given the current geopolitical climate and the challenges of the ongoing war in Ukraine, the logistics sector faces significant disruption and uncertainty, affecting operations, costs and overall market dynamics.

DiFFreight LLC has several strengths that strengthen its position in the market. It benefits from established networks that provide efficient freight management and flexibility. The company's various modes of transportation, including road, sea and air, allow it to adapt to changing conditions and efficiently meet customer requests. In addition, strong relationships with customers and suppliers help increase reliability and customer retention.

The results of the company's financial diagnostics show mixed trends, but in general, it is possible to state an improvement in performance indicators and a stabilization of the financial situation. However, to ensure the sustainable growth of the company, it is necessary to focus on cost optimization, in particular, on the reduction of other operating costs.

These expenses turned out to be a significant factor that negatively affected the formation of operating profit and net profit of the enterprise. The conducted margin analysis confirmed that there are reserves for reducing costs, which will increase the profitability of operations and the overall financial stability of the company.

To ensure innovative activities, the company started implementing the CRM system, but, in our opinion, in the conditions of digitalization, it is more appropriate not to fragmentally improve information interaction with customers, but to form a single information space with all subjects of the supply chain.

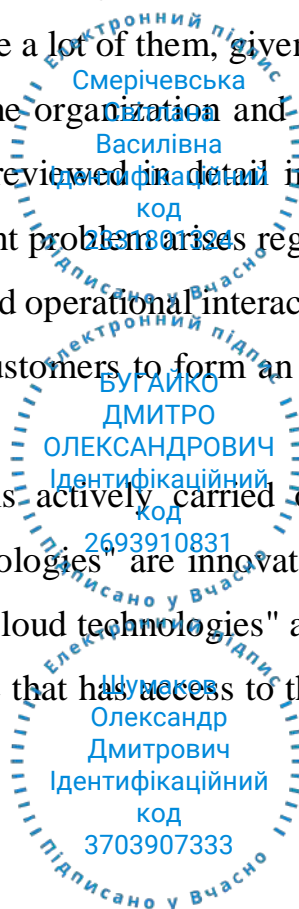
CHAPTER 3

PROJECT PROPOSALS FOR IMPROVING THE INNOVATIVE DEVELOPMENT OF LOGISTICS PROCESSES AT THE ENTERPRISE

3.1 Formation of an innovative approach to the processes of interaction of a transport company with external contractors

The development of logistics processes initiated by the company based on the implementation of the CRM system provides the possibility of interaction of the company itself with customers, taking into account its functional capabilities. However, to improve the management of the company's logistics processes, the CRM system cannot unite all entities in the external environment with which the company cooperates in the process of servicing customers, working in B2B or B2C business models, which form a pool of counterparties. There are a lot of them, given the wide range of services provided by the company regarding the organization and implementation of sea, air, and road transportation, which were reviewed in detail in the analytical part of the qualification work. Therefore, an urgent problem arises regarding the formation of the possibility of ensuring "transparent" and operational interaction of transport companies with counterparties, as well as with customers to form an innovative development of logistics processes.

The solution to this problem is actively carried out using network (cloud) technologies. In general, "cloud technologies" are innovative technologies that allow remote data processing and storage. "Cloud technologies" allow consumers to use data located in the "cloud" from any device that has access to the Internet in any corner of the world.



The following models of deployment of "cloud" technologies are known, which also determine the security of the calculations carried out in these models [62]:

- private cloud (private cloud) - infrastructure intended for use by one organization, which includes several consumers (for example, divisions of the same organization), possibly also customers and contractors of this organization. A private cloud can be owned, managed and operated by the organization itself or by a third party (or any combination thereof);

- public cloud (public cloud) - infrastructure intended for free use by the general public. A public cloud may be owned, managed, and operated by commercial, academic, and government organizations (or any combination thereof). The public cloud physically exists in the jurisdiction of the service provider owner.

Accordingly, the development of a single system of interaction in the context of network development trends can only occur based on ensuring equal access of participants in transport processes - shippers, freight carriers, consignees, and other entities organizing transport and cargo flows to the transport services market by ensuring its information transparency and to achieve a holistic effect from the functioning of the transport and logistics complex.

Therefore, all the main entities of logistics interaction must be included in the private cloud (Fig. 3.1) to connect to single information space, in which the information support of the process of fulfilling a client's order is associated with solving a large set of issues related to the registration of incoming, outgoing and internal documents, with signing, approval, sending, forming them into files, determining storage terms, transferring to the archive or destruction, tracking cargo - are connected into a single whole chain of processes.

Exchanges of cargo carriers are a separate entity of the private cloud. Such exchanges are web-oriented portals on which consignors, consignees, freight forwarders, logisticians and other participants in the transport process interact.

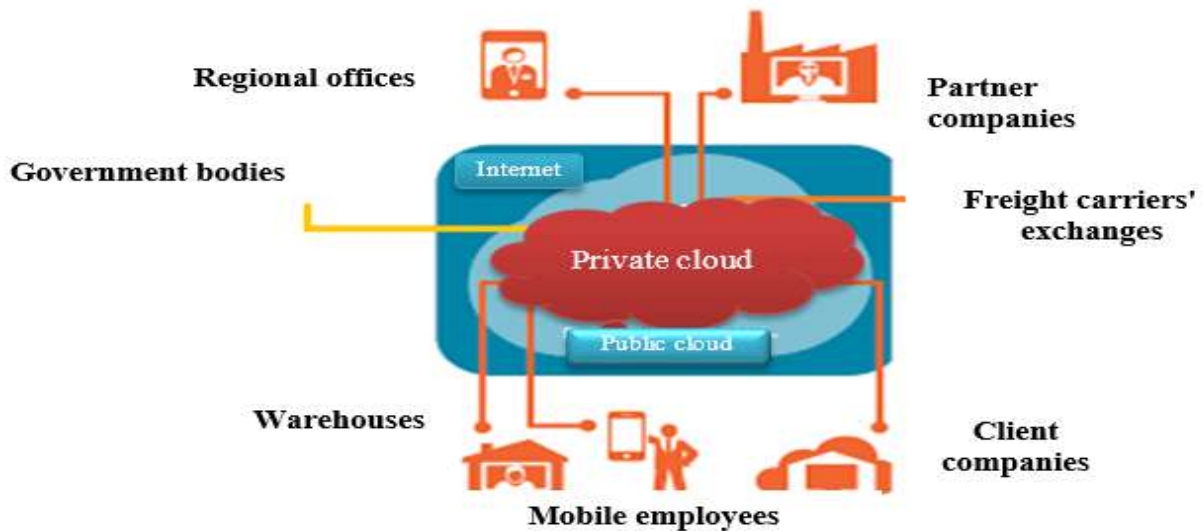


Figure 3.1 – Structure and actors of the transport company cloud

Source: developed by the author

The competitive struggle between large information portals of freight transportation is to attract users. Interaction between users of different professional types is based on the analysis of information provided by some users for others. Naturally, the more "options" an electronic exchange includes, the more users it attracts, this is the main stimulating factor.

The competitive struggle between large information portals of freight transportation is to attract users. Interaction between users of different professional types is based on the analysis of information provided by some users for others. Naturally, the more "options" an electronic exchange includes, the more users it attracts, this is the main stimulating factor.

Exchanges strive to inform customers about the constantly changing balance of cargo and freight vehicles between regions, as well as about periodic changes in transportation conditions between them. The owners of the electronic exchange, as a rule, provide information on the procedure for processing import-export documents, relevant documents for a cargo vehicle, problems that may arise during the loading, transportation, and unloading of goods, conditions for providing legal and financial

services, visas and conditions of the passage of certain of countries, regions, and individual points, about paying for roads.

The main list of factors that contribute to the development of electronic exchanges of freight transportation and the provision of participants in the transportation process within the exchanges:

- increasing competition in the market of transport services;
- increasing transparency of transport services (cost, time, delivery, quality, etc.) due to the development of Internet technologies;
- expansion of the market of electronic services: Internet insurance, Internet trade, electronic declaration, transportation organization, etc.;
- the development of technical and technological resources of the Internet, which allows serving an unlimited number of automated users with the provision of a high degree of protection and information security;
- development of logistics companies that provide complex transportation services (organization of material flows);
- ensuring high productivity of rolling stock due to reduction of empty mileage;
- development of combined (mixed) transportation, transportation of collective cargo, etc.;
- the possibility of providing online services about the status of cargo using the Internet, GPS, WAP, etc.

The subject of the public cloud is the state in the form of its regulatory and control bodies.

According to the access to a certain sector of the cloud, information interaction with the business model is provided [60]:

- 1) private cloud - B2B, B2C, C2B;
- 2) public cloud - B2G, C2G, G2B.

The basis for the effective execution of a client's order is interaction at the level of a private cloud, but there is always the question of protecting access to information

of persons for whom it is not intended. Therefore, we will divide the entities of the private cloud into the following elements [62]:

"Subsidiary" - an enterprise that shares the "parent company's" market development strategy, jointly using the information systems of the main ("parent") enterprise. Subsidiaries include regional offices and warehouses.

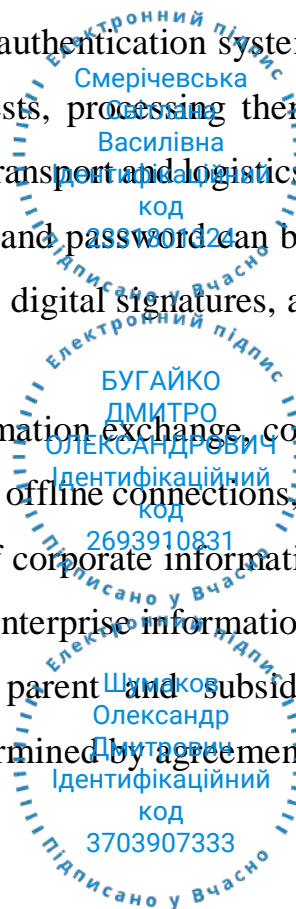
"Regular client" - a contractor enterprise with a long-term cooperation agreement defining aspects of information interaction. Information protection is ensured based on the agreement, current legislation, and other documents regulating relations between the parties, excluding potential "cartel agreements."

"Client" - an enterprise receiving informational services based on public access to generally available client information or a service agreement. Client authorization can be carried out by registering on the company's information portal.

"Guest" - a one-time visitor interested in the company's ability to provide logistics and transportation services. Such a client receives general information, including average statistical indicators of the company's activities.

