

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
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APPROVED
Acting Head of the Department
Svitlana SMERICHEVSKA
(signature, name and surname)
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QUALIFICATION PAPER

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«BACHELOR»

THEME: «Digitization of processes in postal logistics»

Speciality 073 «Management»

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Done by Slobodskyi Nikita
(surname and name) (signature, date)

Supervisor Pozniak Oksana
(surname and name) (signature, date)

Standards Inspector Pozniak Oksana
(surname and name) (signature, date)

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

Nikita SLOBODSKYI
(signature) (name and surname)

Kyiv 2024

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
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Кафедра логістики

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«Авіаційна логістика»

(шифр і назва)

Здобувач:

Слободський Нікіта Олегович

(прізвище, ім'я та по батькові)

(підпис, дата)

Науковий керівник:

Позняк Оксана Володимирівна

(прізвище, ім'я та по батькові)

(підпис, дата)

Нормоконтролер:

Позняк Оксана Володимирівна

(прізвище, ім'я та по батькові)

(підпис, дата)

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(підпис)

Нікіта СЛОБОДСЬКИЙ
(власне ім'я та прізвище здобувача)

Київ 2024

NATIONAL AVIATION UNIVERSITY
Faculty of Transport, Management and Logistics
Logistics Department

Academic Degree Bachelor

Speciality 073 «Management»

Educational Professional Program «Aviation Logistics »

APPROVED

Acting Head of the Department

Svitlana SMERICHEVSKA

(signature, name and surname)

«13» May 2024

TASK

FOR COMPLETION THE QUALIFICATION PAPER OF GRADUATE

Nikita Slobodskyi

(name and surname)

1. Theme of the qualification paper: «Digitization of processes in postal logistics» was approved by the Rector Directive №624/ст. of April 24, 2024.
2. Term performance of the paper: from May 13, 2024 to June 16, 2024.
3. Date of submission paper to graduation department: June 03, 2024.
4. Initial data required for writing the paper: general and statistical information about postal operator JSC «Ukrposhta», information of the company, production and financial indicators of the company, literary sources on logistics and supply chain management and internal transportation, Internet source.
5. Content of the explanatory notes: introduction; the essence of digital transformation of postal logistics; digital technologies in postal logistics, analysis of activity of JSC «Ukrposhta»; general description and analysis of the production and financial indicators of JSC «Ukrposhta», analysis of the digitalization of processes; development of a project for the digitalization of postal logistics processes for JSC «Ukrposhta» based on blockchain technology; evaluation of efficiency of project proposals; conclusions and recommendations.
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	13.05.24-16.05.24	Done
2.	Collection of statistical data, timing, detection of weaknesses, preparation of the first version of the analytical chapter	17.05.24-20.05.24	Done
3.	Development of project proposals and their organizational and economic substantiation, preparation of the first version of the project chapter and conclusions	21.05.24-26.05.24	Done
4.	Editing the first versions and preparing the final version of the qualification paper, checking by standards inspector	27.05.24-29.05.24	Done
5.	Approval for a work with supervisor, getting of the report of the supervisor, getting internal and external reviews, transcript of academic record	30.05.24-31.05.24	Done
6.	Submission paper to Logistics Department	03.06.24	Done

Graduate _____
(signature)

Supervisor of the qualification paper _____
(signature)

8. Consultants of difference chapters of paper:

Chapter	Consultant (position, surname and name)	Date, signature	
		The task was given	The task was accepted
Chapter 1	Associate Professor, Poznyak O.	13.05.24	13.05.24
Chapter 2	Associate Professor, Poznyak O.	17.05.24	17.05.24
Chapter 3	Associate Professor, Poznyak O.	21.05.24	21.05.24

9. Given date of the task May 13, 2024.

Supervisor of the qualification paper: _____ Oksana POZNIAK
(signature of supervisor) (surname and name)

Task accepted for completion: _____ Nikita SLOBODSKYI
(signature of graduate) (surname and name)

ABSTRACT

The explanatory notes to the qualification paper «Digitization of processes in postal logistics» comprises of 134 pages, 37 figures, 27 tables, 62 references and 5 appendixes.

KEY WORDS: BLOCKCHAIN TECHNOLOGY, DIGITALIZATION, POSTAL LOGISTICS, POSTAL SUPPLY CHAIN

The basic principles of digitalization of processes in postal logistics are considered in the qualification paper.

The theoretical part devoted to the investigation of theoretical basics of digitalization in postal logistics. The analytical part is conferred to the analysis of financial and economic activity of Joint Stock Company «Ukrposhta» and to identify the bottlenecks in business processes of postal supply of chain in case of using information technologies.

The project and recommendation part dedicated to development of conceptual model of digitalization of the logistics process management system in the postal chain of JSC «Ukrposhta» and evaluation of efficiency of implementation the blockchain technologies.

The subject of the qualification paper is a set of theoretical, methodological and practical aspects of increasing the efficiency of the postal operator JSC «Ukrposhta» through the implementation of digital technologies.

The object of the qualification paper is the logistics system of the postal operator JSC «Ukrposhta», which includes all stages of processing, transportation and delivery of postal items in Ukraine and abroad.

Materials of qualification paper are recommended to be used during scientific research, in the educational process and in the practice of specialists of logistics departments.

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NOTATION

AI	– Artificial Intelligence;
API	– Application Programming Interface;
AR	– Augmented Reality;
EMS	– Express Mail Service;
ERP	– Resource Planning System;
ESG	– Environmental, Social, and Corporate Governance;
GDP	– Gross Domestic Product;
GPS	– Global Positioning System;
GTD	– Global Trade Digitization;
IoT	– Internet of Things;
JSC	– Joint Stock Company
LMS	– Logistic Management System
OMS	– Order Management Software
PCP	– Postal Chain Planning
RFID	– Radio Frequency Identification
TMS	– Transport Management System
WMS	– Warehouse Management System
YMS	– Yard Management System

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INTRODUCTION

The relevance of qualification paper lies in the fact that in today's world, where speed and accuracy are key factors in successful business, digitization of processes in postal logistics is gaining critical importance. Postal services are faced with growing volumes of shipments due to the development of electronic commerce, which requires new approaches to the management of logistics processes. Digitalization allows not only to increase efficiency, but also to ensure transparency and control at all stages of the logistics chain.

The growth of e-commerce has significantly increased the volume of postal shipments. Companies that carry out online trade need fast and reliable delivery of their goods to the end consumer. Digitization of processes in postal logistics helps to optimize work and ensure high quality of customer service. Traditional methods of managing postal logistics processes are often inefficient and time-consuming. The introduction of digital technologies allows to automate many routine tasks, reducing time and resource consumption. This includes the automation of sorting, tracking and delivery management.

Thus, the digitalization of processes in postal logistics is not only relevant, but also a necessary step to ensure the efficient and reliable operation of postal services in the conditions of the modern market. The introduction of digital technologies makes it possible to optimize processes, improve the level of customer service, reduce costs and make postal logistics more environmentally responsible. This contributes not only to increased competitiveness, but also to the sustainable development of the industry as a whole.

The issues of research into the efficiency of postal operators and courier services were considered in their scientific works by such Ukrainian scientists as: Bury E.P., Burtova A.O., Zakharenko-Seleznyova A.M., Sokyрко O.S., Shepylenko V.Yu., Taranenko O.S.. Research can also be seen in the scientific works of foreign authors: Arlandis A., Borsenberger C., Certa M., Schröder T., Chidepatil A., Sankaran K.,

Iminova N., Xamidullayev B., Rozikin Z., Putra S. P., Sengazani Murugesan V., Sequeira A.H., Jauhar S.K., Kumar V.

In turn, the issues of business process automation, theoretical and practical aspects of digitalisation have been considered in their scientific works by such domestic scholars as: Smerichevska S.V., Poznyak O., Voskanyan Z.A., Hlibova A., Vasylichenko M., Ivanov Yu., Demchenko E., Dorosh A., Skovron I., Balanov V., Koroliuk T.M., Mazurenok, O.R., Malyar E.O., Mukharovska I.O., Chuprina M.O., Negoda A.V., Orekhova T.V., Dubel M.V., Savenko I., Kucherenko V., Nikita T., Taranenko . Also, the issue of digitalization of the activities of postal operators was studied by foreign authors such as: Jaag C., Telukdarie A., Dube T., Matjuta P., Philbin S., Zdolsek Draksler T., Cimperman M., Obrecht M., Zhou H., Wang Q., Wang L., Zhao X., Feng, G. and others.

However, issues of digitization of domestic postal and courier services remain insufficiently covered.

The purpose of the qualification paper is to study the theoretical foundations of postal logistics and develop recommendations for the implementation of digitization of processes in postal logistics to increase the efficiency, reliability, and quality of services, as well as reduce costs and ensure the sustainability of the JSC «Ukrposhta».

The main tasks, the solution of which is necessary to achieve the purpose of the qualification paper are:

- to investigate theoretical basics of digitalization of processes in postal logistics;
- to provide a general characterisation of JSC «Ukrposhta»;
- to analyse the company profile of JSC «Ukrposhta» and the main types of activities;
- to describe the competitive environment of the functioning of JSC «Ukrposhta» on the market of postal services in Ukraine;
- to analyse the management structure, organizational structure of the company;
- to conduct an analysis of the main production and financial indicators of JSC «Ukrposhta» for the years 2021 - 2023;

- to provide practical recommendations on determining the main directions and prospects for solving the problem of digitalization of the postal operator JSC «Ukrposhta».

The object of the qualification paper is the logistics system of the postal operator JSC «Ukrposhta», which includes all stages of processing, transportation and delivery of postal items in Ukraine and abroad.

The subject of the qualification paper is a set of theoretical, methodological and practical aspects of increasing the efficiency of the postal operator JSC «Ukrposhta» through the implementation of digital technologies.

The theoretical and scientific-methodological basis of the qualification paper is the fundamental provisions of management, logistics and supply chain management. In the process of research, the following methods and approaches were used as: analysis and synthesis, generalization, grouping, tabular and graphical methods, statistical analysis, comparative analysis, methods of marketing research, economic analysis, SWOT analysis methods, methods of optimizing logistics system parameters and implementation of project solutions, graphic - visualization of the results of identification of the main technological trends of the postal operator.

Materials of qualification paper are recommended to be used during scientific research, in the educational process and in the practice of specialists of logistics departments.

CHAPTER 1

THEORETICAL BASICS OF DIGITALIZATION OF PROCESSES IN POSTAL LOGISTICS

1.1. The essence of digital transformation of postal logistics

The growth of e-commerce and online shopping leads to an increase in the volume of parcels that need to be delivered. Postal logistics is an important element in the e-commerce ecosystem, as it ensures the delivery of goods from sellers to buyers. The demand for postal logistics services continues to grow, which supports its relevance.

In turn, the globalization of the economy contributes to the growth of international trade. Goods are ordered and shipped all over the world, which requires efficient postal logistics to transport these goods across borders. International logistics services, such as customs clearance and freight transportation, are key components of international postal logistics.

These roles of postal logistics help ensure efficient, reliable and fast delivery of postal items, which is of great importance to many sectors of the economy and people's daily lives.

The analysis of regulatory documents of Ukraine allows us to recognize the following definitions used in the field of postal logistics.

Thus, in the Law of Ukraine «On Postal Communication» Article 1. «Definition of Terms» the following terms and definitions are presented [1]:

- postal operator – a business entity that operates on the territory of Ukraine and provides postal services in accordance with the procedure established by law;
- courier service – a postal service for the forwarding of a postal item, which is received from the sender and/or delivered to the addressee outside the postal facility;

- international postal item – postal item accepted for forwarding outside of Ukraine, delivered to Ukraine or moved through the territory of Ukraine in transit by postal operators;

- postal services – activities of the postal operator in the reception, processing, transportation and delivery (handover) of postal items, including by providing courier services defined by this Law, the execution of user instructions regarding postal transfers, aimed at meeting the needs of users.

It is also worth noting Article 15, which regulates the basic procedure for providing postal services. Thus, in accordance with this article, postal operators provide users with postal services in accordance with the law and may conduct other economic activities in accordance with the procedure established by law.

Also, a postal operator may engage a network of branches and/or postal offices of another postal operator on a contractual basis to provide postal services. Postal operators must publicly announce the conditions of access to their own network of branches and/or postal offices, adhering to the principles of transparency, objectivity, and non-discrimination.

Postal services are provided on a contractual basis in accordance with the rules for providing postal services approved by the Cabinet of Ministers of Ukraine.

Analysing the logistical component of this law, attention is drawn to Article 25 «Vehicles of postal communication», according to which postal operators use their own vehicles for the transportation of mail, as well as vehicles of other individuals and legal entities on a contractual basis.

Transportation of postal items by road, sea, inland water, rail and air transport is carried out on a contractual basis in accordance with the legislation.

But it is worth noting that the Law «On Postal Communications» [1] does not contain any mention of postal logistics except for Article 25, which defines the concept of the essence of the concept of transport of postal items.

However, already in the «Universal Postal Convention», which was approved by the decree of the President of Ukraine dated 10.10.2017 No. 316/217 in Article 16

«EMS and integrated logistics», there are the first mentions of the logistical component of postal shipments [2].

In accordance with Article 25 of the «Universal Postal Convention», member countries or designated operators may agree among themselves to participate in such services as described in the Regulations [2]:

1. EMS, which is an express postal service for documents and cargo, and where possible, the fastest postal service using physical means. This service may be provided on the basis of a multilateral standard EMS agreement or bilateral agreements;

2. Complex logistics, which is a service that fully meets the needs of customers in the field of logistics and includes the stages that precede and follow the physical transportation of goods and documents.

The issues of international postal logistics were repeatedly raised at international conferences and studied by domestic scientists. In particular, Gnylianska L., Budynskyi R., Yurchyk A. (2024) in article «Development of Ukrainian-Chinese postal logistics in today's conditions» [7] believes that postal logistics is specific in that communication services are an integral part of human physical essence. With the help of such services, an appropriate form of human communication is established.

Draksler T.Z., Cimperman M., Obrecht M. (2023) emphasize the means of communication in the social sphere, emphasizing their significant role. Namely, in overcoming territorial distance, in solving problems of both a domestic and social nature, in saving time. They emphasize that with the development of postal logistics and, in particular, the availability of means of communication, the conditions of information and sociability of society have improved. The focus of their research is the development of a new business model based on precise process optimization for real-time dynamic postal logistics 4.0. [41, pp. 1-19].

In turn, Šulentić T., Rakić E., Mostarac K., Kavran Z. (2022) in their publication «ESG management the main factors of sustainable business in the postal logistics sector» emphasize sustainable development postal operators, along with globalization, e-commerce and digitalization. They note that this is one of the main trends in business development, which is based on three main factors: the environment – «green»

business; Social – Socially responsible business; Governance – Corporate Governance (ESG). With the recommendations of the digitalization of the postal logistics business, this leads to the transformation of the business into a «smart» business for a sustainable future [56].

Nagy P.E., Bányai T. (2023) in publication «Improving the Logistics of Institutional Postal Services» describe postal services that are often considered by various institutions as backup services. In particular, they point to the main regulatory elements and logistical processes of institutional postal services, and also describe some critical remarks, focusing on three main areas: optimization of the location of institutional postal services facilities, the lack of use of modern technologies and the lack of modern administrative tools. Based on this criticism, the authors identify recommendations for improving institutional postal services. With regard to the task of optimizing the placement of objects, a mathematical model and an optimization algorithm for evaluating the efficiency of logistics processes of delivery services are described [50, pp. 5-23].

In modern conditions, one can pay attention to the works of Karpil O.P. and Mykhailyk N.I. (2023) in «Trend analysis of logistics services in the postal communication market» [46, pp. 99-107], in which the authors performed a trend analysis of logistics services in the postal communication market. Systematized the main logistics services in the postal market, which include: collection and sorting, transportation, tracking, special handling services, storage, return processing, special services for business, etc. The study takes into account the formed key trends in the delivery of goods in the expectations of buyers: predictability and speed.

Thus, according to the analysis of the main definitions in the field of postal shipments, the following definition of postal logistics can be given [7, 41, 42, 46, 47, 50, 55-57].

Postal logistics is a branch of logistics responsible for the management and organization of transportation, sorting, delivery and distribution of postal items. It deals with all stages of the postal process, starting from receiving the shipment from the sender and ending with its delivery to the addressee.