Existing user authorization and authentication systems allow creating a reliable portal for controlling incoming requests, processing them, and forming multi-level protection of the information space of transport and logistics enterprises. The traditional authorization mechanism with a login and password can be supplemented by systems ensuring secure information exchange, digital signatures, and the development of user authentication systems.

By the level of activity in information exchange, contractors in logistics chains can be divided into online connections, offline connections, and interactive information exchange. Active online connection of corporate information systems is implemented based on standardized requests to the enterprise information system. Such connections are traditionally practiced between parent and subsidiary companies, with the information exchange regulations determined by agreement.



A stricter regulation for obtaining information can be established for "regular clients," for whom a profile is set defining the level of access to information resources, request regulations, and an information security control system. Considering the depth of connections of information systems in online connections, active information protection using continuous authentication, control, and information flow auditing systems should be ensured. The formation of offline connections between corporate information systems should be based on standardized requests defined through client needs analysis.

Figure 3.2 shows access to information types in the private cloud depending on the above-defined subjects.

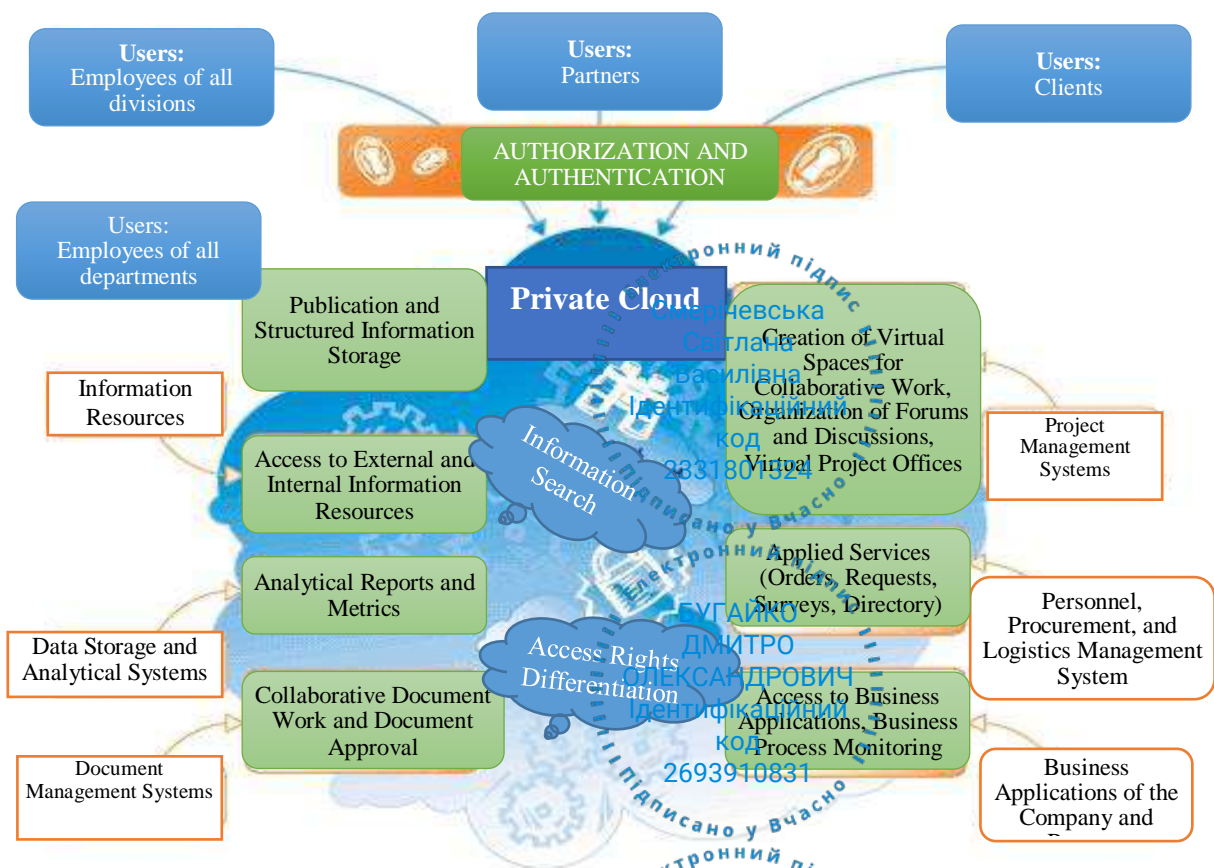


Figure 3.2 - Access to information types depending on subjects of the private cloud

Source: developed by the author

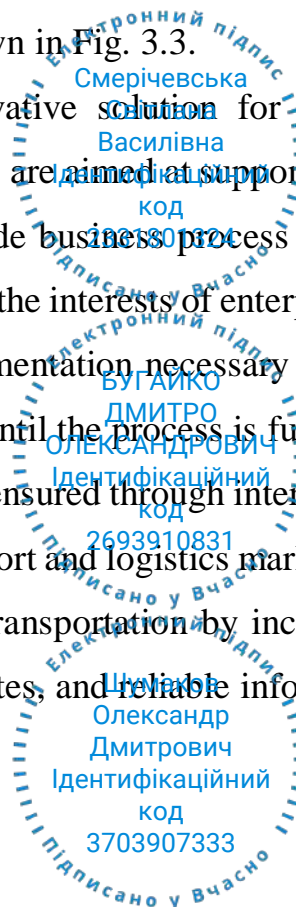
Accordingly, access to the services listed in the lower section is granted only to "subsidiaries" as per the above classification, as this level has restricted access. This restriction is driven by the need to preserve commercial confidentiality. All other subjects, depending on their authorization and authentication, have access to the services in the upper section. These users can have personalized dashboards for more precise interaction.

The private and public clouds form a unified information space for logistical interaction. Within this study, the unified logistical information space (ULIS) of business structures is defined as a set of logistics information systems, information channels of logistics systems of contracting enterprises, and other economically significant information from the external environment. This is integrated with counter and internal interconnected information flows, the primary function of which is to create an optimal level of information entropy—understood as ensuring an adequate (not only informational) response to external informational impacts.

ULIS is planned as an innovative information system that functionally ensures [67] the achievement of the goals shown in Fig. 3.3.

ULIS is designed as an innovative solution for optimizing and improving logistics processes. The main functions are aimed at supporting the achievement of key goals, as shown in Fig. 3.3, and include business process management by organizing business processes taking into account the interests of enterprise participants, providing tools for creating and managing documentation necessary for transportation, ensuring smooth organization and supervision until the process is fully completed.

Integration and cooperation are ensured through interaction between government agencies and stakeholders of the transport and logistics market, simplifying procedures, and accelerating the organization of transportation by including corporate databases, dynamic document preparation templates, and reliable information security measures.



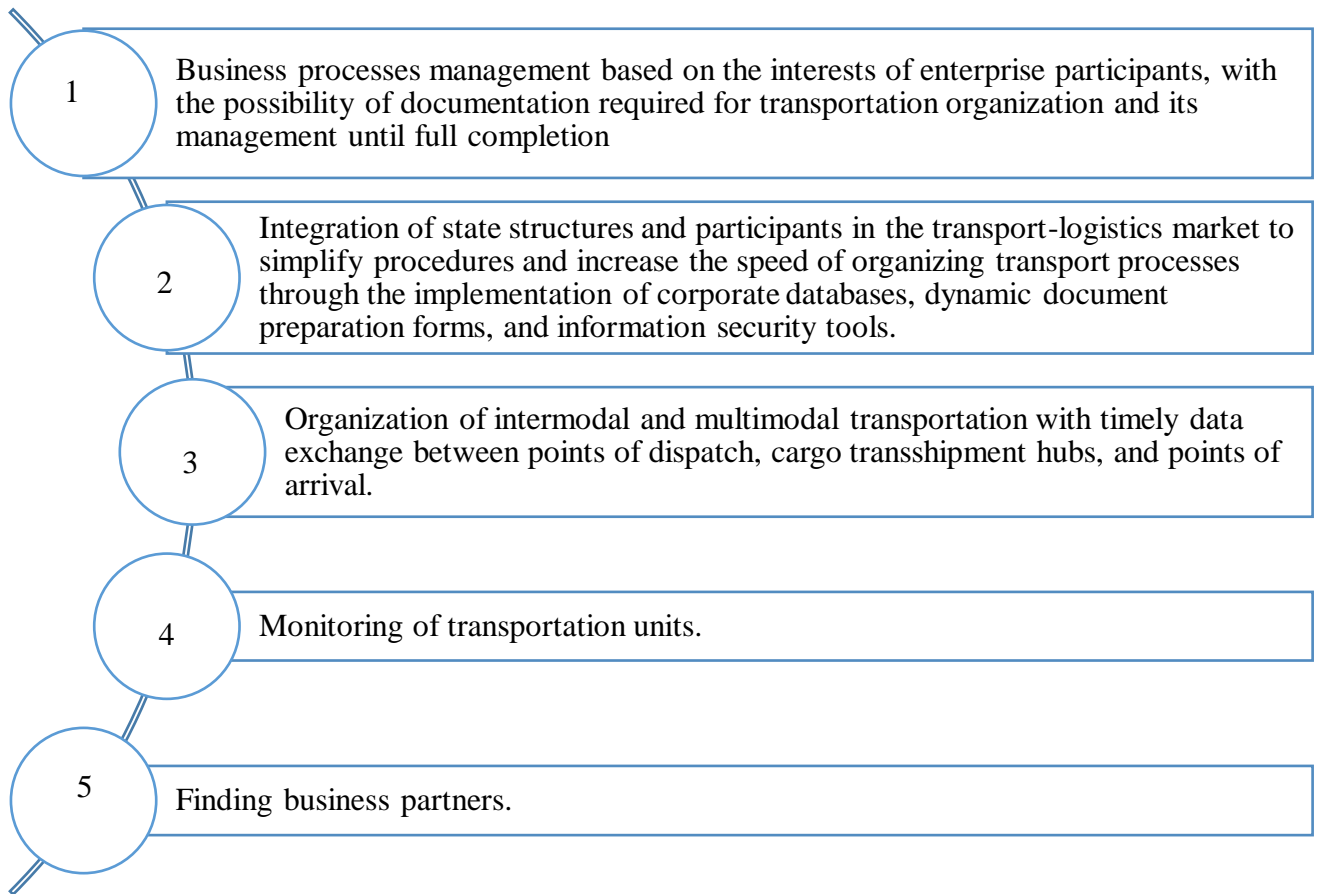


Figure 3.3 – Functional abilities of unified logistical information space (ULIS)

Source: developed by the author

Support for the organization of intermodal and multimodal transportation is provided by ensuring timely data exchange between points of departure, cargo transshipment hubs, and points of arrival.