Considering the essence of logistics services in the postal market, the authors Karpil O.P. and Mykhailuk N.I. (2023) [46] highlight: collection and sorting, transportation, tracking, special handling services, storage, return processing, special services for business, etc. (fig. 1.1).



Figure 1.1 – Logistics services in the postal market [46, P. 101]

Source: [46, P. 101]

Gnylianska L., Budynskyi R., Yurchyk A. (2024) give analogies of logistics operations for the production of products and for the forwarding of postal units, which are presented in the table 1.1 [7].

As can be seen from the table 1.1 the main difference between general logistics and postal logistics is the specific application area and focus. Logistics includes a wide range of supply chain management activities, while postal logistics specializes in optimizing and managing the flow of mail and providing related postal services.

It is worth noting that postal logistics can be considered as a subcategory of general logistics, specialized in a specific sector (postal services), but general logistics can have a wider scope and application in various industries and sectors of the economy.

Thus, postal logistics includes effective planning, coordination and execution of all these processes in order to ensure fast and reliable delivery of postal items. It is of great importance to postal services, e-commerce and many other industries.

Khrutba Yu. S., Paranich P. G., Idziev T. B. (2020) in their article «The current state and peculiarities of the development of the logistics services market in Ukraine»

point out that the domestic market of logistics postal services is closely related to the development of electronic trade. They note that the growth of trade volumes via the Internet at the level of 25–35% over the past few years forced the market of logistics services to offer completely new services for Internet business (table 1.2) [33, pp. 129–136].

Table 1.1 – Analogies of logistics operations for the production of products and for the forwarding of postal units

Logistics operations for the production of products	Logistics operations for forwarding postal units
Procurement of raw materials, semi-finished products and materials	Production of products for the technological support of postal communication, postage stamps, postal envelopes, postal cards, postal forms, packaging, containers
Production of products	Extraction of written correspondence from mailboxes, reception, processing, sorting, consolidation, packing of postal units, forwarding of periodicals
Accumulation of products	Incoming, outgoing, transit accumulation of postal units and periodicals
Product storage	Preservation of postal items and periodicals
Distribution of products	Transportation of postal items and periodicals
Sales of products	Delivery (delivery) of postal items and periodicals to consumers
Synchronization of production operations	Synchronization of processing and transportation of mail units
Ensuring the regulatory deadlines for production of products	Ensuring regulatory deadlines for forwarding postal items

Source: [7, P. 2]

Yu. S. Khrutba, P. G. Paranich, T. B. Idziev (2020) mention that the rapid development of e-commerce has led to the growth of competition between traditional and new formats of sales of goods and postal services, which prompts companies to constantly search for new logistics solutions regarding forms and terms of delivery, packaging of consumer orders, inventory management, storage and distribution of goods [33, P. 134].

The analysis of the research makes it possible to determine that for the further development of the field of postal services, it is necessary to solve a set of mutually coordinated following tasks:

- creation of favourable conditions for entrepreneurial activity in the postal services sector;
- creating an economic and legal environment;
- involvement of the community in active participation in determining the priority areas of growth of the postal services market;
- further development of the commercial system of information support for business activities of postal operators;
- application of the partnership mechanism to stimulate the development of promising types of activities in the field of postal services;
- implementation of measures in the field of investment policy and promotion of innovative investment of enterprises;
- support in the future on an appropriate scientific basis for the development of network and cluster structures directly related to the service nature of postal services.

Table 1.2 – Types of logistics services for Internet business

Name of the service	Segment	Complex of services	The main players
Express delivery of goods	B2B segment	Can provide both classic transport and forwarding services, as well as customer-oriented individualized solutions that create additional convenience and benefits for customers	Ukrposhta, Nova Post, Delivery, Mist express, "In-time" and others
Courier delivery	Mostly B2C segment	Delivery of correspondence or goods in the shortest possible time	DHL, FedEx, TNT, UPS
Postal logistics	Mostly C2C segment	Delivery of letters, packages and parcels	Ukrposhta and private postal operators
Fulfilment	A separate segment of warehouse services for online stores	It provides for the provision of a high level of organization of technological processes in customer order processing centres	Nova Post, ZAMMLER, Raben, Mist Express, Denka Logistics, FM logistic
Direction of sharing economy	The service works mainly in the C2C segment, but there are already attempts to introduce such a service in the B2C and B2B segments	An online platform for connecting cargo owners and carriers performing long-distance and international transportation, and allows you to quickly and conveniently choose a carrier	-

Source: [33, P. 133]

Solving transport problems of postal operators, it is necessary to use theoretical and methodological achievements in the field of logistics services. However, it is important to apply not only existing achievements, but also to develop your logistics strategy and define its main principles.

For Ukraine, the accelerated development of Internet business in the logistics activities of postal operators is relevant. This activity is a serious potential for increasing the export of postal items of Ukraine and therefore deserves priority attention. A significant expansion of Ukraine's participation in world trade in services requires the development of an appropriate activity strategy in the system of the international division of labour. The implementation of the strategy of the transition of the service sector to the innovation-investment model of development will make it possible to activate all types of economic activity in the production and implementation of services and will become one of the components of the country's economic security.

According to the study «Polish Foundation for International and Rational Studies: Digital Transformations in Ukraine», today Ukraine has formed a strategy for the digital transformation of Ukraine, which was presented in the document «Digital Transformations of Ukraine» (2021) [34]. It states that during the last 4-5 years, the digitalization of the economy and society will become one of the priorities within the framework of this policy and will continue to hold the attention of the main stakeholders both from the EU and in the middle of most countries of the Eastern Partnership region. Supporting a sustainable digital transformation is one of the five policy priorities highlighted by the European Commission in its proposal on the long-term policy objectives of the Eastern Partnership [34, P. 6].

On May 22, 2019, the European Union officially launched a new program in Ukraine, EU4Digital: supporting the digital economy and society in the Eastern Partnership. EU4Digital aims to extend the benefits of the European Union's Single Digital Market to Ukraine and other Eastern Partnership countries to stimulate economic growth, create jobs, improve people's lives and help businesses.

In the section «Trends and institutional prerequisites of digital development in Ukraine» of the «Digital transformations of Ukraine» concept, Ukraine has identified

digital transformation as a priority policy, which has already been marked by the successes recognized among the European expert community in the implementation of the «ProZorro» and «e-Health» systems, in the implementation 4G mobile coverage and the launch of electronic services in the public and private sectors [34, P. 7].

The newly created Ministry of Digital Transformation of Ukraine has set the following goals until 2024:

- 100% of public services must be available to citizens and businesses online;
- 95% of transport infrastructure, settlements and their social facilities must have access to high-speed Internet;
- 6 million Ukrainians should be involved in the digital skills development program; - the share of the IT product in the country's GDP should be at least 10%.

Other state institutions that play an important role in the processes of digital transformation of Ukraine include [34, P. 13]: Ministry of Economic Development, Trade and Agriculture of Ukraine; Ministry of Education and Science of Ukraine; Ministry of Health of Ukraine; Ministry of Infrastructure of Ukraine; The National Commission, which carries out state regulation in the field of communication and informatization; State Service for Special Communications and Information Protection; State Customs Service of Ukraine; National Health Service of Ukraine; National Bank of Ukraine; Security Service of Ukraine; Cyber Police Department of the National Police of Ukraine; State enterprise «Diya»; State Enterprise «Electronic Health».

Analysing the European regulations regarding digital transformation indicated on the official website of the European Union, in the section «Joint Communication: Eastern Partnership policy beyond 2020», they include the process of introducing technologies and digital solutions into the business sphere in order to improve efficiency, innovation and competitiveness. It is a strategic approach to transform traditional work methods, operations and business models using modern information technologies [51].

Otsetova A. (2019) in the article «Digital transformation of postal operators - challenges and perspectives» highlights the following components of influence on the digital transformation of postal operators' business, that presented in fig. 1.2 [52].

Thus, the digital transformation of the postal sector encompasses the adoption of digital tools such as cloud computing, the Internet of Things (IoT), artificial intelligence (AI), data analytics and process automation. It can change the way you interact with customers, manage supplies, optimize business processes and create new digital products or postal services.

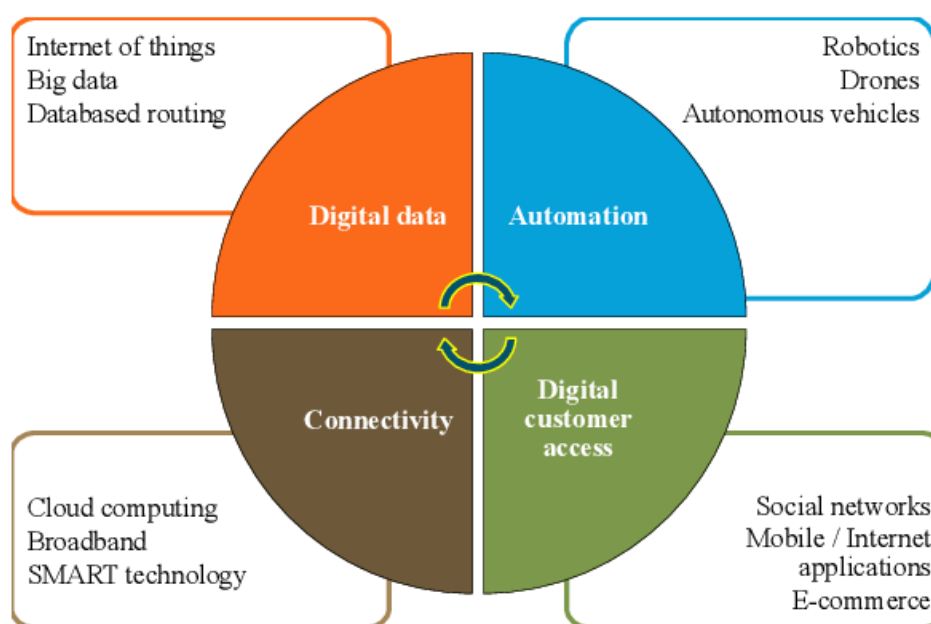


Figure 1.2 – Drivers of digital transformation in postal sector

Source: [52, P. 17]

Modern postal operators, in the context of digital transformation, use digital technologies to transform their operating models and business approaches. They actively implement innovative solutions that enable more efficient collection, analysis and use of data, improve communication with customers, increase automation and optimize internal processes.

The main goal of digital transformation for modern postal enterprises is to become more flexible, competitive and adaptable to the rapidly changing business environment in accordance with Industry 4.0 (Industry 4.0) [44]. Characteristic

features of Industry 4.0 are fully automated productions where management of all processes is carried out in real time and taking into account changing external conditions. Cyber-physical systems create virtual copies of objects in the physical world, control physical processes and make decentralized decisions. They are able to combine into one network, interact in real time, self-adjust and self-learn. An important role is played by Internet technologies that provide communication between personnel and machines. Enterprises produce products in accordance with the requirements of individual customers, optimizing the cost of production (fig. 1.3).

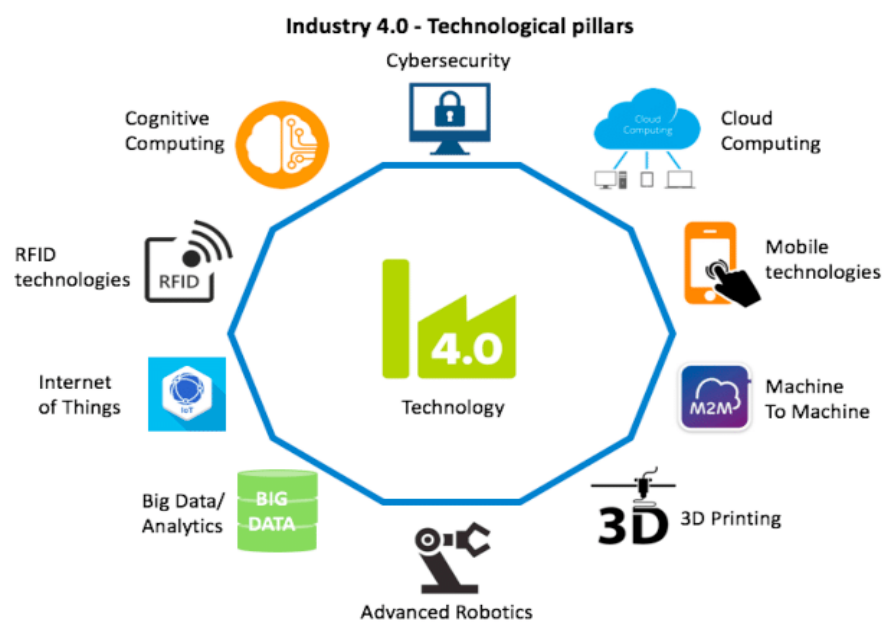


Figure 1.3 – Characteristic features of Industry 4.0 affecting the market of postal services

Source: [44]

Analysis of the above-mentioned regulations and scientific works allows to formulate the following key aspects of digital transformation, as shown in fig. 1.4.

Note, that the role of digital technologies in the development of postal enterprises is extremely important in the modern business environment. They affect various aspects of business, from business processes and work optimization to improving customer interactions and creating new opportunities for growth and innovation.

As the authors Lucia Madleňáková, Radovan Madleňák, Paweł Drożdziel, Ivan Kurtev (2020) note in their work «Layers and processes in the model of technological postal system», one of the key aspects of postal operators is the automation and optimization of business processes [49, pp. 353–360]. In fig. 1.5 presents the logistics chain of providing postal services.

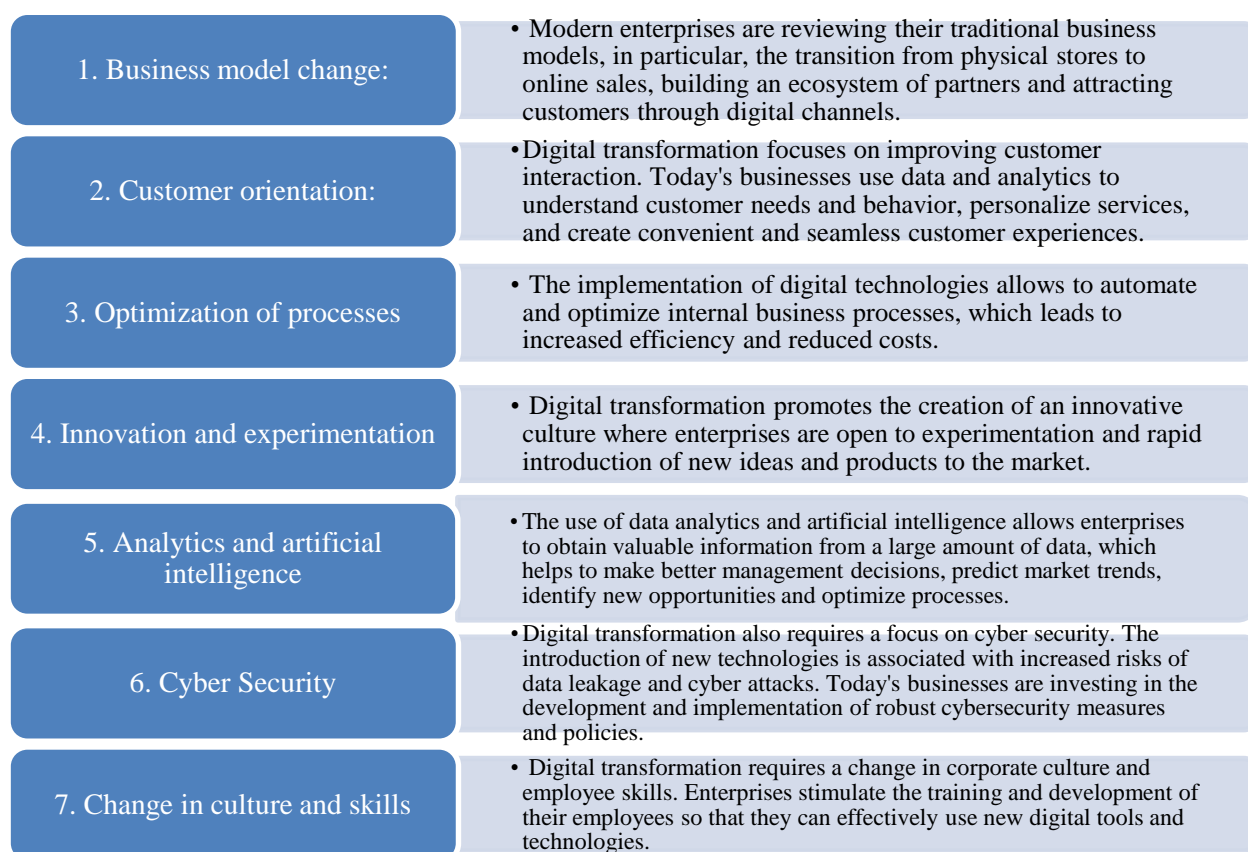


Figure 1.4 – Main aspects of digital transformation of postal operators in Ukraine

Source: developed by author

Digital technologies such as robots, artificial intelligence and machine learning allow businesses to automate routine and repetitive tasks. This reduces time and effort, improves efficiency and accuracy of tasks, and allows resources to be directed to more strategic tasks. For example, the automation of production processes can lead to increased productivity and lower production costs. Data collection and analysis is another important aspect of the role of digital technologies in the development of

enterprises. Data analytics helps identify trends, understand customer needs and behaviour, make predictions, and make informed decisions. The use of machine learning and artificial intelligence tools allows you to build predictive models, recognize patterns and implement personalization depending on customer needs.

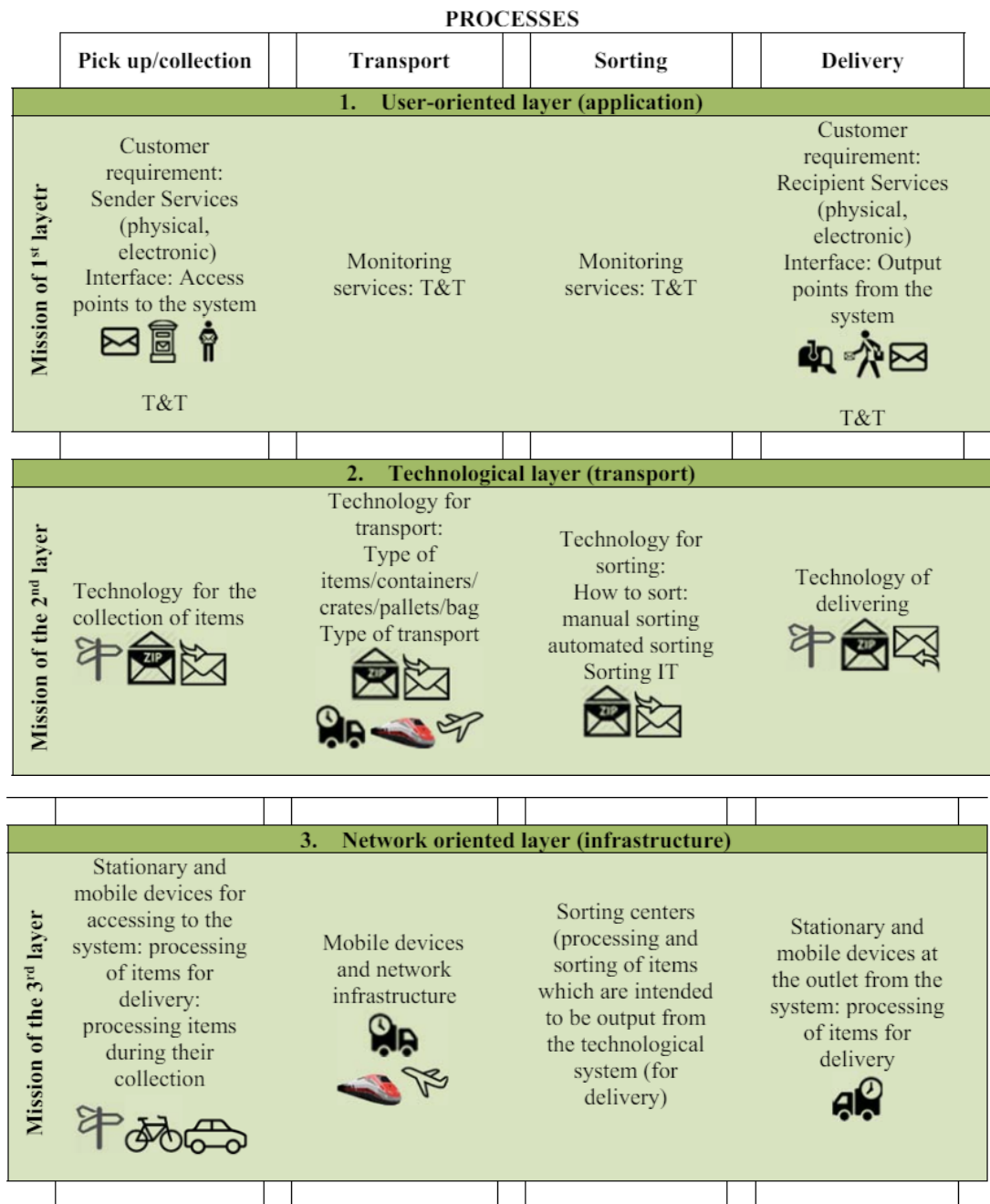


Figure 1.5 – The logistics chain of providing postal services using digital technologies

Source: [49, P. 357]

Therefore, digitization is increasingly entering the sphere of operation of postal operators, especially those that have close contact with consumers. The spread of the Internet to all aspects of life and the change in consumer expectations contribute to and encourage the transformation of business models - from the usual «product» structure to a technological one based on the implementation of a digital strategy and the formation of new management models.

Creating an omnichannel space and synchronizing data and information in all digital and physical channels of interaction is becoming an important task for modern digital business models in order to satisfy the needs of the company's customers at any time and in any place (fig. 1.5).

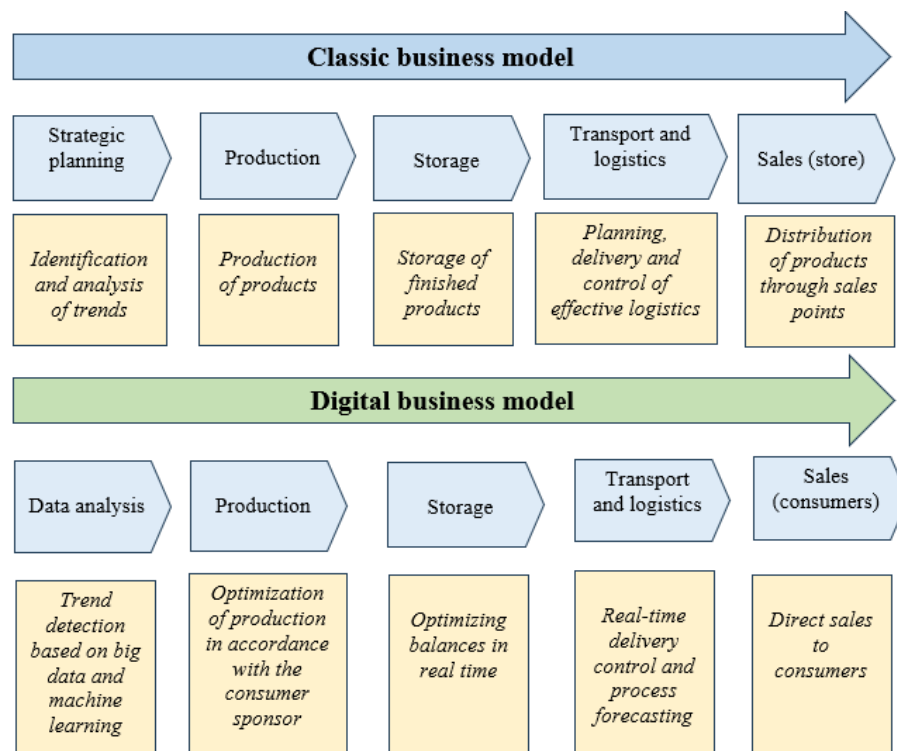


Figure 1.5 – Classic business model vs digital business model

Source: [49]

The effectiveness of the business model is extremely important and has a direct dependence on a clearly defined strategic goal, which must be distributed at certain levels and focused on several aspects: orientation to processes and consumers. The interaction of these aspects in the coexistence and optimal development of processes

will help to achieve a strategic goal, in particular, to obtain profit, ensure the flow of money and intangible assets, organize the company's response to challenges and threats of the external environment and respond to the dynamics of changes in consumer requests and needs.

According to Otsetova A. (2019) the main trends of digitalization of postal operators can be called artificial intelligence, Internet of things, augmented reality, blockchain, smart cities, crowdsourcing, big data, cyber security, crowdfunding, machine learning, definitions of the directions are given in the table 1.3 [52].

Table 1.3. – Main directions of digitalization of postal logistics

Direction	Description
Artificial Intelligence (AI)	Using AI to automate processes, make decisions and improve data analysis capabilities.
Internet of Things (IoT)	Connecting physical devices to the Internet for data exchange and collaboration in order to optimize processes.
Augmented Reality (AR)	An interactive combination of the virtual world with real objects, which allows you to create new ways of perceiving and interacting with information.
Blockchain	A distributed system that ensures the security, transparency and immutability of transactions taking place in the network, without the mediation of centralized organizations.
Crowdsourcing	Engaging a broad group of people to complete tasks, gather ideas, develop products or services using open networks and platforms.
Big data	Collecting, storing and analysing large volumes of data to uncover useful information, identify trends and make decisions based on evidence.
Cybersecurity	Measures and technologies aimed at protecting computer systems, networks and data from intruders and cyber-attacks.
Crowdfunding	Raising funding for projects or ventures by appealing to a broad public of interested people, usually through online platforms.
Machine Learning	The use of algorithms and statistical models to teach computers to perform tasks without explicit programming and to automate decision-making.

Source: [52]

According to the Universal postal union and the «Postal Transport Guide», in fig. 1.6 present the post automation conceptual framework of logistics and supply chain automation system [60].

Summing up, note that the digital transformation of postal logistics consists in the application of modern digital technologies and innovations to optimize and improve processes in the field of postal logistics. The main goal of digital transformation is to improve the efficiency, convenience and reliability of postal services.

From a logistical point of view, digital technologies allow the establishment of real-time postal tracking systems. They allow senders and receivers to check the status and location of their shipment through websites or mobile apps. This increases the level of interaction and promotes trust in postal services.

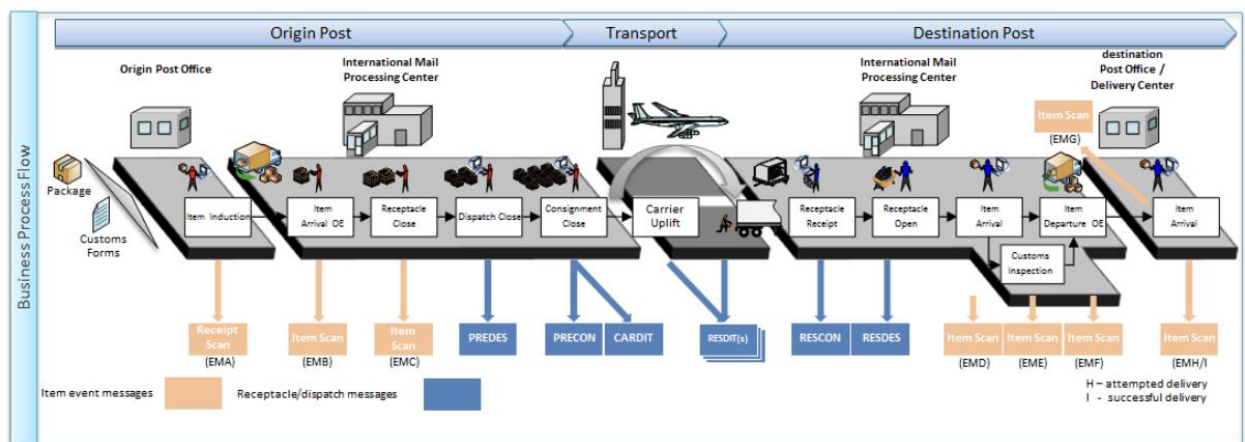


Figure 1.6 – Post automation conceptual framework of logistics and supply chain automation system

Source: [60]

Instead of traditional paperwork, digital transformation allows to switch to electronic document processing. This includes the creation of electronic invoices, delivery documents, reports and other documents that simplify and accelerate the process of information exchange. And sensor technologies, such as RFID tags (Radio Frequency Identification), allow to track the location and status of postal items in real time. This lets improving the accuracy and speed of sorting shipments, as well as providing more accurate tracking of their movement.

The use of data analytics in postal logistics allows you to obtain valuable insights into process efficiency, demand forecasting, optimization of delivery routes, and much

more. Data analytics helps identify patterns, improve processes, and make informed decisions.

The implementation of IoT technologies allows collecting data in real time from various devices and sensors related to postal logistics. This allows you to monitor the condition of the cargo, storage conditions, identify problems and automatically respond to them.

Thus, digital transformation allows for improved communication between all participants in the postal logistics chain, including senders, receivers, couriers, and postal services.

1.2. Digital technologies in postal logistics

Logistics and postal services are an integral part of today's world, where speed and efficiency in the delivery of goods and information are critical. With internet commerce on the rise, as well as with the constant expansion of global logistics networks, the task of logistics operators of companies and post offices is becoming more and more difficult. Accordingly, the need for modern technological solutions to optimize and improve the quality of services becomes more urgent than ever.

The issue of the essence and role of digitization in ensuring the effective operation of the enterprise has been investigated in the works of many Ukrainian scientists. In particular, in scientific research, Gudz O., Fedyunin S. (2019) [9], Dubina M., Kozlyanchenko O. (2019) [12], Drabenko T., Boychuk N. (2020). [11], Korol S., Polovyk E. (2019) [16], Korobka S. (2021) [15], Ustenko M., Ruskikh A. (2019) [31] describe the processes of deployment of digitization to increase competitiveness enterprises. The practical significance of the implementation of digitization as protection against possible force majeure situations is considered in the works of Lazorenko T., Sholom I. (2020) [18].

Korobka S. (2021) claims that the process of digitalization in the conditions of the neo-economy is necessary for the newest enterprises. Such digital innovations are designed to speed up and simplify the work of enterprises with large databases and automate business (both basic and investment, financial and operational) [15]. Equally important is the improvement of communication between customers, partners and suppliers, as well as the interaction of the enterprise between management, employees and divisions.

According to Ustenko M. and Ruskikh A. (2019), the term «digitalization» means a fundamental transformation and penetration of digital innovations into business processes [31], which will improve the functioning of business processes, reduce time and money costs of the enterprise.

Scientists Gudz O., Fedyunin S. (2019) believe that the main goal of implementing digitization at the enterprise is to ensure prompt and comfortable interaction of consumers with business. Among the main factors of the development of digitalization, we can single out [9]: creation of new values, the emergence of modern digital technologies and more demanding consumers (the emergence of new needs, saving time and money), changing the conditions of the external environment.

The rapid implementation of scientific and technical progress at postal enterprises has made it necessary to make digital transformation a priority. Every year, it becomes more and more difficult for a postal operator to become competitive and gain a foothold in the market without the use of artificial intelligence and various services.

The development of means of communication and innovative technologies has become a decisive factor for the introduction of digitalization at the enterprise [19]. The digitization process is the introduction of digital innovations and technologies for the automation and optimization of business processes, as well as the improvement of communication channels between the enterprise and its consumer as a result.

Table 1.4 defines the term «digitalization» offered by various scientists.

Table 1.4 – Definition of the term «digitalization» in scientific sources

Author	Definition
Hudz O., Fedyunin S. [9]	A process based on the capabilities of the IT sphere, the use of communication and information technologies by enterprises to achieve their goals and by transforming essential business processes in ways Their digitalization
Dubina M., Kozlyanchenko O. [12]	A method for converting the original information field into an analogue digital format for accessible use and understanding
Lazorenko T., Sholom I. [18]	A technique for converting information into electronic form, such as converting photographs into images on the screen, or converting paper books into electronic ones.
Lezina A., Borei A. [19]	The process of one-hour development of digital innovations with enhanced customer service and communication systems
Korol S., Polovyk Ye. [16]	The process of creating a system for collecting, analysing and saving data, collecting artificial intelligence, processing large amounts of information, as well as searching for information from the Internet
Korobka S. [15]	Penetration, transformation of digital innovations for automation and optimization of business processes, increased productivity, as well as increased communication interaction with clients

Source: developed by the author based on [9, 12, 15, 16, 18, 19]

As can be seen from the table 1.4, scientists interpret the term «digitalization» as a method of applying, using, translating and transferring information into a digital format; transformation of penetration of digital innovations to optimize business processes; system of storage, collection, analysis and application of artificial intelligence. It is also a process of using, systematizing and processing information in a digital format to improve customer service in a business environment.