Monitoring of transport units is ensured by providing tools for monitoring transport units in real-time, ensuring transparency and control throughout the process.

Business partner search provides opportunities to identify potential business partners and establish connections with them, contributing to the development of cooperation opportunities in the logistics ecosystem.

Смерічевська
Світлана
Василівна
Ідентифікаційний
код
2331801324

БУГАЙКО
ДАМИТРО
ОЛЕКСАНДРОВИЧ
Ідентифікаційний
код
3698919871

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Олександр
Дмитрович
Ідентифікаційний
код
3703907333

Thus, this innovative system emphasizes efficiency, integration and collaboration, meeting the dynamic needs of all transport companies, contractors and customers, taking logistics process management to a new innovative level.

Entities interested in the creation of ULIS are shown in Fig. 3.4:

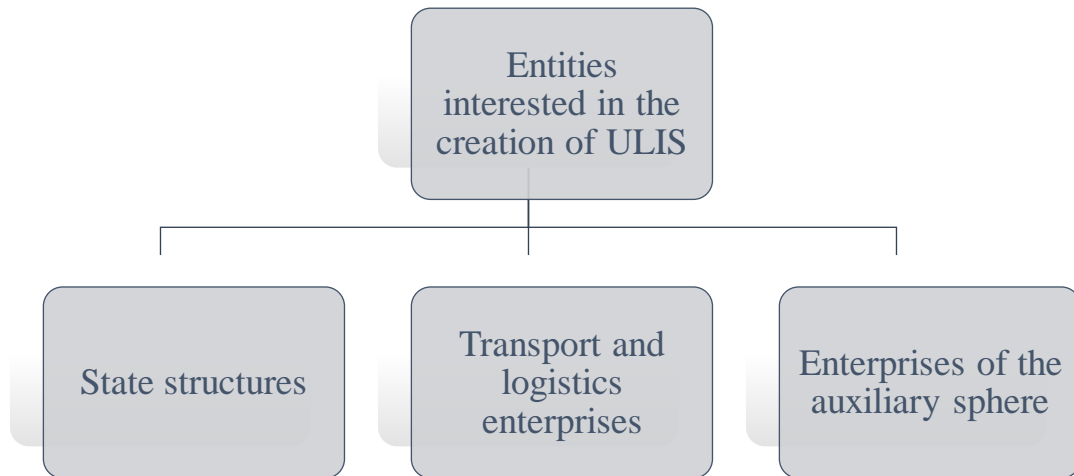


Figure 3.4 - Entities interested in the creation of ULIS

Source: developed by the author

1. State structures (including regional ones) that seek to increase the competitiveness of the transport system (region), reduce the transport component in the price of products of the economy (region) and, therefore, increase its competitiveness.

2. System-forming transport and logistics enterprises with the aim of reducing external risks in the organization of multimodal transport, reducing the cost of transport operations, providing a qualitatively new information service to participants in the transport process.

3. Enterprises in the auxiliary sphere of logistics activities (insurance, banking, financial institutions, etc.) to obtain reliable information on the market of transport services and use it in decision-making when working with enterprises of the transport and logistics market.

In conclusion, it is worth noting that the concept of forming a unified logistics information space is a fundamentally innovative approach to implementing a qualitatively new integrated logistics process management system not only for a separate company but also for all participants in the logistics services market. The creation of a unified information space provides an opportunity to improve the information-process interaction of entities, create "transparent" conditions for the movement of logistics flows, and increase the efficiency of logistics processes due to higher coordination and monitoring of processes, which is predicted to lead to a decrease in process failures, the elimination of operational risks and threats that have a negative impact on the activities of companies. All this is done through the implementation of the main goal of ULIS - to make the interaction of entities in the transport services market open and accessible to each user based on the innovative development of logistics processes.

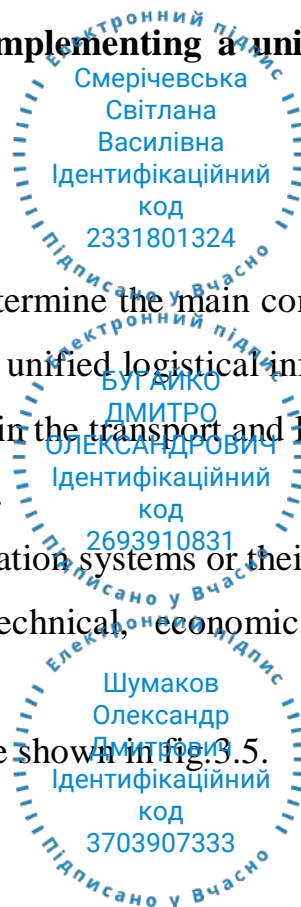
3.2 Socio-technical effect of implementing a unified logistics information space at the transport company

First of all, it is necessary to determine the main components of efficiency that will be common to all participants of a unified logistical information space, namely:

1. Integration of all participants in the transport and logistics services market.
2. Reduction of risk in activities.
3. Integration of existing information systems or their individual elements.

These factors contribute to technical, economic, and social benefits for enterprises [48].

Social and economic benefits are shown in fig.3.5.



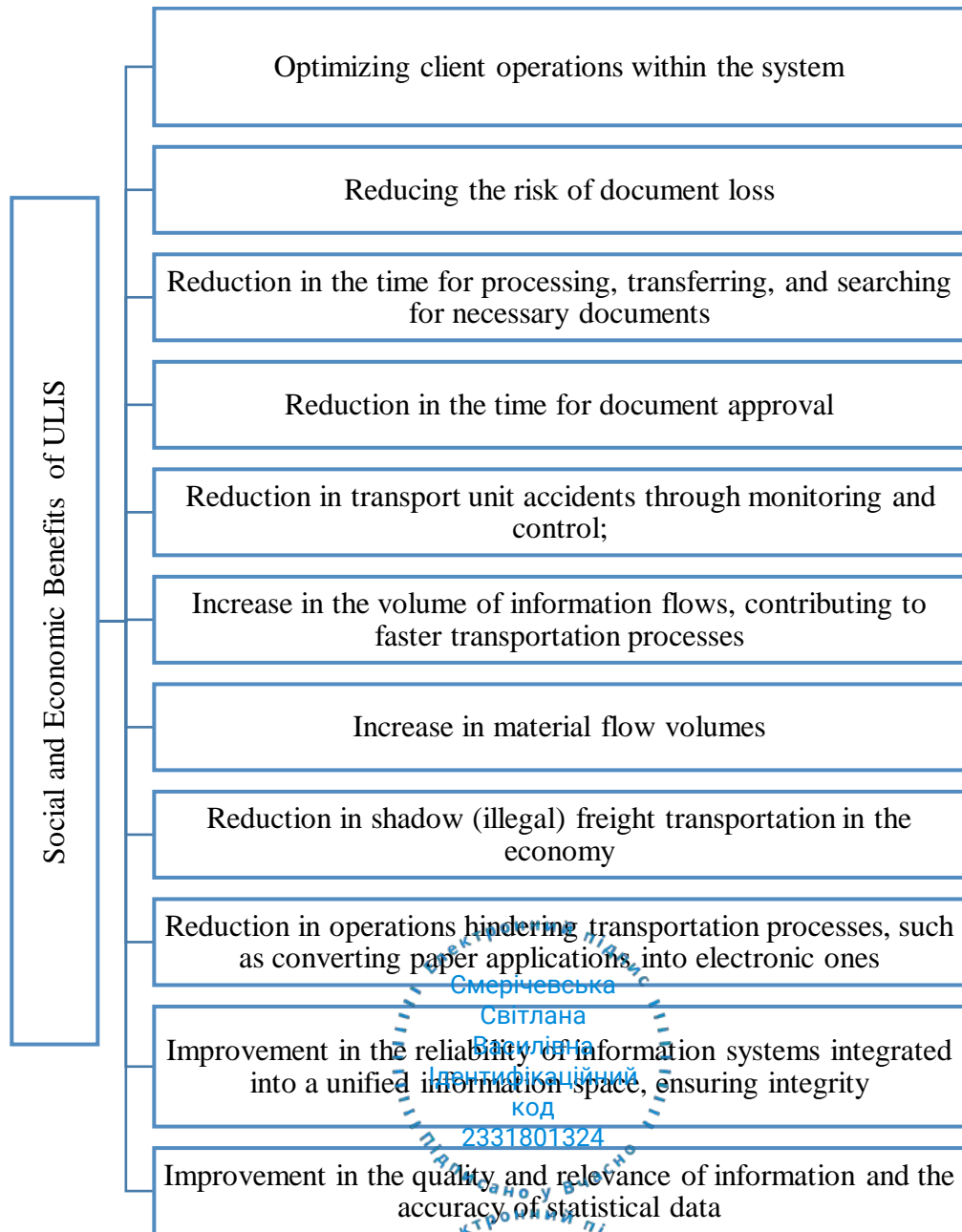


Figure 3.5 - Social and economic benefits from implementing the unified logistical information space

Source: developed by the author

Among the factors hindering the implementation of ULIS: conservatism in the organization and management of large transport companies; insufficient technological

infrastructure in enterprises for implementing electronic document management; conservatism in the regulatory framework for organizing document management.

For the implementation of ULIS, there must be unified standards for document formatting and unified information exchange protocols. The universal telecommunication environment of the Internet essentially provides this opportunity not only at the network protocol level but also through the implementation of universal web-access solutions to corporate systems, predominantly realized using Internet (Intranet) technologies. These technologies also address personnel issues by attracting programmers to optimize program codes for ULIS.

One of the main problems in consolidating the transport market is organizing transportation production (freight transportation) within a transport enterprise without transferring information and management functions to higher management structures. A sudden transition from existing work technologies to a ULIS-based system may lead to resistance and hinder the operations of transport system enterprises. To avoid this, it is necessary to plan and organize employee training, demonstrating the advantages of the new technology.

Table 3.1 presents the indicators of effectiveness from the implementation of ULIS with the integration of automated transport enterprise management systems.

Table 3.1 - Indicators of ULIS efficiency

№ з/п	Characteristics	Values
1	Reduction in document formation and organization of document workflow	At least 3% of overhead costs
2	Elimination of manual operations in document workflow through standardization and electronic processing of documents	Up to 70% of the operator's working time
3	Reduction in time spent on document processing in commercial operations management	Up to 35% reduction in personnel

End of Table 3.1

1	2	3
4	Reduction in the cost of preparing and distributing information	Up to 33% of mailing service costs
5	Avoidance of errors in commercial documents	Up to 30-60% reduction in time spent checking commercial documents
6	Avoidance of information delays due to errors in document processing	In 15% of cases
7	Reduction in the number of incorrectly processed payment documents	Up to 5%

The efficiency of solutions in the technical aspect is determined by:

1. Organization of secure operations for all system users.
2. Increased system fault tolerance.
3. Reduction in operational collisions.
4. Possibility of complete automation and control of transport-technological processes in the market.
5. Ensuring quick execution of all operations.
6. Enabling logical control of technological operations.