However, the development of means of communication and innovative technologies became a decisive factor for the introduction of such a concept at the enterprise. The digitization process is the implementation of digital innovations and technologies for the automation and optimization of business processes, as well as the improvement of communication channels between the postal operator and its consumer as a result.

The latest digital innovations are significantly reducing the overall costs of postal companies by improving their services in the postal industry. At the same time, the productivity of the postal operator also increases, because the implementation of digitalization makes it possible to move to a higher level of management with minimal

effort. Therefore, for the introduction of digital technologies, it is necessary to observe five main stages, which we will present in fig. 1.7.



Figure 1.7 – Stages of developing measures for the digital transformation of business processes

Source: compiled by author based on [16]

Thus, in order to remain competitive in the market, postal operators must create a strategy in which the main goals are to define the application of intellectualization, scientific and technical innovations, and the implementation of digital innovations in the enterprise. Such innovations are aimed at facilitating and speeding up work with a large database of information, ensuring effective cooperation of the enterprise with all its departments, and most importantly - improving work with suppliers and customers.

Given all the above challenges, a large number of postal operators were eventually able to step out of their comfort zone, reorganize their business and introduce digital technologies into it.

Digital technologies play an important role in transforming post offices and improving their services. They allow to solve many tasks related to the efficiency, accuracy and convenience of customer service.

Through these applications of digital technologies, post offices can increase their efficiency, reduce costs and improve customer satisfaction. They are also ready to become more flexible and adaptable in a changing world where demands on logistics and postal services are constantly increasing.

A major application of digital technology for postal operators is mail tracking. IoT-based real-time tracking systems allow both customers and postal services to know the exact location of a shipment throughout the delivery process. This not only gives

customers peace of mind, but also helps identify and resolve potential issues such as delays or losses.

The availability of automated sorting lines is also quite important. After all, robotic sorting systems use computer vision and machine learning technologies to efficiently distribute goods to the right places. This speeds up the process of processing large volumes of parcels and reduces the likelihood of errors.

In their activities, postal operators often use the optimization of delivery routes. With the help of artificial intelligence algorithms and a lot of data about road conditions, traffic and other factors, postal companies can find the most optimal routes for delivery. This reduces fuel costs and shortens delivery time.

Postal operators give a great role to electronic communication and mobile applications. Improved electronic communication allows customers to track the status of their parcels and communicate with the post office using mobile applications. This provides greater convenience and interactivity for customers.

When managing inventory, with the help of AI and analytics, post offices can plan inventory more accurately, reducing the risks of shortages or overstocks.

Through these applications of digital technologies, post offices can increase their efficiency, reduce costs and improve customer satisfaction. They are also ready to become more flexible and adaptable in a changing world where demands on logistics and postal services are constantly increasing.

Digital technologies do open up many opportunities for postal operators, but they also present challenges and challenges. Next consider at some of the main benefits and challenges associated with the application of digital technologies in the field of logistics and postal services (table 1.5).

In general, digital technologies open up new opportunities for postal operators and transform their work. However, to successfully integrate these technologies, it is important to consider the challenges and address their aspects in order to achieve maximum benefit and efficiency.

Table 1.5 – Advantages and challenges of using digital technologies in postal logistics

Advantages of using digital technologies in postal logistics	Challenges of using digital technologies in postal logistics
1. Increased efficiency. One of the main benefits is increased efficiency of processes. Digital technologies allow for the automation of many tasks, reducing the need for manual work and reducing the risk of errors.	1. Cybersecurity. Cybersecurity has now become a major topic for logistics companies and postal services. The growing number of connected devices and increasing volumes of digital data increase the risks of cyber attacks and information leaks.
2. Cost reduction. By optimizing routes, managing inventory and reducing fuel costs, post offices can save money and increase their competitiveness.	2. Staff training. Integrating new technologies requires staff training so they can use these tools effectively. This may require time and resources.
3. Improved customer service. Access to real-time cargo tracking and the ability to interact with customers through mobile applications make service more convenient and interactive.	3. Integration with existing systems. Many post offices have legacy systems that need to be integrated with new digital technologies. This can be a difficult task.
4. Ensuring security and accuracy. The use of blockchain and tracking systems helps prevent loss, theft and counterfeiting, ensuring reliability and accuracy.	4. Cost. Implementing digital technologies can require significant investment and may not always bring immediate returns.

Source: compiled by author based on [9, 11, 12, 16]

Digital technologies have become a key tool for achieving these goals. The Internet of Things (IoT), artificial intelligence (AI), blockchain and other innovations are transforming logistics and postal services, helping to improve their productivity and competitiveness (fig. 1.8).

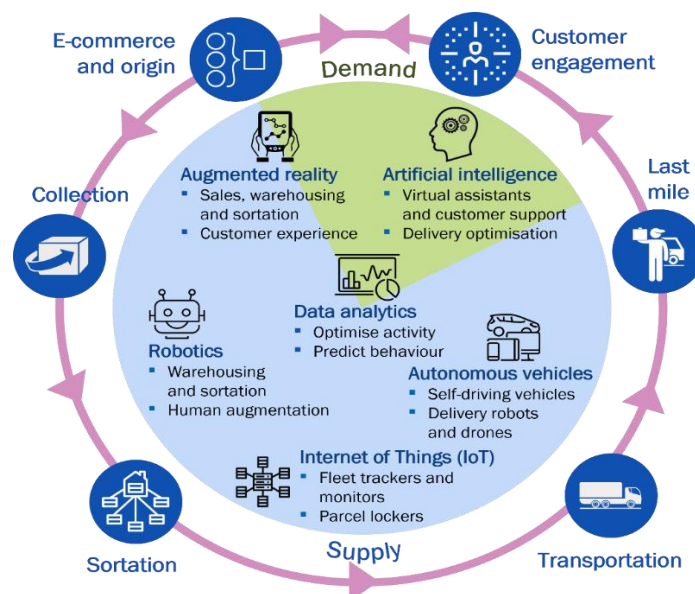


Figure 1.8 – New technologies embedded in the global postal chain

Source: [35]

Otsetova, A. (2019) article «Digital Transformation of Postal Operators – Challenges and Perspectives» highlights the following impact of digital transformation in postal sector, that summarized in fig. 1.9 [52].

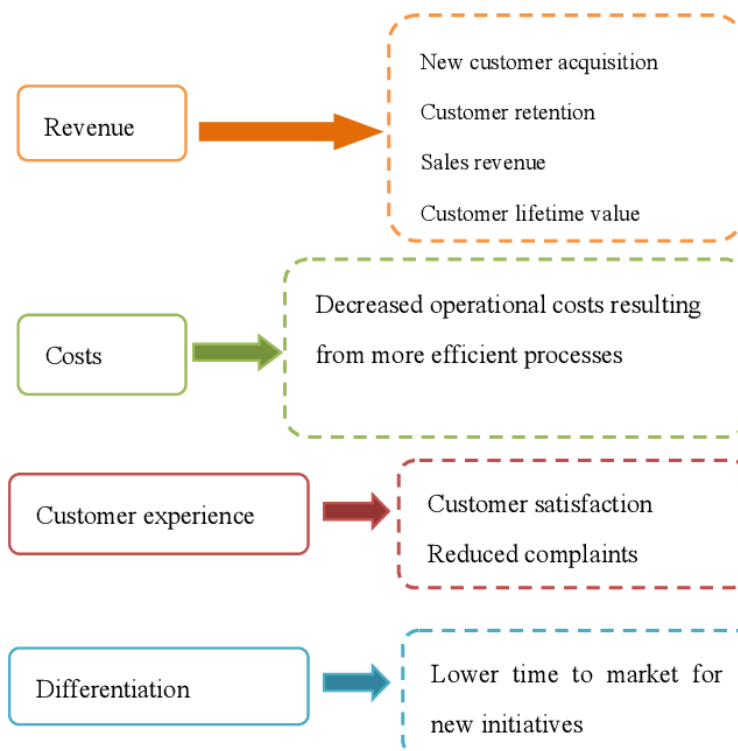


Figure 1.9 – Impact of the digital transformation in postal sector

Source: [52, P. 17]

Thanks to digital transformation, postal networks are becoming increasingly complex, as are the services delivered by them. Customers expect a postal network that scales to their needs, offers innovative digital services and is highly engaging. To meet this challenge, postal operators must embark on the journey to be fully digital.

In connection with dynamic changes in the environment, enterprises are obliged to constantly improve their competitive strategy, which will include automated solutions and the use of innovative technologies. Digitization is becoming a necessary trend, ignoring which will lead to the backwardness of the enterprise, the loss of potential consumers and, as a result, the disappearance from the market. The implementation of digital technologies in business will increase the innovativeness and creativity of a certain type of activity.

Summarizing, it should be mention that digitization is the process of implementing digital technologies, tools and strategies with the aim of optimizing business processes, improving efficiency and achieving competitive advantage.

Therefore, digital technologies are already transforming logistics and postal services today, increasing efficiency and providing better customer service. However, with the benefits come challenges such as cybersecurity and integration with existing systems. For the successful implementation of these technologies, it is important to carefully plan and manage the process. However, digital solutions have the potential to improve the competitiveness and quality of services in the world of logistics and postal operators.

1.3. Chapter 1 summary

The theoretical part of the qualification work is devoted to issues of the basics of digitalization of postal logistics processes. The conducted research allows to draw the following conclusions.

The growth of e-commerce and online shopping leads to an increase in the volume of parcels that need to be delivered. Postal logistics is an important element in the e-commerce ecosystem, as it ensures the delivery of goods from sellers to buyers. The demand for postal logistics services continues to grow, which supports its relevance.

According to the analysis of normative acts, conventions, scientific works of domestic and foreign scientists, it was possible to understand the concept of postal logistics as a branch of logistics responsible for the management and organization of transportation, sorting, delivery and distribution of postal items. Postal logistics deals with all stages of the postal process, starting from receiving the shipment from the sender and ending with its delivery to the addressee.

Considering the essence of logistics services in the postal market, the following were distinguished: collection and sorting, transportation, tracking, special handling services, storage, return processing, special services for business, etc.

In the theoretical part, it was determined that postal logistics includes effective planning, coordination and execution of all these processes in order to ensure fast and reliable delivery of postal items. It is of great importance to postal services, e-commerce and many other industries.

The work examines in detail the components of influence on the digital transformation of postal operators' business, which include the implementation of digital tools such as cloud computing, the Internet of Things (IoT), artificial intelligence (AI), data analytics and process automation. It found that digital transformation can change the way we interact with customers, manage supply, optimize business processes and create new digital products or postal services.

Conducted studies have shown that the main goal of digital transformation for modern postal enterprises is to become more flexible, competitive and adaptable to the rapidly changing business environment in accordance with Industry 4.0.

Thus, the digital transformation of postal logistics consists in the application of modern digital technologies and innovations to optimize and improve processes in the field of postal logistics. The main goal of digital transformation is to improve the efficiency, convenience and reliability of postal services.

CHAPTER 2

ANALYSIS OF DIGITALIZATION OF POSTAL OPERATOR'S PROCESSES

2.1. General characteristics of the Joint Stock Company «Ukrposhta»-subject of the air transportation supply chain

The postal system of Ukraine is a complex economic mechanism. For a long time, postal communication remains one of the key elements of the state's infrastructure and an important mechanism in the functioning of the economy of Ukraine. The problem of analysis of the postal service market and its improvement remains relevant. This is significantly influenced by the rapid digitalization of almost all spheres of the economy and the popularization of orders via the Internet.

JSC (Joint Stock Company) «Ukrposhta» as a national operator ensures the provision of not only universal postal services, the list of which is determined by the government, and the tariffs are approved by the National Communications Regulatory Commission, but also offers consumers more than 50 different types of services [21].

JSC «Ukrposhta» is an enterprise whose founder and shareholder is the state of Ukraine represented by the Ministry of Infrastructure of Ukraine. The activity of «Ukrposhta» is regulated by the Law of Ukraine «On Postal Communications», other laws of Ukraine, as well as regulatory acts.

The company provides postal services, in particular universal postal services throughout Ukraine, with the aim of fully meeting the needs of users in postal services and ensuring the effective development of the unified national postal network of Ukraine.

«Ukrposhta» has been functioning as an independent business unit since 1994, when the Ukrainian Postal Union «Ukrposhta» was formed, which was reorganized in

July 1998 and is currently operating in accordance with the Ukrposhta Restructuring Program.

«Ukrposhta» is a member of the international payment systems Visa and Mastercard, as well as the national payment system «Prostir». The company actively cooperates with the ProZorro system in the field of public procurement and was awarded the «Zakupki. The best». «Ukrposhta» was the first state-owned enterprise to start leasing real estate through ProZorro Sales.

Ukrposhta's partners include the European Investment Bank, the European Bank for Reconstruction and Development, and postal operators in Europe, Asia, and the United States.

«Ukrposhta» today is:

- more than 28,967 postal facilities (as of December 31, 2024): post offices, post offices, mobile, seasonal and island postal offices throughout Ukraine;
- 34,751 employees at the beginning of 2024;
- more than 3,500 cars - it is one of the largest car fleets in Ukraine;
- a wide selection of services for private and corporate clients.

The mission of JSC «Ukrposhta» is to provide consumers with high-quality services in the field of postal communication, financial and other publicly available services, also with the participation of air transport. General information of JSC «Ukrposhta» in figures, in the beginning of 2024 are presented on fig. 2.1.

The main values of the company are a responsible attitude towards each client; ensuring high quality of services; guarantee of reliability and efficiency.

The subject of JSC «Ukrposhta» activity is:

- 1) activities of the national post office: provision of universal postal services throughout the territory of Ukraine, the list of which is approved by the Cabinet of Ministers of Ukraine; issuance, introduction into circulation and organization of distribution of postal payment signs, which include postage stamps, blocks, marked envelopes and cards, as well as their withdrawal from circulation; other postal services, including forwarding of domestic and international mail; sending «Goods by mail»;

forwarding of grouped postal items marked «Consignment»; forwarding «EMS» shipments and others;



Figure 2.1 – Key figures of JSC «Ukrposhta» in 2024

Source: developed by author according to [21]

2) other types of monetary intermediation: sending postal transfers within Ukraine; forwarding of international postal transfers in national and foreign currency; payments and acceptance of cash transfers through payment systems in accordance with concluded agreements; accepting payments; acceptance of trade proceeds; payment and delivery of pensions, cash assistance to low-income citizens, other social benefits on a contractual basis; carrying out settlement and cash transactions;

3) distribution of periodical printed publications by subscription;

4) ordering circulations and selling periodical printed publications;

5) wholesale and retail trade in periodicals and other printed publications;

6) courier activity;

7) banking operations;

8) collection and transportation of money and other valuables with the help of personnel or equipment to protect such property during transportation;

9) agency services;

10) services using means of communication: facsimile communication; access to the Internet, including the creation of "Internet points"; reception and transmission of electronic messages;

11) distribution of insurance policies, lottery tickets, anniversary and commemorative coins, cards or electronic prepaid vouchers for city, long-distance and international communication services, cellular communication, Internet access, etc.;

12) provision of other auxiliary commercial services;

13) photocopying, lamination, scanning, packaging, etc.;

14) customs services.

15) transport services: transportation of goods, including retail editions of periodical printed publications, within Ukraine and beyond; maintenance and repair of motor vehicles, provision of car parking services, refueling and storage of fuel and lubricants, etc.; cargo storage at destination;

16) trade in: unmarked postcards, postcards, envelopes; philatelic products; non-food and food products, in particular tobacco and alcoholic products; pesticides and agrochemicals; pharmaceutical and medical products; automobile spare parts; goods via the Internet; non-specialized wholesale trade;

17) rental of post office (subscription) boxes or other postal and courier services, such as preliminary sorting, addressing, etc.;

18) catering services;

19) development of design and estimate documentation for the implementation of construction works, technological re-equipment, reconstruction and expansion of existing production, as well as for the construction of non-production facilities;

20) implementation of publishing activities, publication of newspapers, magazines and other types of publishing activities;

21) delivery of invoices, advertising and information products;

22) conducting educational activities;

- 23) issuance of securities;
- 24) purchase and sale of securities;
- 25) implementation of marketing and advertising activities;
- 26) provision of temporary accommodation (accommodation), excursion, entertainment, tourist and other services;
- 27) carrying out work in the field of cryptographic protection of confidential information;
- 28) production of branded items, production stamps for the needs of the Society from metal and polymer;
- 29) creation and development of own small-scale production;
- 30) purchase and sale of foreign currency;
- 31) provision of telecommunication services;
- 32) provision of financial services, including implementation of investment and innovation activities;
- 33) insurance activity;
- 34) auditing activity;
- 35) auxiliary activities in the spheres of financial services and insurance;
- 36) representative, service, consulting, informational, legal and other services of a civil-legal and economic-legal nature;
- 37) intermediary activity of a customs broker and a customs carrier;
- 38) organization of exhibitions, fairs, symposiums, participation in exhibitions;
- 39) participation in social and charitable actions and events in accordance with the procedure established by legislation, this Statute and internal documents (regulations, regulations, etc.) of the Society;
- 40) consulting on informatization issues;
- 41) data processing, posting of information on web sites and related activities;
- 42) provision of electronic digital signature services and maintenance of key certificates;
- 43) repair of computers and peripheral equipment;
- 44) provision of security system maintenance services;

- 45) carrying out electrical installation works;
- 46) retail trade in electrical security and alarm systems;
- 47) provision of property protection services against criminal encroachments, ensuring personal safety of citizens;
- 48) provision of mediation services (commercial mediation);
- 49) transactions with immovable property, including leasing and operation of own or leased immovable property.

Air transport plays an extremely important role in serving global supply chains for JSC «Ukrposhta», as it offers highly integrated, comprehensive and fast delivery with safe, reliable, convenient and highly efficient services.

The "courier, express and parcel" service is a specific segment of services of JSC «Ukrposhta», which actively uses air transport for expedited delivery of goods, especially in international transportation. JSC «Ukrposhta» strives to increase the efficiency of the supply chain.

With the beginning of the War, JSC «Ukrposhta» was able to rebuild its parcel delivery flights to the countries of North America with the help of its partners Windrose Airlines and DHL Express from Warsaw (Poland). The general supply chain with the participation of air transport is presented schematically in fig. 2.2.



Figure 2.2 – Cargo delivery scheme of JSC «Ukrposhta» with the participation of air transport

Source: developed by author

Describing the logistics supply chain, we note that cargo is delivered to Poland and Warsaw by rail and road transport, and then air transport is used. The main features of express delivery of goods with the participation of air transport of JSC «Ukrposhta» is the speed of delivery, since express deliveries offer their customers overnight or next-day service.

One of the disadvantages of air delivery is that integrated express delivery companies use a fixed schedule. The tight schedule and standardized service make the integrated express services of JSC «Ukrposhta» somewhat inflexible, since the service schedule is difficult to adapt to individual needs.

Let's consider in more detail the technological process of delivery of express parcels in international communication with the participation of air transport of JSC «Ukrposhta» according to the "door to door" principle. Traditionally, this process includes sequential and parallel operations:

- collection of small shipments from shippers or agents;
- delivery of goods to a regional or central sorting station;
- preparation of cargo for transportation (bringing it into transportable condition, accumulation of cargo, etc.);
- loading cargo and performing secondary operations (registration of documents, securing of cargo, etc.);
- transportation from Ukraine to Poland, Warsaw;
- transfer to the airport of departure;
- cargo, support and warehouse operations at the airport;
- delivery of goods to the destination or transshipment airport;
- transit operations at the transshipment port (transshipment, warehousing);
- cargo, auxiliary and warehousing operations at the airport of destination;
- moving cargo to the sorting station;
- loading, auxiliary and warehouse operations at the sorting station;
- delivery of goods to the recipient with the help of partners in the country of destination.

The price of air cargo delivery differs significantly. Everything depends on the services that the client of JSC «Ukrposhta» wants to use. Standard air transportation costs less, but the departure time is usually longer. Such air transportation involves several stops, which increases the delivery time. But it is possible to choose charter flights. In this case, the entire aircraft or its part is assigned to the cargo, which is not subject to the normal flight schedule.

JSC «Ukrposhta» receives its main income thanks to the offer of basic services, which are shown in fig. 2.3.

The Company may carry out any other types of economic activity, if they are not prohibited by law and are aimed at achieving the purpose of the Company's activity.

Certain types of economic activity, for the conduct of which, in accordance with the law, it is necessary to obtain a special permit or license, the Company conducts after obtaining them in the established manner.



Postal services (forwarding of letters, parcels and postcards in Ukraine and abroad);



Payments and delivery of pensions and other social benefits to citizens;



Financial services (acceptance of payments for utility services; forwarding of postal transfers within Ukraine and international postal transfers);



Distribution of periodicals (subscription and delivery of periodicals);



Trade in goods (including when the Company acts as a commercial intermediary and sells products owned by other parties) and other services.

Figure 2.3 – List of «Ukrposhta» services in 2024

Source: developed by author according to [21]

The company has the right to independently carry out foreign economic activity in any field related to the subject of its activity. During the implementation of foreign economic activity, the Company enjoys the full range of rights of the subject of foreign economic activity in accordance with the current legislation of Ukraine.

The bodies of the Company are: general meeting, supervisory board, general director. The Company includes the General Directorate, 24 regional directorates, SSC «Zelena Bucha», the Directorate of Mail Processing and Transportation and Autotransposhta, the corporate publication «Poshtovy Visnyk». The structure of the Company is shown in fig. 2.4.

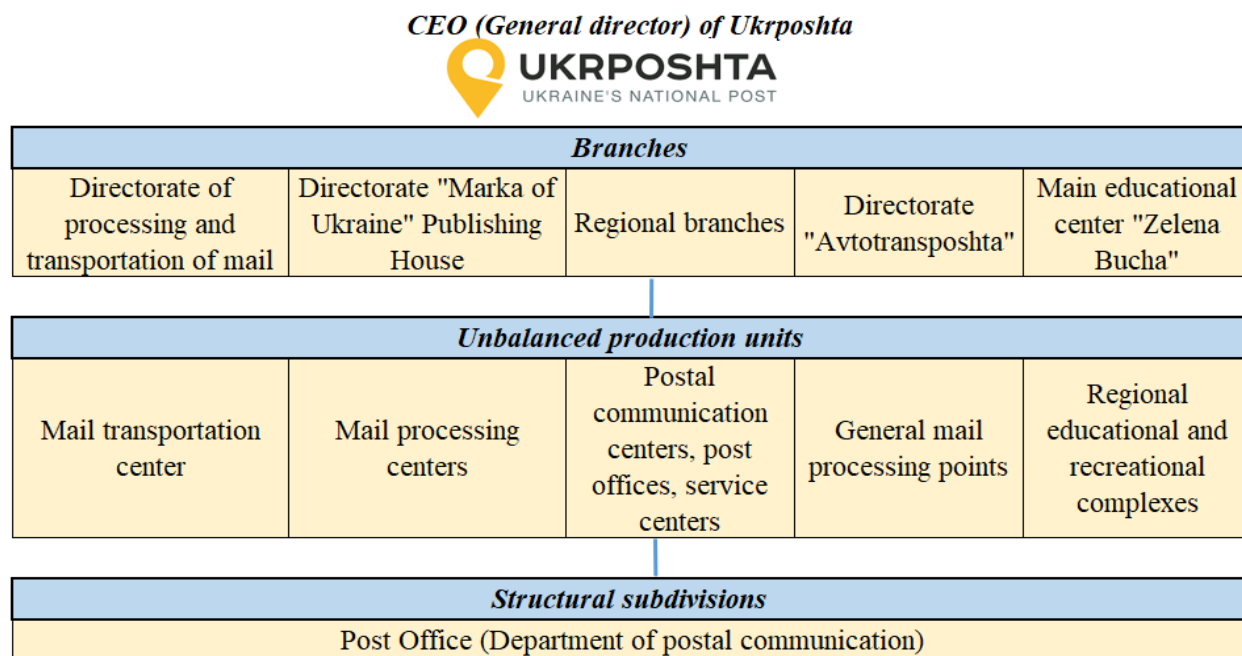


Figure 1.4 – Organizational structure of the management of «Ukrposhta» JSC

Source: developed by author according to [21]

The organizational structure of JSC «Ukrposhta» is built according to functional directions. The organizational model is determined by building a network enterprise that covers the entire territory of Ukraine, with a three-level hierarchy system:

Level I - management apparatus - location of the legal entity;

II level branch - directorate - a separate structural unit located outside the location of the legal entity and performs part of the functions of the legal entity;

III level - post offices, postal communication centers - off-balance sheet production units that are part of the directorate and include production units: shops, zonal centers for mail processing and transportation, which ensure the technological process of providing services; post offices, central postal offices, postal offices, consumer service centers that provide postal services in all populated areas of Ukraine and ensure the provision of socially significant services (delivery of pensions, social assistance, etc.).

The internal control system of «Ukrposhta» is aimed at preventing, identifying and taking measures to correct significant errors, ensuring the protection and preservation of assets, compliance with the current legislation of Ukraine, the completeness and accuracy of accounting documentation, and includes administrative and accounting control.

JSC «Ukrposhta» offers consumers more than 50 types of services. The company's service portfolio is divided into 13 main product areas, grouped into four basic segments, which are shown in Appendix A.

On February 24, 2022, the Russian Federation launched a full-scale military invasion of Ukraine. This was followed by the immediate adoption of martial law by Decree of the President of Ukraine, approved by the Verkhovna Rada of Ukraine and with the corresponding introduction of temporary restrictions that continue to affect the economic environment in 2023. Taking into account the above, the «Ukrposhta» Company made an assessment of the assumption regarding the continuity of activity, on the basis of which the financial statements for 2023 were prepared. The activities of «Ukrposhta» were significantly affected by the war, currently there is considerable uncertainty regarding the development of the military invasion of the Russian Federation on the territory of Ukraine, its duration and, accordingly, the impact on the activities of «Ukrposhta», its personnel, liquidity and preservation of assets [8].

Due to military operations, the Company temporarily lost control of approximately 12% of its post offices, mostly in the occupied areas of Luhansk, Donetsk, Kherson and Zaporizhzhia regions.

Thus, it can be noted that in modern conditions, the effectiveness of JSC «Ukrposhta» depends on the quality of services provided to consumers. Since the competitive market in Ukraine is now very strong, it is necessary to understand that the requirements for organizations have increased. The development of competitive relations is characterized by the creation of strict conditions that encourage the use of new and creative forms of promoting one's services with the help of modern information technologies.

Speaking about the main players in the market of postal logistics in Ukraine, it should be noted that for the first time the leader of the past steps – «Ukrposhta» - was replaced by «Nova Poshta», the leadership especially strengthened as a result of the COVID-19 pandemic, when the demand for delivery services of various parcels increased. and also increased the volume of online trade [4].

«Ukrposhta» and «Nova Poshta» are the two main competitors in the logistics sector in Ukraine. They work both with large shipments and with small ones, with a focus on private individuals. Constant competition benefits both companies, forcing them to constantly improve the quality of service and speed of delivery [5]. In addition, competitors of the two largest companies in the postal delivery industry are «Meest», «Justin». List of the main features of each service from enterprises is summarized in table 2.1.

Table 2.1 – Features of the postal services in Ukraine

Characteristic	«Nova Poshta»	«Ukrposhta»	«Justin»	«Meest»
Number of departments	More than 11400	More than 11000 and Mobile departments	More than 800	More than 1100
Delivery speed	2 hours around the city	one day around the garden	2 hours around the city	5 hours around the city
API (software interface for placing orders in the operator's system)	+	+	+	+
Availability of post machines	+	+(from September 2021)	+	+
Chat bot	+	+	+	+

Source: compiled by the author based on [3, 8, 14, 21]

Note that «Ukrposhta» is the only one offering such a service as «Mobile post office» is a full-fledged post office that comes to small villages and hamlets with a population of up to 1,200 inhabitants. Mobile offices are needed so that residents of even the most remote and smallest settlements of Ukraine receive all the postal, logistical and financial services they need (fig. 2.5.)

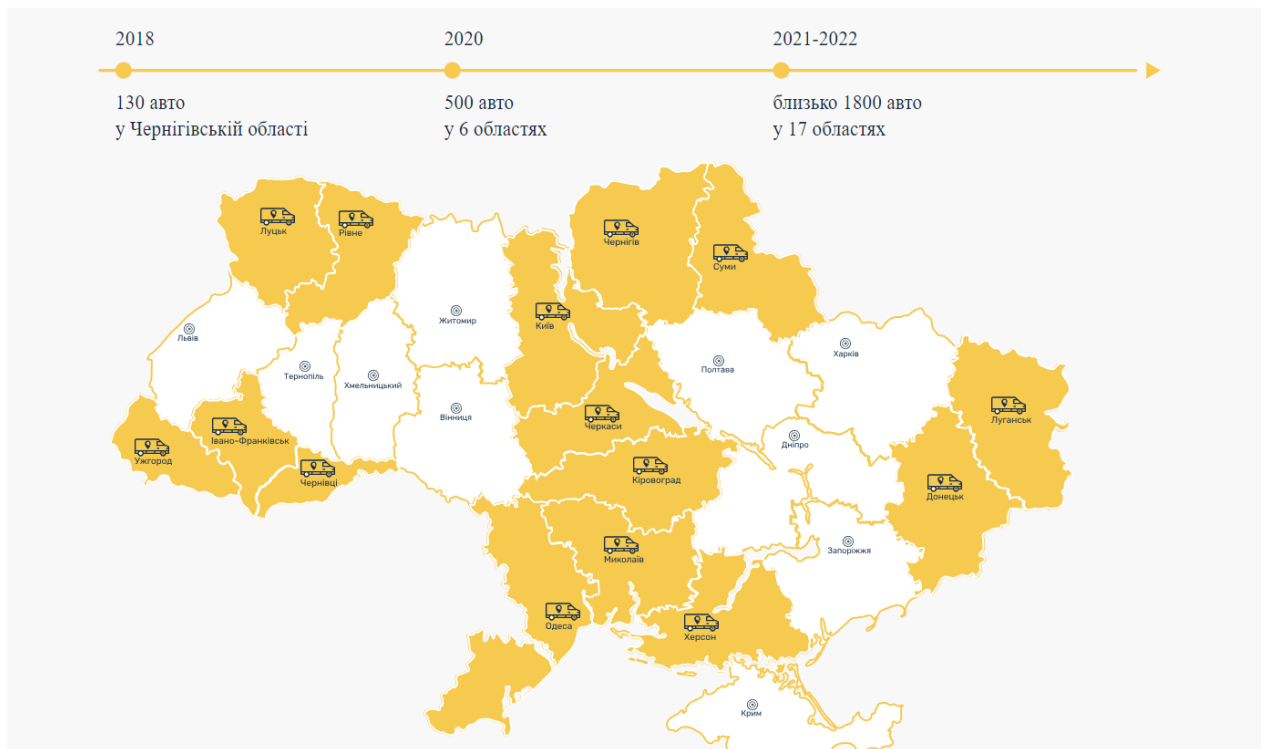


Figure 2.5 – Number of «Ukrposhta Mobile Postal Service» in 2023

Source: [21]

All services have their own chatbot and API functions, which allows you to track orders and carry out the necessary operations within your own account on the website or in the application, but only «Nova Poshta» and «Meest» have post offices.

The speed of delivery is the highest at «Justin» and «Nova Poshta» [14], and «Ukrposhta» is the leader in terms of delivery cost. Company's cost minimization strategy has become a gradual reduction in the number of its own branches, as the costs of maintaining them are significant. Evidence of this is the reduction in recent years of branches located in small settlements and villages in order to optimize own costs.

«Nova Poshta» entered the war as the undisputed leader in the delivery market. Revenue for 2021 increased by 23% to UAH 20.8 billion, net profit – 2.6 times, to UAH 2.6 billion. In 2021, Ukrainians sent 372 million parcels (+14%) through «Nova Poshta» [14].