The socio-economic effect of ULIS organization for the end consumer lies in reducing product costs by accelerating turnover, reducing transport and logistics expenses, and minimizing losses in the cargo flow organization chains. The intellectualization of the ULIS system allows for reducing the human factor in errors that disrupt logistics processes.

The scheme for the development of ULIS infrastructure, presented in Figure 3.6, defines the order and sequence of organizational and technological solutions. Essentially, the creation of the infrastructure involves integrating the "DiFFreight" company's information system with the information systems of all participants into a unified private cloud, with defined protection protocols and access rules.

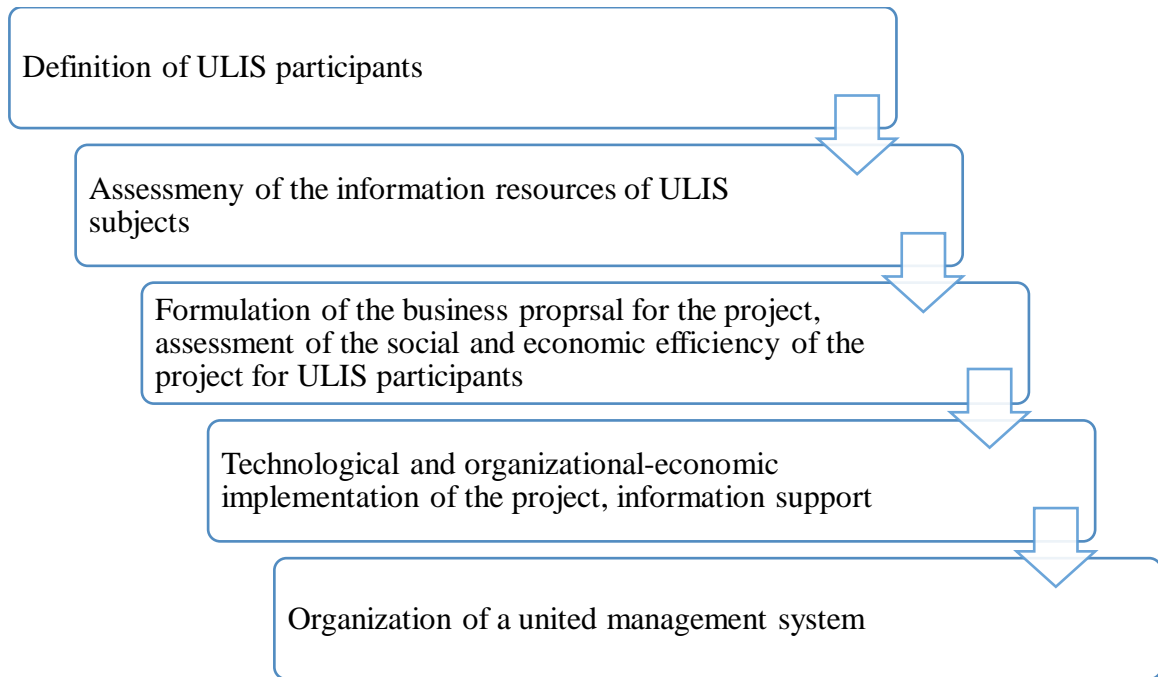


Figure 3.6 – Scheme for the Implementation of the ULIS creation project

Source: developed by the author

This integration will enhance the efficiency of flow-based interaction among ULIS participants, particularly in managing informational flows that ensure the movement of material and financial flows. The accuracy of transport document formation, correct order specifications for items and quantities, directly impacts payment processing, physical shipment, and avoiding the return of incorrectly delivered orders.

To increase the system's efficiency and mobility, it is proposed to design ULIS based on a modular approach, allowing the synthesis of elements performing specific functions. The modular principle simplifies system design by optimizing the development of independent functional components. When designing ULIS modules, the following properties must be ensured [53]:

1. **Functionality:** a module is a holistic object enabling the execution of specialized functions.
2. **Connectivity:** modules must be linked with other modules depending on their functional significance.

3. Reliability: in case of technical failures or disruptions, modules must be capable of self-recovery.

Thus, specialized modules need to be developed, as shown in Figure 3.7.

The design of these and other modules for the end user should be carried out as additional functionality requirements arise.

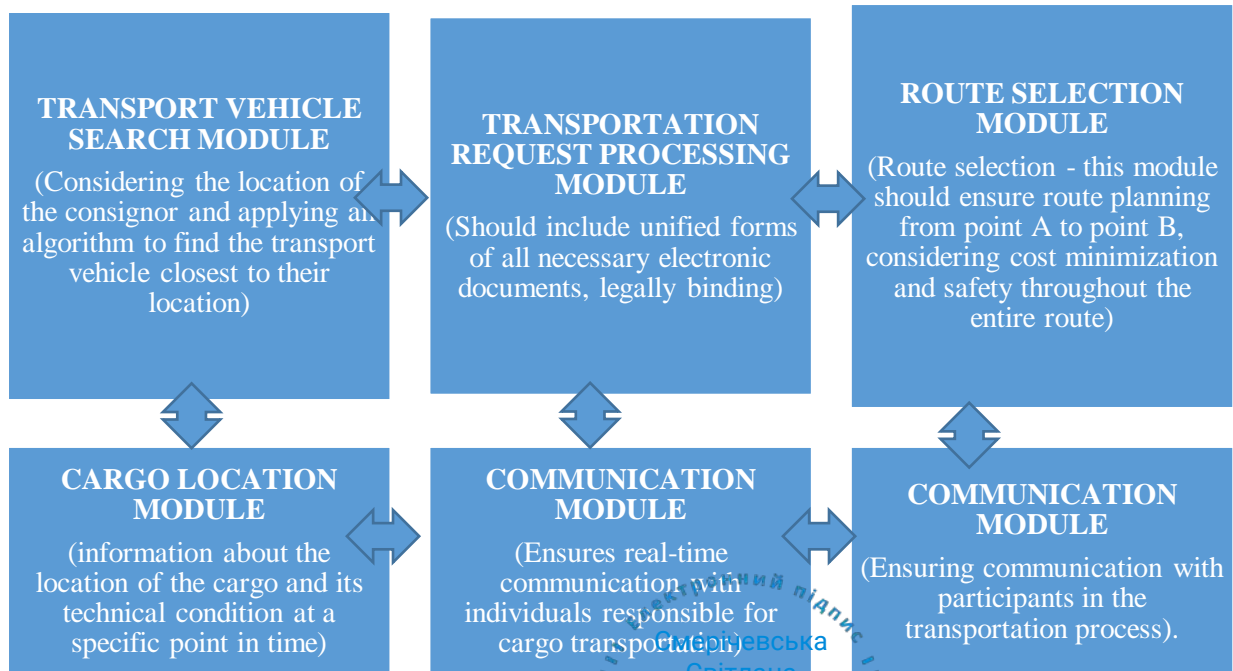


Figure 3.7 – ULIS Modules

Source: developed by the author

When using ULIS based on modularity, the following strategic tasks will be addressed:

- minimization of adaptation costs for transport companies to changes in the external environment;
- improvement of the final financial result;
- timely and high-quality delivery of products to end consumers, based on a high level of service;

- reduction of costs through improved efficiency in the use of enterprise development resources, increasing information resources through data exchange with other (external) enterprises;

- support for a high probability of on-time delivery, based on the analysis of technological risk levels and ensuring necessary safety.

The modularity of ULIS allows for a flexible and universal logistics tool for managing information flows at different levels of transport process management, enhancing the speed of information exchange, reducing the number of errors, and integrating disparate information blocks. The costs and time for system development and implementation are determined by the complexity of interconnections between its individual modules, while operating costs mainly depend on the time for functional task execution, the number of unused data transmissions, the transport factor, or the productivity during task execution, as well as the reliability of data processing.

Thus, the main quality criterion for modular data processing systems is the complexity of inter-module information connections (inter-module interfaces), which dominate during the system's design, setup, implementation, and modification. Therefore, developing ULIS based on modularity provides an effective and flexible tool for managing the transport process, oriented towards the end consumer.

3.3 Economic evaluation of the project of implementation of a unified logistics information space based on cloud technologies

The economic evaluation of the effect from implementing the ULIS project includes investments and costs. Investments in the project implementation [31]:

- investments in creating the technical infrastructure on which ULIS will be designed (equipment, office technology, etc.);

- investments in purchasing software and creating proprietary software necessary for ULIS creation;
- costs for employee salaries, utility payments, consumables;
- depreciation costs;
- costs related to using global computing networks;
- additional costs for project maintenance.

Thus, the total costs (for investments and operations) will be:

$$C = C_1 + C_2 + C_3 + C_4 + C_5 + C_6. \quad (3.1)$$

The main indicators for calculating the effectiveness of the investment project are:

1. Net Present Value (NPV) is a financial metric used to evaluate the profitability of an investment or project by calculating the difference between the present value of cash inflows and the present value of cash outflows over a specified time period. It helps determine whether a project or investment will generate value beyond its costs. If the NPV value is positive, the project can be recommended for financing. If NPV is zero, the revenues from the project will only cover the invested capital. If NPV is negative, the project is unprofitable, and investment should not be made. The net present value (NPV) is calculated using the following formula:

$$NPV = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} - I_0 \quad (3.2)$$

where: r - discount rate; n - number of project implementation periods; CF_t - net cash flow for period t ; I - initial investment.

If:

$NPV > 0$, the project should be accepted;

$NPV < 0$, the project should be rejected;

$NPV = 0$, the project is neither profitable nor unprofitable.

To forecast revenues over the years, all types of income, both production and non-production, associated with the project should be considered. If, after the project implementation period, income from the liquidation value of equipment or the release of working capital is expected, they should be accounted for as income in the corresponding periods.

If the project involves not a one-time investment but continuous investment of financial resources over m years, the formula for calculating NPV is modified as follows:

$$NPV = PV - IC = \sum_{k=1}^n \frac{P_k}{(1+r)^k} - \sum_{j=1}^m \frac{IC_j}{(1+r)^j}, \quad (3.3)$$

where: i - forecasted average inflation rate.

2. Profitability Index (PI) is a financial metric used to evaluate the relative profitability of an investment or project. It measures the value created per unit of investment, helping in the prioritization of projects when resources are limited. The formula used for calculating this indicator is:

$$PI = \frac{PV}{I_0} \quad (3.4)$$

where: PV - present value of the cash flow over the economic life of the project.

If $PI > 1$, the present value of the cash flow exceeds the initial investment, ensuring a positive NPV. In this case, the profitability rate exceeds the required level, and the project should be accepted. If $PI = 1$, $NPV = 0$, and the investment does not generate income. If $PI < 1$, the project does not meet the required profitability level and should be rejected.

In conditions of limited investment resources, the project with a higher PI is preferred over one with a lower value. For mutually exclusive projects, the one with the highest PI should be selected. The profitability index is a relative indicator: it shows the income level per unit of expenditure, i.e., the investment efficiency — the higher the value of this indicator, the greater the return from each unit invested in the project. Therefore, PI is very useful when selecting one project from several alternatives.

3. Discounted Payback Period (DPP) is a financial metric that determines the time required for the present value of cash inflows to recover the initial investment, taking into account the time value of money. Unlike the regular payback period, the DPP accounts for the discounting of future cash flows, providing a more accurate assessment of the investment's profitability and risk.

The discounted payback period is calculated using the formula:

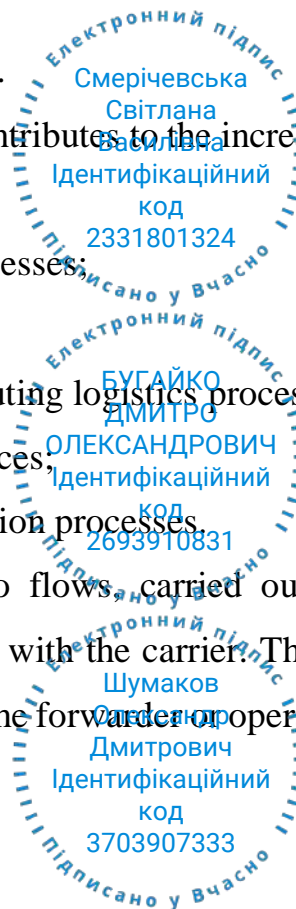
$$DPP = \frac{C_t}{(1+r)^t} \dots \dots \dots (3.5)$$

where: C_t - cash flow in period t .

The implementation of ULIS contributes to the increased economic efficiency of the transport market, including:

- increased speed of logistics processes;
- market transparency;
- significant time savings in executing logistics processes;
- efficient use of personnel resources;
- reduction in the cost of information processes.

Logistics management of cargo flows, carried out by operators and freight forwarders, requires close cooperation with the carrier. The economic effect from the implementation of ULIS, achieved by the forwarder or operator, comes from the prompt



response to deviations of cargo from its route during transit. This helps avoid additional costs for route correction and cargo preservation.

It should be noted that with the implementation of ULIS, its users will save a significant amount of time performing the same operations. By analyzing the groups of participants planned for ULIS implementation in transport and logistics enterprises, and the impact of modern information technologies on organizing document management using corporate and global computer networks, Table 3.2 can be constructed.

Table 3.2 – Time savings assessment from the implementation of ULIS

№	Positions of participants in transport and logistics enterprises working in ULIS	Working day duration, hours.	Time to perform operations on the Internet without ULIS, hours	Time to perform operations on the Internet with ULIS, hours	Time savings assessment, hours
1	Road Transport Dispatcher	8-12	4	1	3
2	Transportation Management Coordinator	8-12	2,5	1,5	1
3	Freight Forwarder	8	2	1	1
4	Cargo Handling Operator	8	2	1,5	0,5
5	Logistics Department Manager	8	1,5	1	0,5
6	Logistician	8-12	5	3	2
	Sales Manager	8	1	0,4	0,6
7	Key Account Manager	8	1-4	1-2	1-2
8	Warehouse Logistics Coordinator	8-12	1-3	1-2	1
9	Foreign Economic Activity Manager	8	2-4	1-3	1-2
10	Customs Broker	8	3-5	2-4	1-2

The total working time savings for employees of various categories range from 13 to 16 hours. Achieving economic effects is supported by a number of technological requirements for the ULIS [48]:

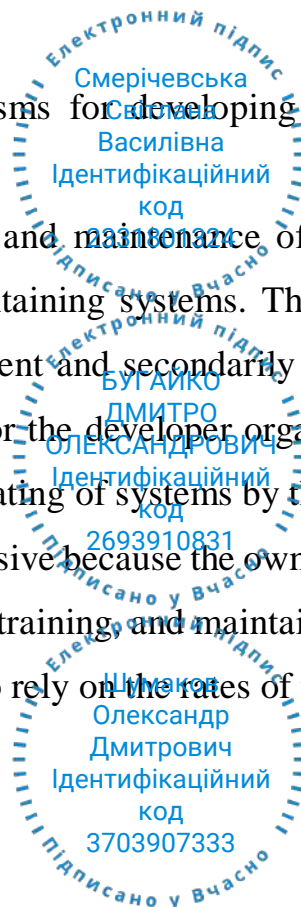
- system modularity;
- user profiling and support for a common unified database for all users;
- cross-platform compatibility;
- support for additional functional components;
- integration with satellite navigation systems and auxiliary systems for cargo status during transit.

During the process of increasing economic efficiency, the following issues may arise:

- insufficiently developed IT infrastructure for implementing certain strategies;
- unclear organization of the project technical documentation, on the basis of which the software components of ULIS are developed;
- lack of clear adherence to market conditions and changes in management mechanisms;
- use of outdated IT mechanisms for developing software components and modules.

A current issue is the creation and maintenance of ULIS systems. There are several options for creating and maintaining systems. The first way is outsourcing, which is used primarily for development and secondarily for servicing and updating systems by third-party organizations or the developer organization itself. The second way is creation, maintenance, and updating of systems by their owners.

The first option is less labor-intensive because the owning company does not need to spend financial resources on hiring, training, and maintaining staff. However, in this case, the owning company will have to rely on the rates of the outsourcing companies, which can also be quite costly.



The second option is more reliable. In this case, there is an opportunity to ensure control over the staff, set fixed salaries, formulate optimization tasks, and develop instructions for their execution. Creating ULIS requires the involvement of developers who have experience designing large networked information transport projects and the corresponding qualifications. The development cost depends on the existing and utilized information systems that need to be integrated into ULIS, the design of new elements and modules for both low and high levels of the system, the organization of a database that supports all required types and connections, the creation of search engines, system design, and the user interface, as well as the analysis of the most convenient and latest communication technologies for effective interaction between counterparts.

According to experts' estimates, if the project is implemented independently, the payback period will be at least 6 years, which is quite a long time for the rapidly developing and changing information systems market. Therefore, the first option – outsourcing – was chosen.

Among the software products that provide "cloud" services as the basis for ULIS, experts and consumers have highlighted the following (see Figure 3.8) [61].

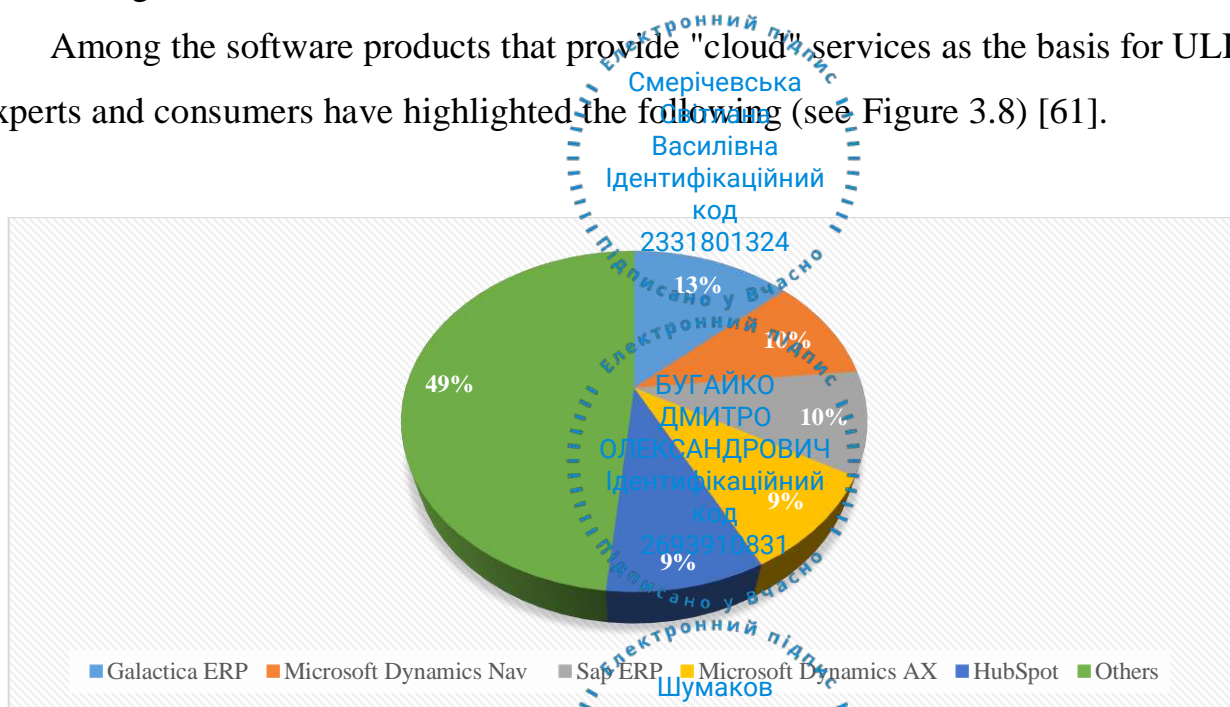


Figure 3.8 – Software Products supporting interaction with counterparties in the cloud

Considering the company's requirements and the capabilities of the technology, it is proposed to implement Microsoft Dynamics NAV as an integrated enterprise management system (Integrated Business Management Solution) supplied by Microsoft in the new Microsoft Dynamics product line for small and medium businesses (Small Medium Business).