According to Forbes analysis (see fig. 2.6), the market shares of «Nova Poshta» is 65%, its main pursuer, the former monopolist «Ukrposhta», is 25%, and the «Meest» company is less than 3% [8].

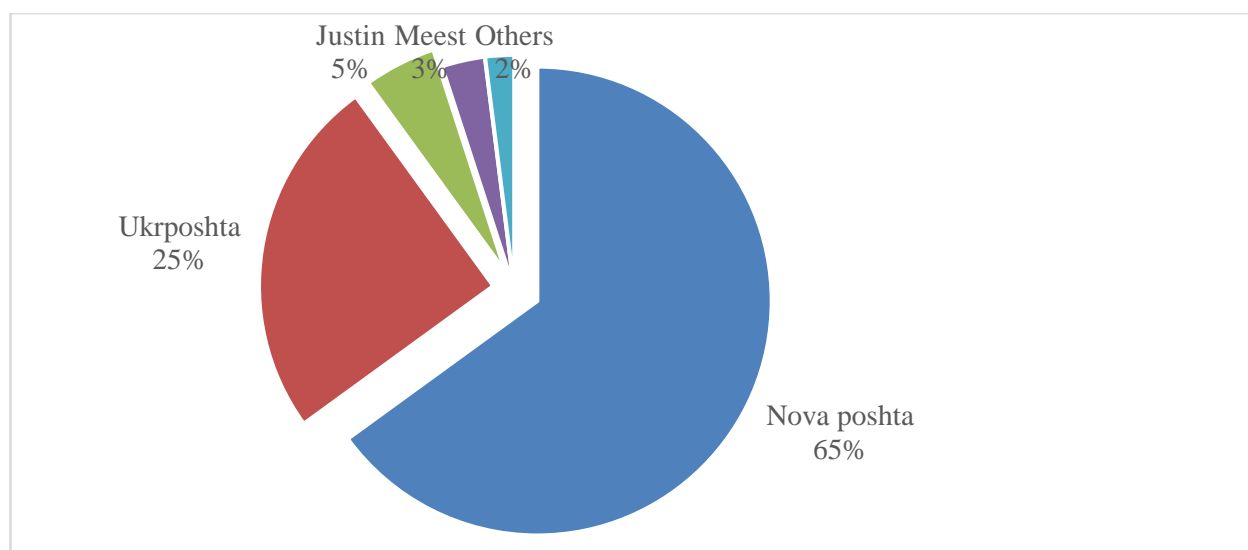


Figure 2.6 – Market share of the postal industry of enterprises in 2023

Source: [8]

In 2021, «Nova Poshta» LLC reduced the average delivery speed by one and a half times, to 23 hours. For 2022, the company has increased its development budget from UAH 3 billion to UAH 5 billion. The network of post machines was to double, to 25,000, and the number of branches – by 10%, to 11,000 [14].

Analyzing the cost of delivery, that is presented on fig. 2.7, the cost of «Ukrposhta» is lower than its competitors, which indicates the superiority of the national postal operator «Ukrposhta».

Note that the advantage of «Nova Poshta» operator is sorting terminals and a network of automated complexes, which other competitors do not have («Ukrposhta», «Justin», «Meest», «Autolux», etc.). At the beginning of the war, the company had five terminals: in Kyiv, Dnipro, Khmelnytskyi, Kharkiv and Lviv. They allow you to sort

continuously. «Nova Poshta» does not wait until the end of the day to deliver parcels around the country, but does it as branches and terminals fill up. At the same time, the company is solving the problem of labor shortages in peak shipment months.

	Kyiv	Odesa
 УКРПОШТА (стандарт/експрес)	42/50 Uah	42/50 Uah
 НОВА ПОШТА	70 Uah	70 Uah
	55 Uah	55 Uah
Characteristics of shipments		
		2 kilo
		25 cm
		200 Uah

Figure 2.7 – The cost of delivery of 2 kilograms of cargo in Kyiv and Odesa by various postal delivery operators in Ukraine, (2024 data)

Source: developed by author according to [14, 21]

The carrier Justin is part of the Fozzy Group and has more than 800 branches throughout the country, located in the stores of the chain: Silpo, Fozzy and Fora. The delivery time is from 2 to 48 hours. To arrange delivery of goods from the online store with Justin, you need to conclude an agreement. Parcels are issued through a personal account, integration through API is also provided. Likewise, Justin offers partners joint promotions, advertising in social networks, on the website and other communication channels.

For deeper research of the external and internal environment of the «Ukrposhta» company, it is worth conducting a SWOT analysis (see table 2.2), which indicates the company's strengths and weaknesses, as well as reveals threats and opportunities.

Table 2.2 –SWOT analysis of JSC «Ukrposhta»

Strengths	Weaknesses
1. Extensive work experience in the Ukrainian market 2. A wide range of services 3. Constant modernization of branches 4. High brand awareness 5. Low postal rates 6. A developed postal network in Ukraine	1. Lack of qualified personnel 2. High level of personnel turnover 3. Lack of technical support for all departments 4. Low level of staff motivation 5. Long terms of fulfillment of orders
Threats	Opportunities
1. Modernization of financial services 2. Encouragement of new consumer segments 3. Improving the quality of service provision	1. The safety of the Company's personnel and the lack of employees to ensure sustainable operations; 2. Security of property, which depends on the development of military events. Property losses include both physical destruction, damage to property, and write-offs due to loss of access or control; 3. Disruption of operations due to operational failures, including due to hacker attacks and russia's constant attacks on the energy and other critical infrastructure of the country; 4. Modernization and development of competitors 5. Low solvency of consumers

Source: developed by the author based on [4, 8, 21]

The internal environment of the organization should include extensive experience in the domestic market of Ukraine, recognition of the «Ukrposhta» brand, a wide range of services provided by the company, a developed network in the country and, as already mentioned, low tariffs. At the same time, the weak points are the low level of personnel qualifications and their motivation, as well as high turnover rates, poor technical support of departments and rather long terms of order fulfillment. Analysis of the external environment of JSC «Ukrposhta» showed that the company has such opportunities as modernization of financial services, improvement of the quality of its own services and capture of new segments of the domestic market. Among the threats, it is possible to single out changes in the legal framework of the state (namely, the introduction of new restrictions), a decrease in the level of solvency of target consumers, and the improvement/emergence of competitors.

Thus, this subsection establishes that the postal market remains an important element of Ukraine's infrastructure and has a tendency to increase its attractiveness for

a long time. The main competing players in this market were analyzed and compared according to such criteria as the number of branches and post offices in Ukraine, the duration of delivery, basic tariffs, international delivery services and transportation of oversized cargo, as well as the presence of a mobile application. For a deep study of the business environment of the JSC «Ukrposhta» company, the results of the SWOT analysis are given.

Thus, the postal logistics market of Ukraine is mainly represented by the four largest enterprises of the industry: JSC «Ukrposhta», LLC «Nova Poshta», LLC «Just In», LLC «Mist Express Trading House». However, the leading positions are held by JSC «Ukrposhta» and LLC «Nova Poshta», the two largest companies in the postal industry.

In recent years, LLC «Nova Poshta» has been more adapted to the needs of the market, this company has strengthened its position and is the market leader, although JSC «Ukrposhta» remains the largest company in the industry with the largest number of branches, and has significant financial resources due to the status of a state-owned enterprise.

2.2. Analysis of the economic and financial state of the JSC «Ukrposhta» activity

An important role in the activity of each enterprise is played by the financial and economic condition. In order to assess the technical and economic condition of JSC «Ukrposhta», it is necessary to analyze the dynamics of the company's indicators in recent years according to the balance sheet presented in Appendix B.

Considering the average rate of economic growth for 2021-2023, it is 30% in 2022 and 22% in 2023, which conditions the successful operation of the enterprise. As of 2023, JSC «Ukrposhta» has implemented operational and financial services in the

amount of UAH 680,020 thousand, and in general, for the analysed period, the data look as follows, which can be seen in the table 2.3.

Table 2.3 - Cost of sold products (goods, works, services), thousand UAH of JSC «Ukrposhta» during 2021 – 2023

Indicator	2021	2022	2023
Cost of sold products (goods, works, services), thousand UAH	9 536 425	9 926 858	10 656 528
Growth rate, %	-	4	7

Source: developed by the author according to the balance sheet Appendix B

The growth rate was calculated as follows, so, for the base period, data for 2021 was taken and equated to 100%. In 2022, the rate was $(9926858 \cdot 100 / 9536425) - 100\%$, which is 4%. Similarly, it was calculated in 2023 and 7% was obtained. This is an indicator of the dynamic's series, which shows how much the current level of the indicator has changed in %, compared to the previous or base period. It can be noted that the average growth rate of the cost of goods sold of JSC «Ukrposhta» is 6%, which is positive for the company. The graphic interpretation is presented in fig. 2.8.

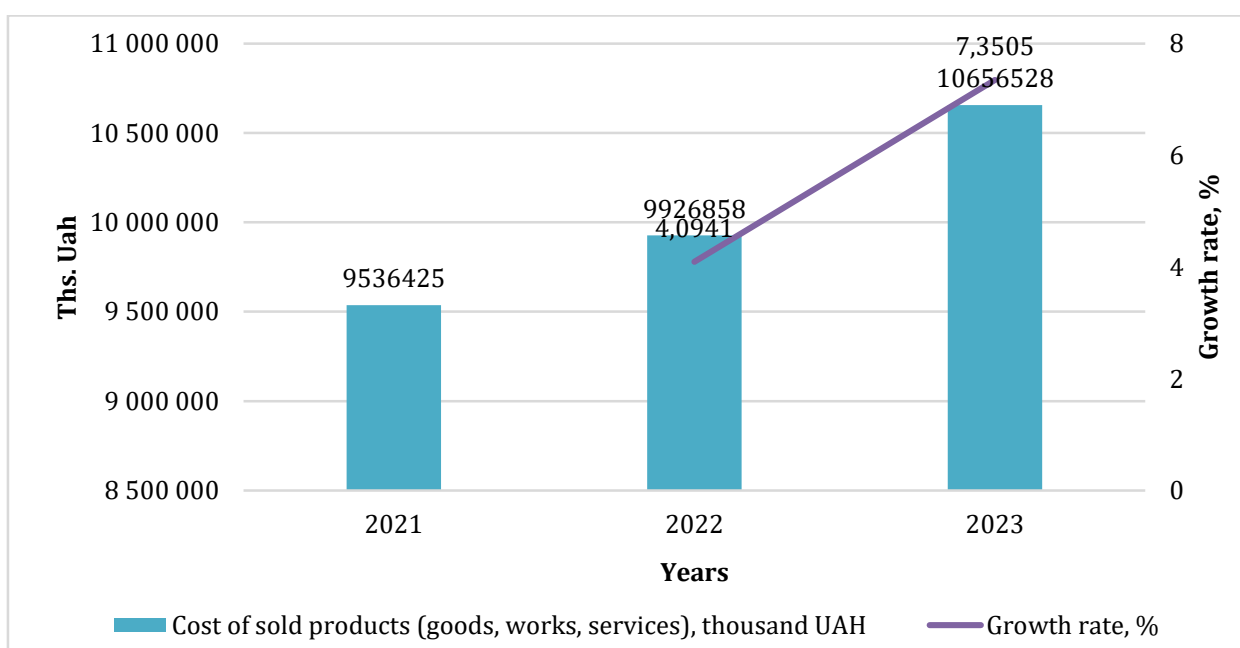


Figure 1.8 – Cost of sales of JSC «Ukrposhta» and growth rate for 2021-2023

Source: developed by author

As the company's management noted in its annual reports, during 2022 fixed assets (transport) were purchased under financial lease agreements for a total cost of 72,148 thousand hryvnias (in 2021 - 90,090 thousand hryvnias), and in 2023 fixed assets (transport) under financial lease agreements for a total value of 108,882 thousand hryvnias. Thus, it can be concluded that JSC «Ukrposhta» is focused on improving the logistics service of its customers and meeting growing needs with the company's own resources.

Income from the sale of products (goods, works, services) consisted of the following components, which are presented in the table 2.4.

Table 2.4 – Income from the sale of products (goods, works, services) of JSC «Ukrposhta» during 2021-2023 in thousand UAH

Income from the sale of products	2021	2022	2023
Services of the national post office	5 180 133	5 493 340	6 481 499
Delivery of parcels and small packages	2 476 208	2 569 759	3 448 725
Written correspondence	1 106 805	1 725 587	1 535 661
International postal exchange	883 178	571 133	919 587
Registration and delivery of periodicals by subscription	429 017	332 904	197 853
Delivery of invoices, information materials	-	-	300 061
Other postal services	284 925	293 957	79 612
Financial and related services	4 551 837	3 979 989	4 213 515
Payments and delivery of pensions and other social benefits	2 937 917	2 694 149	2 801 123
Acceptance of payments		1 029 211	1 014 988
Postal transfers		168 141	317 187
Other financial services	1 613 920	88 488	80 217
Trade in own and commission goods	448 185	849 417	873 322
Other commercial services	1 713	673	12 775
Total income from the sale of products (goods, works, services)	10 181 868	10 323 419	11 581 111

Source: developed by the author according to the balance sheet Appendix B

During the analyzed period, it is possible to see an increase in the values of received income in 2023. The main source of income for JSC «Ukrposhta» is national mail services, namely: delivery of parcels and small packages, written correspondence,

international postal exchange, registration for subscription and delivery of periodicals, delivery of invoices, information materials, other postal services.

Thus, in 2023, the services of the national nursery increased by 988 159 000 Uah. It is also worth noting the growth of revenues in Delivery of parcels and small packages by 878 966 ths. UAH compared to the previous period. In general, the dynamics of income growth over the years can be seen in fig. 2.9.

As of 2023, JSC «Ukrposhta» had the following distribution of revenues for services provided, as shown in fig. 2.10.

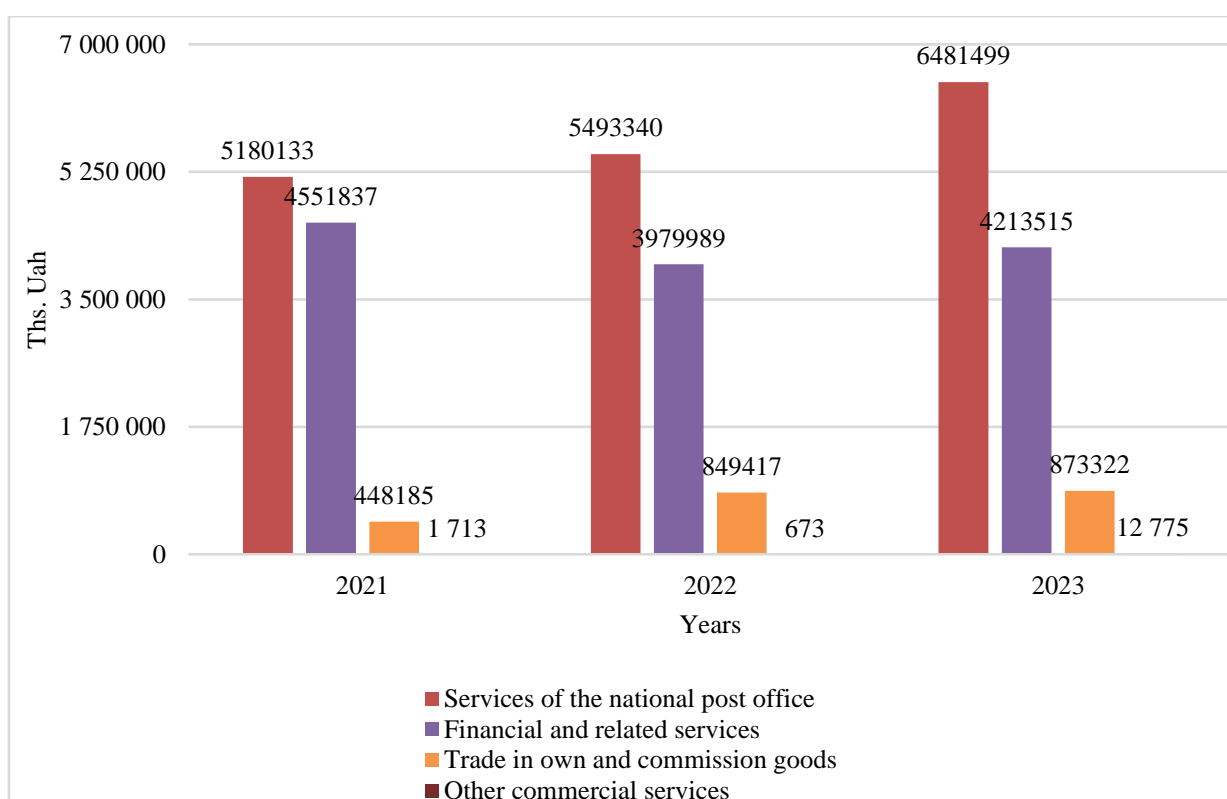


Figure 2.9 – Dynamics of income by types of services provided by JSC «Ukrposhta» during 2021-2023

Source: developed by author

As can be seen from fig. 2.9 and 2.10, the delivery of parcels and small packages, the provision of pensions and social benefits, export and import activities are considered the priority areas of activity of JSC «Ukrposhta».