This system includes the following functionality (see Figure 3.9) [3]:

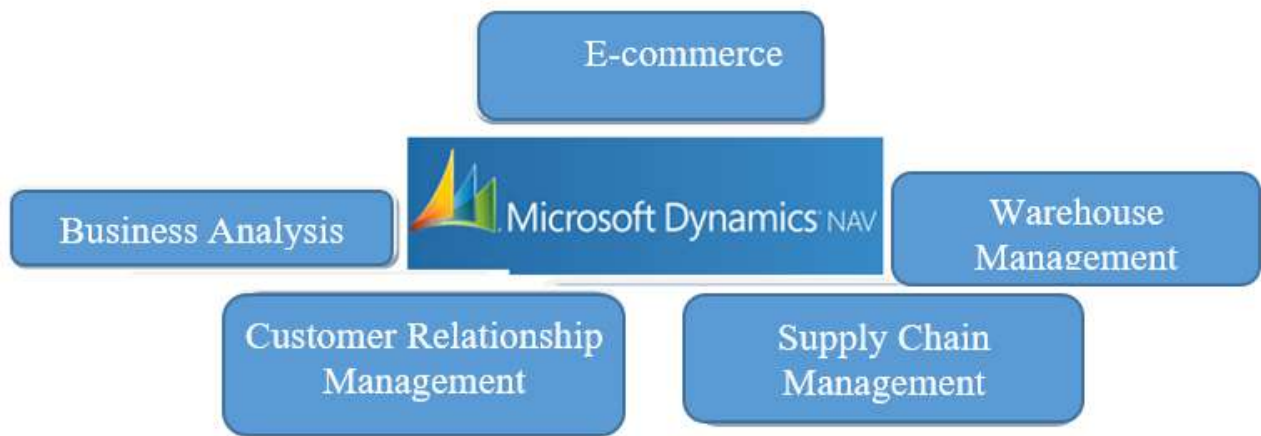


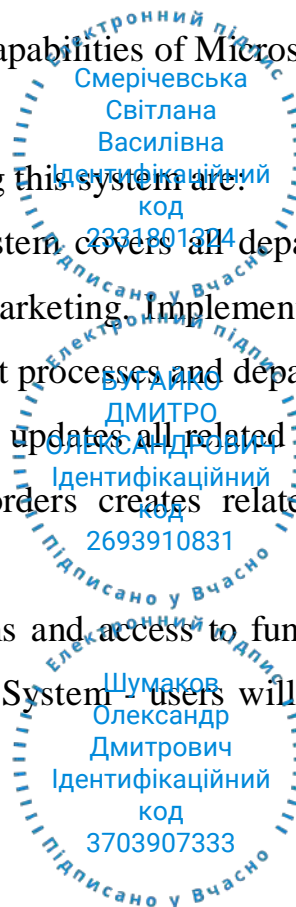
Figure 3.9 – Functional capabilities of Microsoft Dynamics NAV

The advantages of implementing this system are:

Integrated management: the system covers all departments, from finance and production to human resources and marketing. Implementation can be carried out in stages, starting with the most important processes and departments.

Cross-processes: each operation updates all related information in all modules. For example, processing customer orders creates related accounting records and production orders.

Familiar interface: menus, forms and access to functions are organized in the familiar style of the Microsoft Office System. Users will not need much time to get acquainted with the system.



Low operating costs: client-server architecture, proprietary or SQL database, quick installation.

With Microsoft Dynamics NAV, it is possible to reduce order fulfillment times, increase responsiveness to customer inquiries, and reduce operational costs.

The system is functional for both external and internal environments. For the internal environment of "DiFFreight" it enables the connection of regional offices and warehouses into a unified system, significantly increasing manageability and operational efficiency, thereby creating an internal information space for managing flow interaction.

For the external environment, it allows linking the company's activities with those of its counterparties based on B2B and B2C platforms, thus creating an external information space for managing flow interaction.

Together, these form a unified logistical information space.

Let's take a closer look at the functional capabilities of the subsystems:

1. Inventory Management includes:

- managing inventory turnover;
- warehouses and warehouse units;
- specifications, substitute goods, mutual preferences;
- warehouse operations – movement, picking, shipping, receiving, transferring, reserving, write-offs;

- batch and serial number tracking;
- goods cost accounting (FIFO, LIFO, average by serial numbers, standard);
- order tracking to monitor related documents in the demand-supply chain.

2. Warehouse Management includes

- warehouse infrastructure management;
- warehouse space optimization mechanism;
- automated data collection system via radio terminal devices (ADCS);
- inter-warehouse movement, goods-in-transit tracking;

- warehouse load control at the cell level;

3. Customer and Supplier Transactions include:

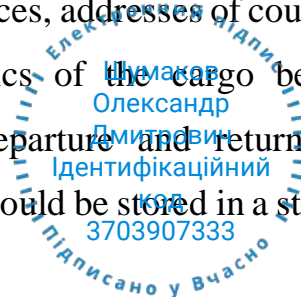
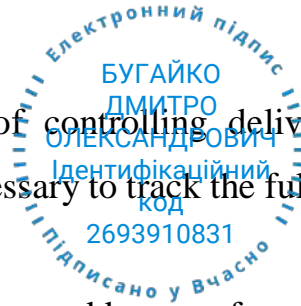
- control of receivables and payables;
- order and invoice processing;
- price and discount management;
- delivery time calculation;
- return processing;
- alternative delivery addresses;
- supply agents, direct deliveries from third parties;
- processing partial payments;
- cancellation of payments by invoice;
- control of the credit limit of counterparties;
- analysis of overdue debts.

4. Customer Relationship Management, through integration with all other system modules, increases the return from each business contact:

- customer contacts and history;
- counterparty database management;
- contact segmentation;
- contact management;
- document history;
- logging of interactions.

There is also the possibility of controlling deliveries, which is especially important for "DiFFreight" as it is necessary to track the fulfillment of customer orders (see Figure 3.10).

The prices for transportation services, addresses of counterparties and warehouses, weight and dimensional characteristics of the cargo being transported, technical parameters of transport vehicles, departure and return times to the base, fuel consumption, traveled distance, etc., should be stored in a structured and well-protected



database. This way, logistics processes become information-integrated with many other processes within the enterprise and with external counterparties.

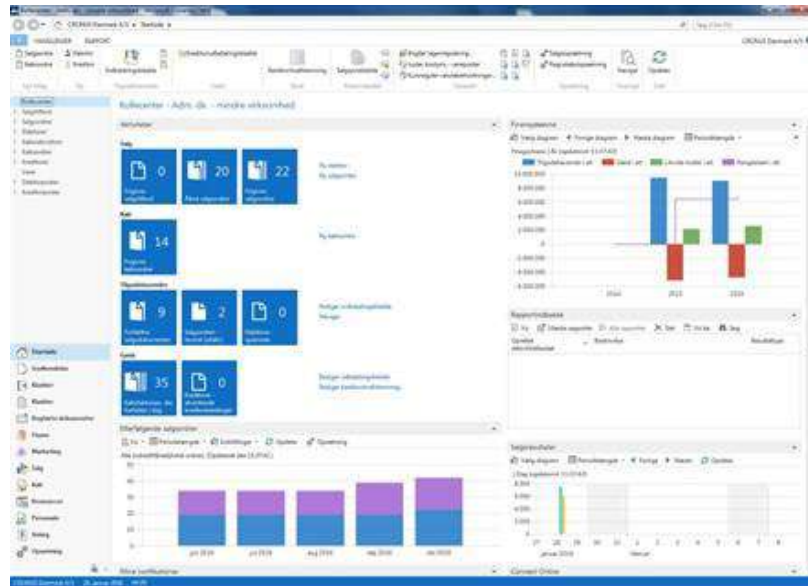


Figure 3.10 – Functional Module "Delivery"

The next functional module is the "Intelligent Route Planning System" (see Figure 3.11).



Figure 3.11 – Functional Module "Intelligent Route Planning System"

Freight delivery should be economical: there's no need to rack up unnecessary kilometers on the odometer and waste fuel with your vehicles. Use the planning module that distributes delivery orders among transport vehicles, plans economical routes, and ensures timely arrival as required by the client. This planning module should be integrated with the enterprise's automated accounting and management system to ensure the process is as comfortable, reliable, and efficient as possible.

Thus, the system fully forms an integrated information space and helps ensure effective interaction among the participants in ULIS.

Let's calculate the efficiency indicators of implementing this software product for the company "DiFFreit". The costs of implementing the project are given in Table 3.2.

Table 3.2 – Investment costs for the implementation of Microsoft Dynamics NAV for "DiFFreit" LLC

№	Investment Direction	Time, days	Cost (UAH)
1	Express Implementation of Microsoft Dynamics NAV (installation and employee training (basic version) system based on "cloud technologies")	24 days	40600
3	The prototype is being tested on a staging server by the system administrator.	3-4 days	2000
4	The system administrator launches the system that supports the company's key processes.	10 days	10000
5	The system administrator configures the tool for organizing, planning, controlling, and analyzing the efficiency of freight delivery processes.		
6	The system administrator creates a centralized data repository for all completed shipments with the required level of detail.		
7	Creates a unified information space for the interaction of all participants in the logistics chain.		
	Total	37-38 days	52600

Therefore, the creation of the basic version of the program takes approximately 1.5 months and costs 52,600 UAH. To increase the functionality of the system, it is proposed to order access to additional modules. Access to the system's modules for one

access point per month costs 790 UAH. It is planned to take 5 access points. Investment costs will increase by 47,400 UAH (5 access points for 12 months). These costs will represent the annual expenses for the investment project.

Based on the formulas described above, provide calculation the main performance indicators of the investment project for the implementation of Microsoft Dynamics NAV for "DiFFreit" LLC. Calculation the Net Present Value (NPV) of the project at two discount rates of 18% and 20% are shown in Table 3.3 and Table 3.4.

Table 3.3 – Results of Net Present Value calculation for the project at a discount rate of 18%

Years,t	Positive Cash Flow	Investment Costs	Net Cash Flow	Discounted Cash Flow
1		100000	-100000	-100000
2	80000	47400	32600	27627,12
3	85000	47400	37600	27003,73
4	90000	47400	42600	25927,68
5	90000	47400	42600	21972,61
Сума	345000	289600	55400	
NPV				2531,14
PI				1,0253

The net cash flow is formed as the difference between the positive cash flows (forecast results from the project's implementation) and the investment costs. The discounted cash flow is the net cash flow multiplied by the discount rate (values are taken from the discount multiplier tables).

For the calculation of forecasted results from the project's implementation, we used the amount of time savings from personnel due to the implementation of cloud technology. Clearly, the implementation of ULIS will bring other types of benefits, but at this stage, we cannot precisely calculate them, so the project is calculated even considering these minimal benefits.

The payback period for the project with a discount rate of 18% is 3 years and 11 months.