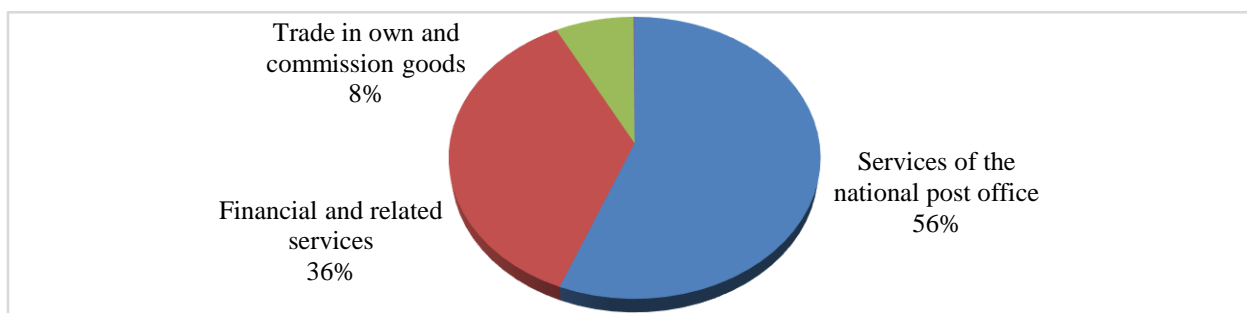


Figure 2.10 – Structure of revenues by types of services provided by JSC «Ukrposhta» in 2023

Source: developed by author

It is worth noting that in 2023 and 2022, the Pension Fund of Ukraine was the only client whose revenues exceeded 24% of the total revenue of JSC «Ukrposhta». The pension fund is represented by more than 25 regional offices in each oblast and the city of Kyiv, with which contracts have been concluded for the provision of services for the delivery and payment of pensions to the population of Ukraine. The amount of income received as a reward for the delivery of pensions and other social benefits amounted to 2 801 123 ths. UAH in 2023 (2 694 149 ths. UAH in 2022).

Analysing the geography of customers, it can be presented in the following form, which is presented in fig. 2.11.

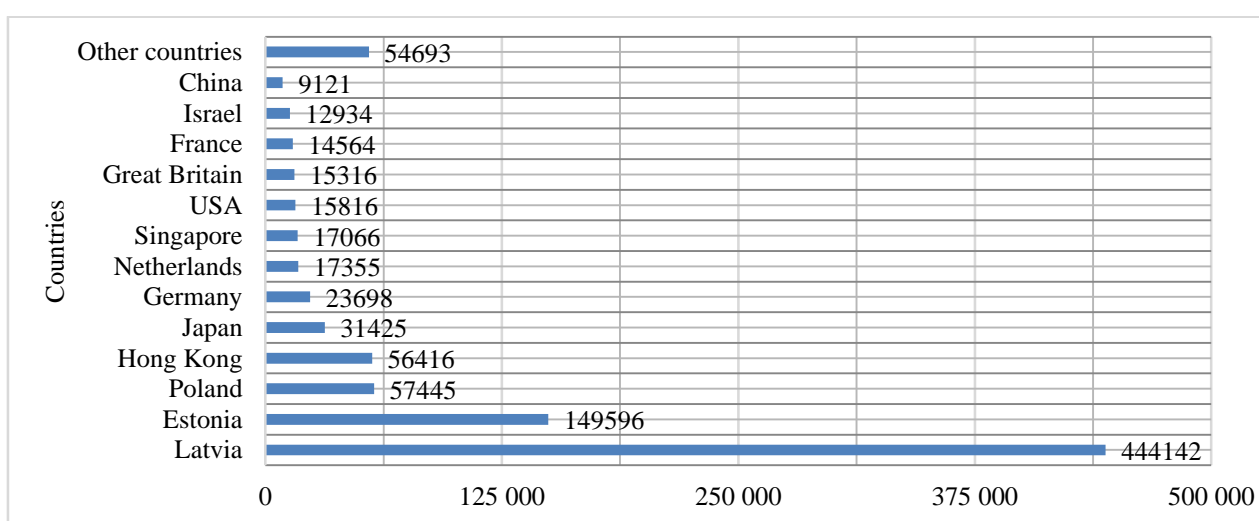


Figure 2.11 – Geography of clients of JSC «Ukrposhta» in the structure of its revenues, thousand UAH

Source: developed by author

As can be seen from fig. 2.11, the main customers in international traffic are Latvia, Estonia, and Poland, the share of which is 77%.

«Ukrposhta» is a member of the Universal Postal Union and cooperates with 192 national postal operators. Customers can send shipments to 660 thousand branches in more than 230 countries and territories of the world.

This distribution to the countries of Latvia, Estonia and Poland can be explained by the fact that JSC «Ukrposhta» offers a special offer from 2023 - discounts of up to 75% on the delivery of shipments. Also, in 2024, the company reduced tariffs for postal shipments to Canada to 20%.

The categories of shipments of standard international delivery of JSC «Ukrposhta» are shown in fig. 2.12.

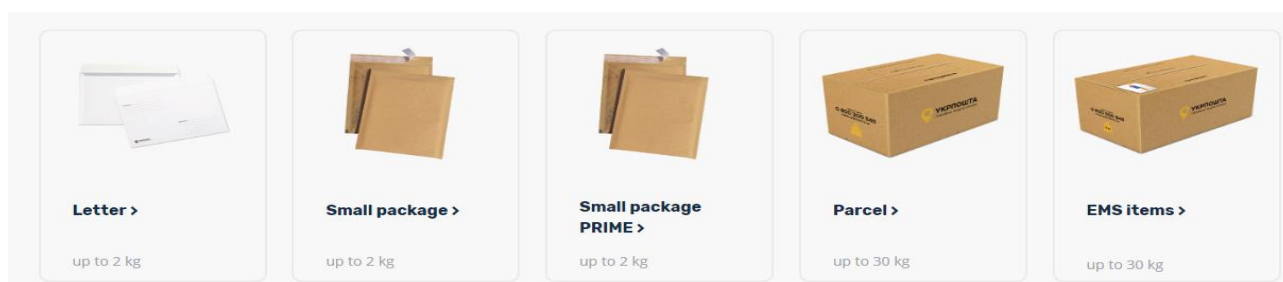


Figure 2.12 - Categories of shipments of standard international delivery of JSC «Ukrposhta»

Source: [21]

In the process of providing its international delivery services, JSC «Ukrposhta» provides its customers with the following services:

- ability to track;
- the possibility of using a personal account or API (In the Personal account you can calculate the tariff for international delivery, get additional discounts, create accompanying forms, track shipments);
- compensation in case of loss.

The analysis of main financial and economic indicators of JSC «Ukrposhta» during the period 2021 - 2023 is presented in table 2.5, using the company's balance

sheets (statement of financial condition) and reports on financial results (statement of total income) (Appendix B).

Table 2.5 – Main financial and economic indicators of JSC «Ukrposhta» in 2021 – 2023

Indexes	Years			Dynamics 2022/2021		Dynamics 2023/2022		Dynamics 2023/2021	
	2021	2022	2023	Th. UAH	Growth rate, %	Th. UAH	Growth rate, %	Th. UAH	Growth rate, %
1. Net revenue from the sale of products, works, services, ths. UAH	11181868	10323419	11581111	-858449	-7,7	1257692	12,2	399243	3,6
2. Cost of sold products, ths. UAH	9536425	9926858	10656528	390433	4,1	729670	7,4	1120103	11,7
3. Gross profit, ths. UAH	346431	396561	924583	50130	14,5	528022	133,2	578152	166,9
4. Net profit/loss, ths. UAH	183582	-1258089	-796361	-1441671	-785,3	461728	-36,7	-979943	-533,8
5. Labor costs, ths. UAH	5194389	5469472	5974643	275083	5,3	505171	9,2	780254	15,0
6. Average annual cost of fixed assets, ths. UAH	362076	345274	388228	-16802	-4,6	42954	12,4	26152	7,2
7. Average annual value of assets, ths. UAH	10338548	9418683	11502953	-919865	-8,9	2084270	22,1	1164405	11,3
8. Gross profitability of product sales, %	3,10	3,84	7,98	0,74		4,14		4,89	
9. Net profitability of product sales, %	1,64	-12,19	-6,88	-13,83		-5,31		-8,52	

Source: compiled by author

According to the calculations from table 1.5, the following should be noted regarding the financial and economic condition of the company:

1. Net revenue from product sales for 2023 increased by 1 257 692 ths. UAH. Note the increase in revenue over the entire period of the study, which indicates the absence of problems with product sales in 2021-2023.

2. The cost of goods sold for 2023 also increased by 729 670 ths. UAH, the growth rate was 7.4%. This financial situation indicates effective cost management at the enterprise and only requires further improvement of the management policy of this aspect of the financial and economic activity of JSC «Ukrposhta».

3. Gross profit increased by 528 022 ths. UAH over the three years of the study, the growth rate was 133.2%. This situation is positive for the company.

4. Analysing the net profit, we note that in 2021 JSC «Ukrposhta» incurred losses of 183 582 000 UAH and in 2023, the company suffered losses in the amount of 796 361 000 UAH. This situation indicates the presence of crisis phenomena in the financial and economic activity of JSC «Ukrposhta». The main reason was lost assets in the temporarily occupied territories of Kherson, Donetsk and Luhansk regions; also due to losses from exchange rate differences due to fluctuations in the exchange rate. In particular, the company continued automation and purchased and installed 780 POS terminals in branches.

5. Labor costs in 2023 increased significantly by 505171 ths. UAH, the growth rate was 9.2%. We note significant rates of growth in labor costs.

6. The average annual value of fixed assets increased in 2023 by 42 954 000 UAH compared to 2022 and by 26 152 000 UAH compared to 2021. An increase in the value of fixed assets may indicate not only the growth of the enterprise's production potential, but also a decrease in capital mobility, reduction of own working capital and deterioration of financial stability indicators.

7. The average annual value of the company's assets increased by 26 152 000 UAH over the three years of the study, the growth rate was 7.2%.

8. Gross profitability of product sales increased during the research period. In general, the gross profit margin demonstrates the profitability of the costs that are required for the production and sale of products. Calculations require an indicator of

gross profit. The obtained value of the gross profit must be divided by the revenue from sales.

9. The net profitability of product sales during the study period had a negative value. This situation confirms the presence of financial and economic problems of JSC «Ukrposhta». Net profitability is defined as the ratio of profit from operating activities to net income (revenue) from the sale of goods (works, services).

Profitability of sold products based on net profit is a profitability indicator that indicates the amount of net profit (the company's revenue, after deducting operating expenses, interest, taxes, etc.), which is generated by each hryvnia of sales. In 2023, JSC «Ukrposhta» suffered a loss of 0,0688 UAH for every hryvnia of sales.

To assess the financial condition of the enterprise under study, it is necessary to consider the dynamics of its economic indicators.

The study of the quality of financial management at the enterprise under investigation begins with a horizontal and vertical analysis of assets, using for this purpose the data of the enterprise's balance sheets (reports on the financial status) for the years 2021-2023 (Appendices B, C, D, E).

Let's start with a horizontal and vertical analysis of the assets of JSC «Ukrposhta» in 2023 (table 2.6).

According to the results of the analysis of the balance sheet assets of JSC «Ukrposhta» in the table 1.6, we can draw the following conclusions.

1. The company's assets for 2023 increased by UAH 2 084 270 thousand, the growth rate was 22.13%. This situation is positive in the company's activities and demonstrates a stable economic position on the market.

2. The increase in non-current assets was influenced by: an increase in the residual value of intangible assets by UAH 7 727 000, with a growth rate of 6.67% (specific weight increased by 0.37%); increase of unfinished capital investments by UAH 28 993 thousand, with a growth rate of 9.81% (specific weight increased by 1.39%); an increase in the residual value of fixed assets by UAH 170 206 thousand, with a growth rate of 4.40% (specific weight decreased by 8.17%).

Table 2.6 – Horizontal and vertical analysis of the balance sheet assets of JSC «Ukrposhta» during 2022 - 2023

Indicators	Line code	01.01.2022		31.12.2023		Dynamics		Growth rate, %
		Ths.UAH	Specific weight,%	Ths. UAH	Specific weight,%	Ths. UAH	,%	
I. Non-current assets								
Non-material assets:	1000							
- residual value		115895	1,23	123 622	1,07	7 727	0,37	6,67
Unfinished capital investments	1005	295454	3,14	324 447	2,82	28 993	1,39	9,81
Fixed assets:	1010							
- residual value		3870901	41,10	4041107	35,13	170206	8,17	4,40
Investment Property	1015	68961	0,73	65 522	0,57	-3439	-0,16	-4,99
- other financial investments	1035	12579	0,13	13 418	0,12	839	0,04	6,67
Long-term receivables	1040	180	0,00	166	0,00	-14	0,00	-7,78
Deferred tax assets	1045	87652	0,93	255571	2,22	167919	8,06	191,57
All according to section I	1095	4451622	47,26	4823853	41,94	372231	17,86	8,36
II. Current assets								
Inventories	1101	564624	5,99	455388	3,96	-109236	-5,24	-19,35
Unfinished production	1102	-	0,00	-	0,00	0	0,00	0,00
Final product	1103	-	0,00	-	0,00	0	0,00	0,00
Goods	1104	216207	2,30	123 757	1,08	-92450	-4,44	-42,76
Accounts receivable for goods, works, services:								
- net realizable value	1125	325 063	3,45	555 585	4,83	230 522	11,06	70,92
Accounts receivable:								
- according to the budget	1135	9193	0,10	8 481	0,07	-712	-0,03	-7,75
- according to the issued advances	1130	74177	0,79	150 544	1,31	76 367	3,66	102,95
- from accrued income	1140	19958	0,21	7 802	0,07	-12 156	-0,58	-60,91
Other current receivables	1155	114114	1,21	130809	1,14	16 695	0,80	14,63
Cash and cash equivalents:	1165	3132038	33,25	5233842	45,50	2 101 804	100,84	67,11
Other current assets	1190	68977	0,73	76 110	0,66	7 133	0,34	10,34
All according to section II	1195	4893242	51,95	6618561	57,54	1 725 319	82,78	35,26
III Non-current assets held for sale and disposal groups	1200	73819	0,78	60539	0,53	-13 280	-0,64	-17,99
Balance	1300	9418683	100	11502953	100,00	2 084 270	100,00	22,13

Source: compiled by author

Also increase in non-current assets was influenced by: decrease in investment real estate by UAH 3 439 000, at a rate of decrease of 4.99% (specific weight decreased by 0.16%); an increase in other financial investments by UAH 839 000, with a growth

rate of 6.67%; reduction of long-term receivables by UAH 14 000, at a rate of decrease of 7.78% (specific weight decreased by 0.01%).

3. The increase in current assets was influenced by: receivables for goods, works, services, namely net realizable value of UAH 230 522 thousand, with a growth rate of 70.92%; accounts receivable for advances issued for UAH 76 367 000, with a growth rate of 102.95%, other current receivables amount to UAH 16 695 000, with a growth rate of 14.63%; cash and cash equivalents by UAH 2 101 804 thousand, with a growth rate of 67.11%; other current assets for UAH 7 133 000, with a growth rate of 10.34.

At the same time, there was a decrease in the following indicators, such as production stocks, goods, accounts receivable from the budget, from accrued income.

Although it is worth noting that the decrease in indicators did not affect the overall growth of current assets, which amounted to an increase in 2023 by UAH 1 725 319 thousand and a general growth rate of 10.34%.