Table 3.4 – Results of Net Present Value calculation for the project at a discount rate of 20%

Years,t	Positive Cash Flow	Investment Costs	Net Cash Flow	Discounted Cash Flow
0		100000	-100000	-100000
1	80000	47400	32600	27166,67
2	85000	47400	37600	26111,11
3	90000	47400	42600	24652,78
4	90000	47400	42600	20543,98
Сума	345000	289600	55400	
NPV				-1525,46
PI				0,9847

According to the calculations, increasing the discount rate to 20% led to the unprofitability of the investment project implementation.

Based on this, the internal rate of return (IRR) will be 19%. This means that the discount rate can fluctuate up to 19%, and the implementation will still bring financial benefits. However, exceeding this rate will make the project inefficient and lead to losses.

Chapter 3 summary

The DiFFreit" LLC company is in the process of developing its own CPM system, which it plans to use to improve customer relationship management. To increase the level of innovation of the company's activities in logistics process management, it is proposed to transfer the level of interaction to an innovative new

level by creating a single logistics information space and uniting all counterparties and customers of the company within this innovative space based on cloud technologies.

"Cloud" technologies allow you to create a single platform for all categories of shippers, including manufacturing enterprises, trade organizations, and logistics service providers, consolidating the management of all basic processes in transport logistics systems. Therefore, to ensure interaction with external counterparties, it is proposed to create a Single Logistics Information Space (SLIS), a fundamentally new approach to implementing a completely new integrated transport process management system in the transport market.

The modular system allows to include in ULIS information systems used by external counterparties, allowing participants to work in real-time, organizing direct dialogues, such as participant-participant, participant-group, and group-to-group.

To implement ULIS, it is proposed to deploy cloud technology based on Microsoft Dynamics NAV - an integrated enterprise management system (Integrated Business Management Solution), provided by Microsoft for small and medium-sized businesses (Small Medium Business). The system is functional for both external and internal environments. For the internal environment of "DiFFreit" LLC this makes it possible to combine regional offices and warehouses into a single system, significantly increasing manageability and efficiency of work, thereby creating an internal information space for managing flow interaction.

For the external environment, this allows you to link your activities with the activities of your counterparties on B2B and B2C platforms, thus creating an external information space for managing flow interaction. Together they form a single logistical information space.

When assessing the effectiveness of the proposed solutions, the net present value (NPV), profitability index (PI), and internal rate of return (IRR) were calculated. It was determined that the project would break even at a discount rate of 18% in almost four years.

CONCLUSIONS AND RECOMMENDATIONS

The study of the issues of innovative development of logistics processes at the enterprise allowed us to come to the following conclusions.

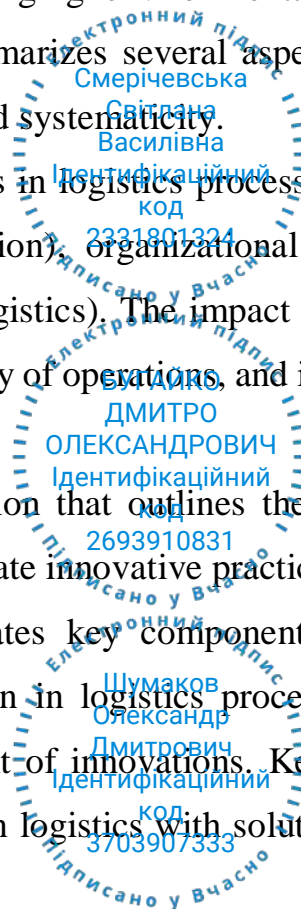
The consideration of the theoretical foundations of innovative development of logistics processes at the enterprise allowed us to make the following conclusions:

1. The conducted literature review allowed to identify four approaches to the formation of the concept of innovation, namely: process-oriented, result-oriented, object-utilitarian, and process-financial. This indicates a high interest of scientists in this issue and the continuation of research into the essence of this concept.

2. Innovation in logistics can be defined as purposeful changes based on the implementation of new or improved technologies, organizational methods, processes or solutions that ensure increased efficiency, competitiveness and adaptability of logistics systems in response to changing environmental conditions and growing consumer needs. This definition summarizes several aspects such as novelty, result orientation, technology integration, and systematicity.

3. The main types of innovations in logistics processes are identified, including technological (automation, digitalization), organizational (optimization of business models), and environmental (green logistics). The impact of innovations on reducing costs, increasing the speed and accuracy of operations, and improving customer service is determined.

4. Scheme of logistics innovation that outlines the interconnected processes, technologies, and strategies that integrate innovative practices into logistics operations was developed. This scheme illustrates key components, technologies, and their relationships in stimulating innovation in logistics processes. Inputs determine the factors that influence the development of innovations. Key processes determine the combination of types of innovations in logistics with solutions that can be developed



and implemented within the defined types of innovations. Outputs are the results that a logistics company can obtain as a result of implementing recognized types of innovations.

5. Global trends that determine the development of logistics processes are studied, in particular automation, integration of artificial intelligence, implementation of IoT, and Blockchain. The growing importance of drones and autonomous vehicles in delivery, particularly in the "last mile" zone, is described. The role of digital platforms and big data in increasing the transparency and efficiency of supply chains is analyzed.

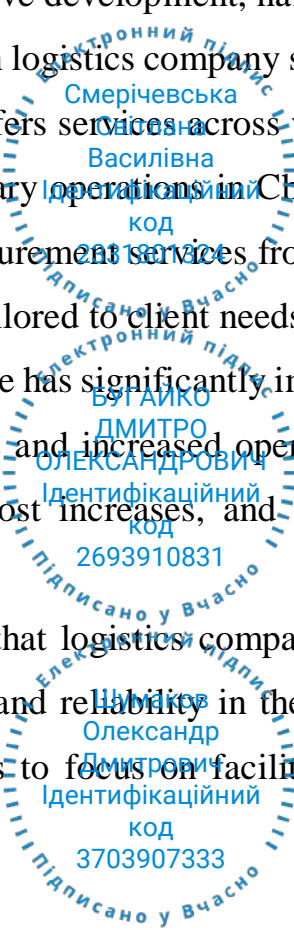
6. Chapter forms a scientific and methodological basis for further analysis of the practical implementation of innovative solutions in the logistics of a particular enterprise. The relevance of the study in the context of dynamic changes and increased competition in the logistics services market is highlighted.

The analysis of the activities of the research object allowed us to identify trends in the company's activities and innovative development, namely:

1. DiFFreight LLC is a Ukrainian logistics company specializing in international freight transportation. The company offers services across various modes of transport, including air, sea, and road, with primary operations in China, the USA, and Europe. Additionally, DiFFreight provides procurement services from China, aiming to deliver convenient and transparent solutions tailored to client needs.

2. The ongoing conflict in Ukraine has significantly impacted the logistics sector, leading to disruptions in supply chains and increased operational costs. The war has impeded the flow of goods, fueled cost increases, and created product shortages, affecting global supply chains.

3. These challenges necessitate that logistics companies like DiFFreight adapt their strategies to maintain efficiency and reliability in their services. In response to these challenges, DiFFreight continues to focus on facilitating the transportation of



goods both domestically and internationally, striving to provide reliable logistics solutions despite the current geopolitical climate.

4. The financial diagnostics of the company revealed mixed trends in its performance indicators. While some metrics show improvement, reflecting the company's efforts to stabilize its financial position, certain challenges remain. Notably, operating costs—specifically other operating expenses—have had a significant adverse effect on the company's operating and net profits. This is corroborated by a detailed margin analysis, which highlighted the detrimental impact of these costs on overall profitability.

5. To achieve sustainable growth, the company should prioritize cost optimization strategies. Focusing on reducing other operating costs will enhance operational efficiency, improve profit margins, and contribute to long-term financial stability. This proactive approach will also position the company to better navigate uncertainties and capitalize on market opportunities.

6. To solve this problem, it is recommended:

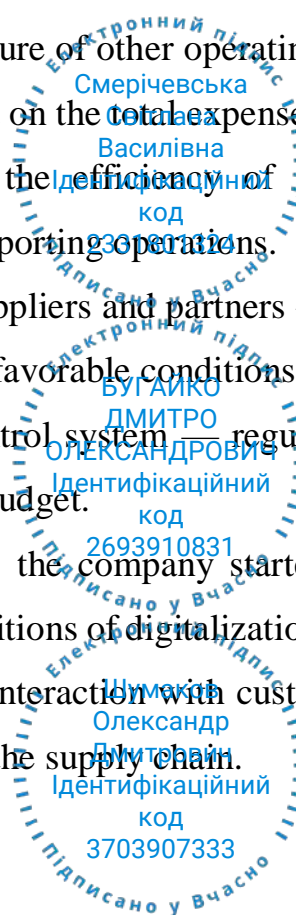
1. Detailed analysis of the structure of other operating expenses - to identify the key items that have the greatest impact on the total expenses.

2. Automating and improving the efficiency of processes - using modern technologies to reduce the costs of supporting operations.

3. Revision of contracts with suppliers and partners — with the aim of reducing the cost of services or obtaining more favorable conditions.

4. Implementation of a cost control system, regular monitoring of costs and analysis of their compliance with the budget.

To ensure innovative activities, the company started implementing the CRM system, but, in our opinion, in the conditions of digitalization, it is more appropriate not to fragmentally improve information interaction with customers, but to form a single information space with all subjects of the supply chain.



In the project part, the development of the concept of innovative development of a logistics company based on the creation of a single logistics information space for the company's interaction with external counterparties is proposed.

The following proposals were developed in the project section of the thesis:

1. To ensure effective interaction with external counterparties, it is proposed to create a unified logistics information space (ULIS), which represents an innovative approach to implementing a holistic transportation process management system in the transport market. Unified logistics information space will help increase the competitiveness of companies, reduce transportation costs, improve service quality, and ensure transparency at all stages of the logistics chain.

2. The development and implementation of a unified logistics information space (ULIS) to improve information interaction between transport system enterprises not only creates a common technological base for managing transport processes, but also significantly reduces transport and logistics costs in the implementation of material flows. Transparency in the implementation of logistics operations, provided by the ULIS, not only helps reduce corruption risks, but also builds trust between market participants. This, in turn, stimulates the sustainable development of the transport industry and increases its competitiveness.

3. The modular system will provide the possibility of including information systems operated by external contractors in the ULIS. Assigning profiles to ULIS participants will ensure the security of their work in the system and will lead to a reduction in the risks of participants both in working in the system and in the general organization of logistics processes. The ability to organize business management in ULIS will reduce the communication costs of enterprises, such as using mobile communications, information resources of other companies, building their own information architecture. ULIS will provide participants with the opportunity to work in real time with the organization of direct dialogue of the participant - participant, participant - group, group - group type.

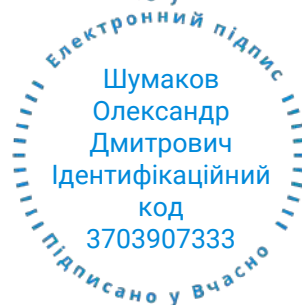
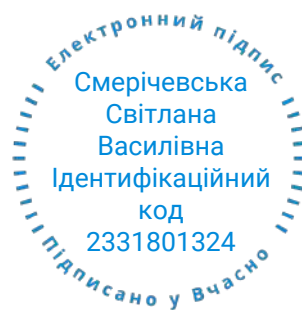
4. Intelligent components of the system will provide assistance in organizing production in transport in the form of information about the condition of the cargo or vehicle during movement, deployment, passing customs and other types of control, the degree of vehicle occupancy, the amount of fuel, the condition and health of the driver. Thanks to intellectualization, predictive processes will be carried out, auxiliary management advice will be provided in the system, the search for optimal solutions for optimizing routes based on the data of each participant, transportation planning, control of transportation execution, accounting of cargo in warehouses of enterprises. Timely informing customers about problem situations that have arisen during the implementation of logistics operations will help in finding solutions. The unification of warehouse management systems, supplies, financial, monitoring, analysis, communication of participants, unified document flow and search services in the ULIS forms a holistic information product.

5. For the implementation of ULIS, cloud technology based on Microsoft Dynamics NAV is proposed for implementation - as an integrated enterprise management system (for medium and small businesses). The system is functional for both the external and internal environment. For the internal environment of the DiFFreight company, it provides the opportunity to connect regional representative offices, warehouses into a single system, which significantly increases the manageability and efficiency of activities, i.e. creates an internal information space for managing flow interaction.

For the external environment - it provides the opportunity to connect its activities with the activities of counterparties, based on the B2B and B2C platforms, i.e. building an external information space for managing flow interaction. In synergy, they form a single logistics information space.

6. So, the creation of the basic version of the program takes about 1.5 months and costs 52,600 UAH. To increase the functionality of the system, it is proposed to order access to other modules. Access to the system modules for 1 access point per month

costs 790 UAH. It is planned to take 5 access points. Investment costs will increase by 47,400 (5 access points for 12 months). These costs will constitute the annual costs of the investment project. The assessment of the economic efficiency indicators of the project shows the feasibility of its implementation. The payback period of the project at a discount rate of 18% is 3 years and 11 months. The internal rate of return is 19%.



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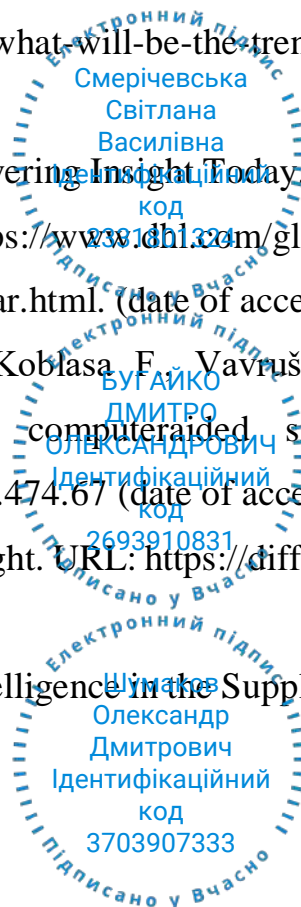
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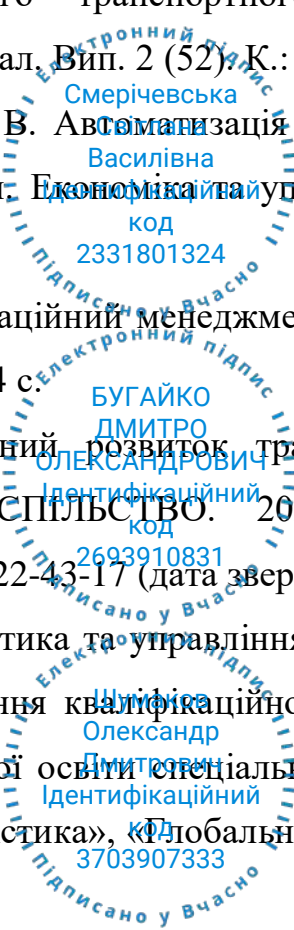
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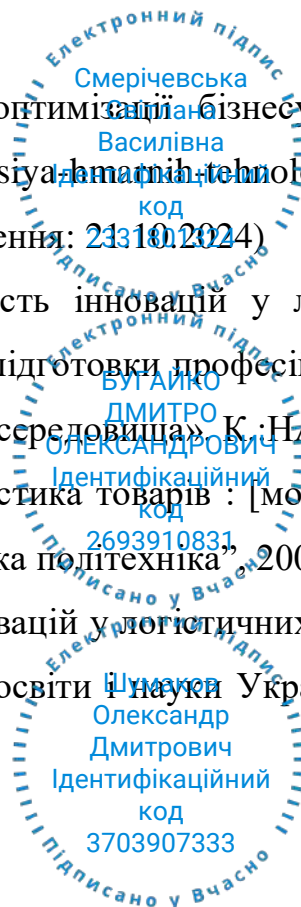
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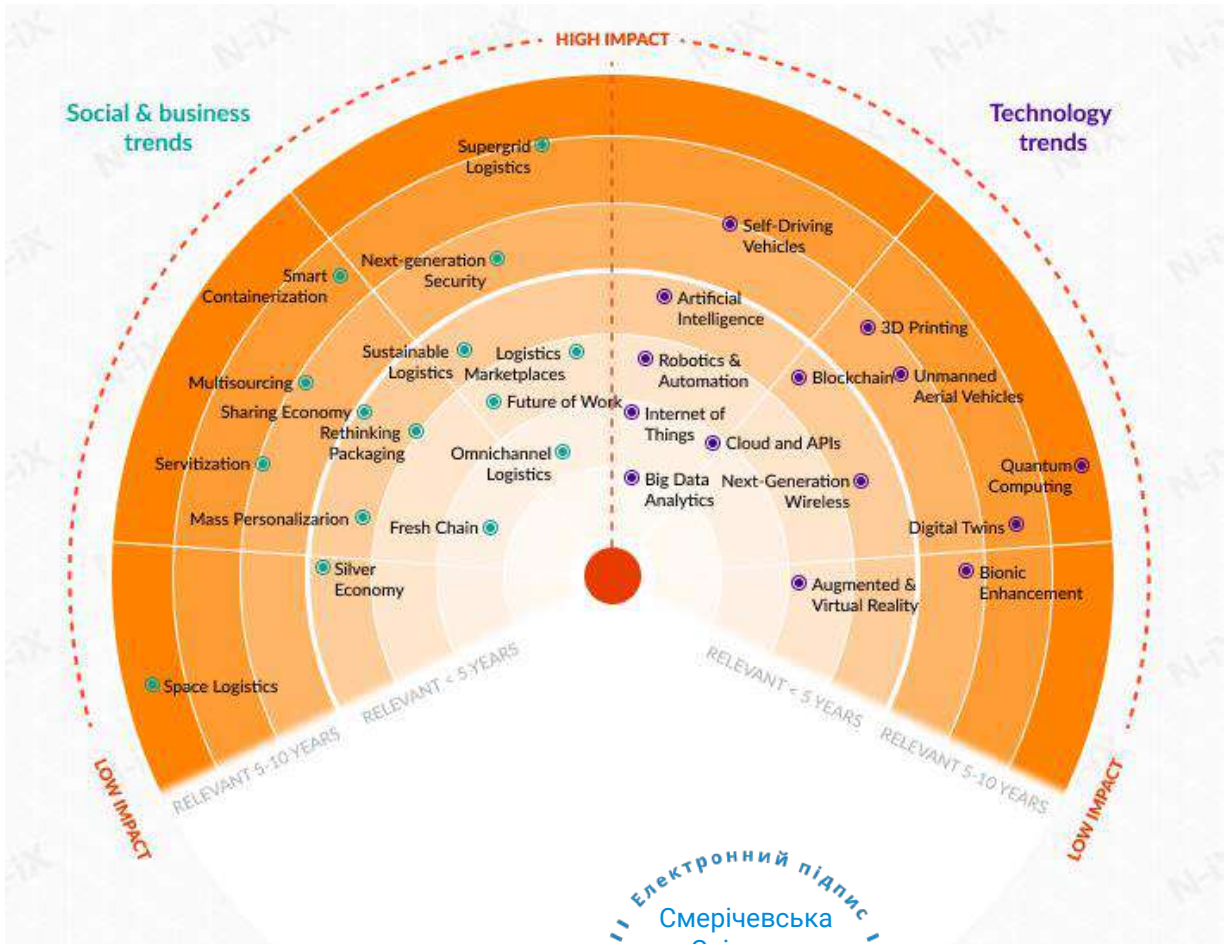


Figure A.1 –Trend Radar developed by DHL

Електронний підпис
Смерічевська
Світлана
Василівна
Ідентифікаційний
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Підписано у Вчасно

Електронний підпис
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ДМИТРО
ОЛЕКСАНДРОВИЧ
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Електронний підпис
Шумаков
Олександр
Дмитрович
Ідентифікаційний
код
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Підписано у Вчасно

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Документ підписано у сервісі Вчасно (продовження)
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Документ отримано: 10:59 25.11.2024

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11:01 25.11.2024

Ідентифікаційний код: 3703907333

Шумаков Олександр Дмитрович

Власник ключа: Шумаков Олександр Дмитрович

Час перевірки КЕП/ЕЦП: 11:01 25.11.2024

Статус перевірки сертифікату: Сертифікат діє

Серійний номер: 382367105294AF9704000000246858008D00A802

Тип підпису: кваліфікований

Електронний підпис

11:13 25.11.2024

Ідентифікаційний код: 2693910831

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Власник ключа: БУГАЙКО ДМИТРО ОЛЕКСАНДРОВИЧ

Час перевірки КЕП/ЕЦП: 11:13 25.11.2024

Статус перевірки сертифікату: Сертифікат діє

Серійний номер: 5E984D526F82F38F040000008C07660190E71E05

Тип підпису: удосконалений

Електронний підпис

12:39 25.11.2024

Ідентифікаційний код: 2331801324

Смерічевська Світлана Василівна

Власник ключа: Смерічевська Світлана Василівна

Час перевірки КЕП/ЕЦП: 12:39 25.11.2024

Статус перевірки сертифікату: Сертифікат діє

Серійний номер: 382367105294AF97040000002F7F1100B35EDB01

Тип підпису: кваліфікований