Summary of the values for the assets of JSC «Ukrposhta» for the years 2021-2023 is presented in table 2.7 and graphically in fig. 2.13.

Table 2.7 – Current and non-current assets of JSC «Ukrposhta» during 2021 - 2023

Indicators	2021	2022	2023
I. Non-current assets	4327306	4451622	4823853
II. Current assets	6364685	4893242	6618561
III Non-current assets held for sale and disposal groups	75643	73819	60539
Balance	10767634	9418683	11502953

Source: compiled by author

Analysing the data in fig. 2.13, it can be noted that the increase in the balance sheet of JSC «Ukrposhta» according to the company's assets can indicate several different aspects such as the expansion of production capacities. The company invests in the purchase of new equipment, machines, vehicles, buildings, warehouses, which leads to an increase in the asset balance. This indicates the growth of production capacity and the possibility of a larger volume of production.

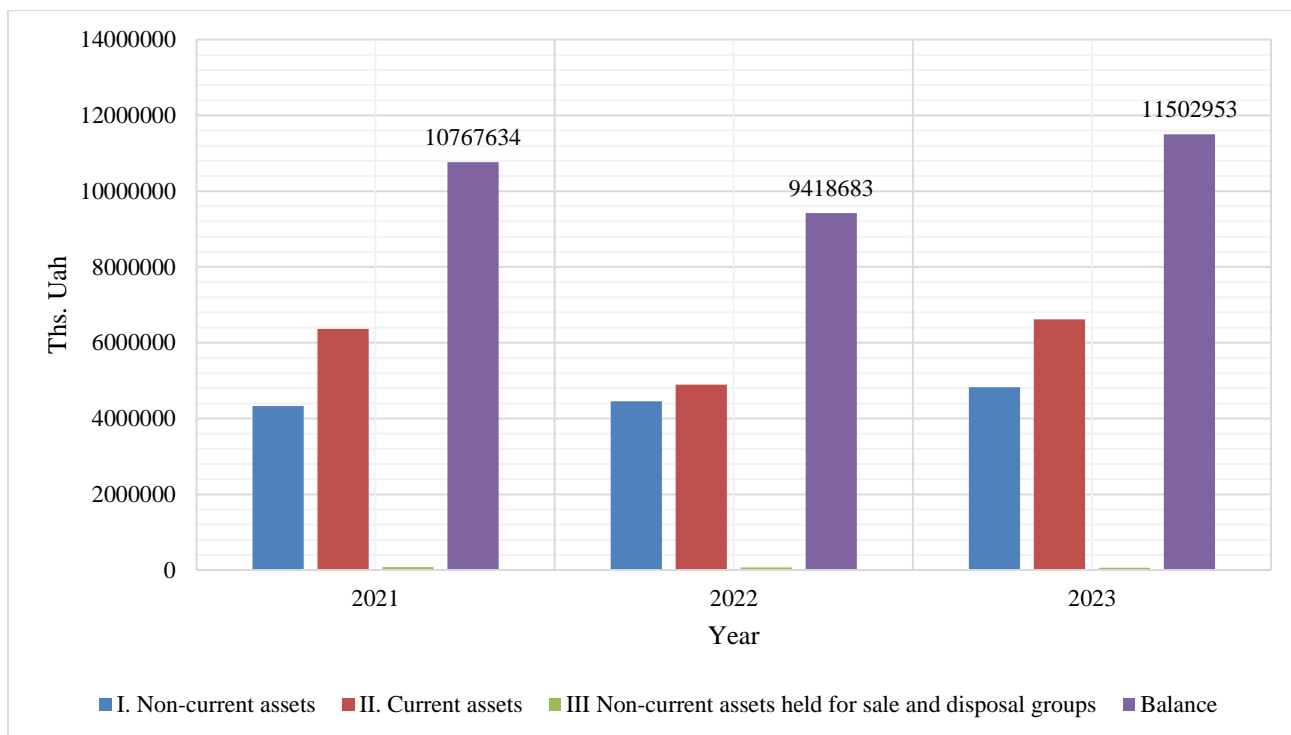


Figure 2.13 – Dynamics of changes in current and non-current assets of JSC «Ukrposhta» during 2021-2023

Source: compiled by author

It is important to note that the increase in the asset balance by itself is not the final indicator of the success of JSC «Ukrposhta». It is important to analyse other financial indicators and context, such as profitability, liquidity and coverage of liabilities, to obtain a complete picture of the financial stability and efficiency of the enterprise.

Analysis of the depreciation is shown in table 2.8. Summarizing the analysis in the table 1.8, we can note that the depreciation rate of fixed assets of JSC «Ukrposhta» was in the range of 1-2% throughout the study period. Note that the range of the depreciation rate of fixed assets in the range of 1-2% may indicate that the fixed assets of JSC «Ukrposhta» wear out very slowly. The expected useful life of assets depends on several factors, such as the type and nature of the asset, the intensity of its use, technological progress, etc.

A depreciation rate range of 1% to 2% may be applied to assets that have a long life or do not depreciate quickly. For JSC «Ukrposhta», it can be buildings or infrastructure objects that have a long service of exploitation.

Table 2.8 - Analysis of depreciation coefficients of fixed assets of JSC «Ukrposhta» for 2022-2023

Indicators	Line code	2022	2023
Depreciation and amortization	2515	582986	718363
The cost of fixed assets		345 274	388 228
Depreciation rate of fixed assets		1,6884735	1,850364

Source: compiled by author

Such a low attrition rate can have several possible consequences for the enterprise:

1. Longer asset life: If the wear rate is low, it means that the assets can remain in service for a longer period, which can reduce the need for their replacement or modernization.

2. Improved financial sustainability: Reducing the costs of replacing or upgrading assets can lead to improved financial sustainability of the enterprise, as capital investment costs will be lower.

Based on the analysis of the assets of JSC «Ukrposhta» in 2021 - 2023, it is clear that there are no significant problems with asset management in government financial and government activities, which have been demonstrated analysis.

The study of the financial management system continues through horizontal and vertical analysis of liabilities, which is used to determine the balance sheets of the enterprise (reports on the financial sector of JSC «Ukrposhta»).

Horizontal and vertical analysis of the liabilities on the balance sheet of JSC «Ukrposhta» for 2022 – 2023 is shown in table 2.9.

Table 2.9 – Horizontal and vertical analysis of liabilities on the balance sheet of JSC «Ukrposhta» during 2022 – 2023

Indicator	Line code	2022		2023		Deviation		Growth rate, %
		ths. UAH	Specific weight,%	ths. UAH	Specific weight,%	ths. UAH	Specific weight,%	
I. Own capital								
Registered capital	1400	6518597	69,21	6518597	56,67	0	0,00	0,00
The effect of revaluation during corporatization	1416	-5254038	-55,78	-5254038	-45,68	0	0,00	0,00
Undivided profit	1420	155241	1,65	-641120	-5,57	-796361	-38,21	-512,98
All according to section I	1495	1419800	15,07	623439	5,42	-796361	-38,21	-56,09
II. Long-term liabilities and security								
Deferred tax liabilities	1500	0	0,00	0	0,00	0	0,00	0,00
long-term bank credits	1510	863115	9,16	795276	6,91	-67839	-3,25	-7,86
Other long-term liabilities	1515	266211	2,83	451034	3,92	184823	8,87	69,43
All according to section II	1595	1129326	11,99	1246310	10,83	116984	5,61	10,36
III. Current liabilities and provisions								
Short-term bank credits	1600	3381	0,04	0	0,00	-3381	-0,16	-100,00
Current arrears for long-term liabilities	1610	431583	4,58	485913	4,22	54330	2,61	12,59
Current accounts payable for advances received	1635	213236	2,26	172698	1,50	-40538	-1,94	-19,01
Charges and other provisions	1660	619143	6,57	919501	7,99	300358	14,41	48,51
Deferred income	1665	319253	3,39	344135	2,99	24882	1,19	7,79
Other current commitments	1690	2174098	23,08	3882727	33,75	1708629	81,98	78,59
All according to section III	1695	6869557	72,94	9633204	83,75	2763647	132,60	40,23
Balance	1900	9418683	100,00	11502953	100,00	2084270	100,00	22,13

Source: compiled by author

According to the results of the analysis of the liabilities of the balance sheet of JSC «Ukrposhta» in the table 2.9 can draw the following conclusions.

1. The company's liabilities increased by UAH 2,084,270,000 for the year, the growth rate was 22.13%.

2. In 2023, there was a decrease in equity by UAH 796 361 thousand, which represented a decrease in the growth rate by 56.09%. A decrease in the equity capital of JSC «Ukrposhta» may indicate financial losses that exceed the company's profit or accumulated profits from previous periods. This may be the result of poor financial performance, ineffective management, rising costs or unprofitable operations.

3. The increase in long-term liabilities was influenced by the increase in other long-term liabilities, which overshadowed the decrease in long-term bank loans in 2023 by UAH 67 839 000. In general, long-term liabilities and collateral increased by UAH 116,984 thousand, with a growth rate of 10.36%.

4. The increase in the size of current liabilities was influenced by: current debt for long-term liabilities, accruals and other provisions, income of future periods, and other current liabilities. In general, Current liabilities and provisions in 2023 increased by UAH 2 763 647 thousand with a growth rate of 40.23%.

Present a summary of the values for the liabilities of JSC «Ukrposhta» during the years 2021-2023 in the table 2.10 and graphically in fig. 2.14.

Table 2.10 – Own capital, long-term and current liabilities and provision of JSC «Ukrposhta» for 2021-2023

Indicators	2021	2022	2023
I. Own capital	2677889	1419800	623439
II. Long-term liabilities and collateral	1120498	1129326	1246310
II. Current liabilities and collateral	6969247	6869557	9633204
Balance	10767634	9418683	11502953

Source: compiled by author

Summarizing the analysis of the liabilities of JSC «Ukrposhta» in 2021-2023, we note:

- JSC «Ukrposhta» needs to diversify the sources of property formation due to the activation of the attraction of long-term capital;

- significant increase in short-term bank loans and increase in retained earnings;

- current liabilities and provisions increased significantly over the entire period of the study.

We pay special attention to the significant increase in the amount of short-term bank loans and the amount of accounts payable for goods, works, services and advances received. This situation leads to significant interest payments for loans, and can also trigger the bankruptcy of the enterprise.

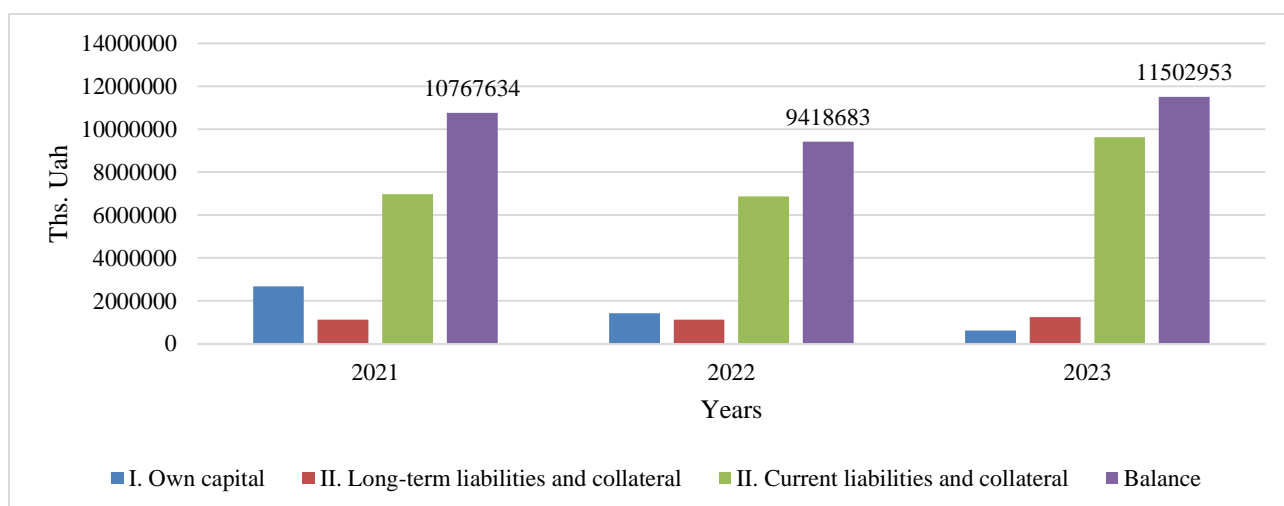


Figure 2.14 – Dynamics of changes in own capital, long-term and current liabilities and provision of JSC «Ukrposhta» during 2021-2023

Source: compiled by author

The next element of the study of the financial condition of the enterprise is the analysis of liquidity. Let's start it with an analysis of balance sheet liquidity, using the company's balance sheets (financial statements) for the years 2021-2023 (see Appendices C-E). The analysis of the liquidity of the balance sheet of JSC «Ukrposhta» for 2022-2023 is presented in the table 2.11.

Analysis of the liquidity of the balance sheet of JSC «Ukrposhta» in 2021 showed the following:

- the situation at the end of 2022 – ($A1 > L1$, $A2 > L2$, $A3 < L3$, $A4 > L4$).

- the situation at the end of 2023 – ($A1 > L1$, $A2 > L2$, $A3 < L3$, $A4 > L4$).

The situation at enterprises demonstrates the unchanged dynamics of existing problems: a significant advantage of hard-to-realize assets over permanent liabilities and a shortage of slowly-realizable assets.

Table 2.11 – Liquidity analysis of the balance sheet of JSC «Ukrposhta» during 2022-2023, ths. UAH

Conventional designation of a group of assets	31.12. 2022	31.12.2023	Conventional designation of a group of liabilities	31.12. 2022	31.12. 2023	Payment surplus / deficiency,+/-	
						31.12. 2022	31.12. 2023
1. The most liquid assets (A1)	5441207	5402628	1. Longest-term liabilities (L1)	3484784	2945809	1956423	2456819
2. Assets that are quickly realized (A2)	571341	610438	2. Short-term liabilities (L2)	2311536	2910074	2299636	1740195
3. Slow-moving assets (A3)	266249	351619	3. Long-term liabilities (L3)	611434	1120498	-345185	-768879
4. Hard-to-realize assets (A4)	3630676	4327306	4. Permanent liabilities (L4)	3501719	3791253	128957	536053
Balance	9909473	10767634	Balance	9909473	10767634	0	0

Source: compiled by author

Let's supplement the liquidity analysis of the balance sheet with a coefficient analysis of liquidity (table 2.12), using the company's balance sheets (reports on financial condition).

Table 2.12 - Ratio analysis of liquidity of JSC «Ukrposhta» during 2021-2023

Indicators	Normative value	On 31.12.2021	On 31.12.2022	Deviation from 2022 to 2021	On 31.12.2023	Deviation from 2023 to 2021
1. Current liquidity ratio	2 – 2,5	0,87	0,92	0,05	0,91	0,04
2. Term liquidity ratio	0,7- 0,8	0,83	0,88	0,05	0,86	0,03
3. Absolute liquidity ratio	0,2- 0,35	0,74	0,78	0,04	0,77	0,03

Source: compiled by author

The analysis of liquidity ratios of JSC «Ukrposhta» during 2021-2023 made it possible to draw the following conclusions:

- the ratio of current liquidity during the study period increased by 0.04 from 0.87 at the end of 2021 to 0.91 at the end of 2023 and the entire study period was outside the normative value;
- the term liquidity ratio increased by 0.03 during the study period from 0.83 at the end of 2021 to 0.86 at the end of 2023, and the entire study period was outside the normative value;
- the ratio of absolute liquidity during the study period increased by 0.03 from 0.74 at the end of 2021 to 0.77 at the end of 2023 and the entire study period was outside the normative value.

Therefore, JSC «Ukrposhta» has problems with liquidity management, which demonstrates the non-compliance of liquidity ratios with normative values for the entire period of analysis.

Analysis of financial stability of JSC «Ukrposhta» in 2021 - 2023 is presented in table 2.13, using the company's balance sheets.

Table 2.13 - Analysis of indicators of financial stability of JSC «Ukrposhta» during 2021-2023

Indicators	Recommended value	31.12. 2021	31.12. 2022	Deviation 2022/ 2021	31.12. 2023	Deviation 2023 /2022	Deviation 2023/ 2021
1. Coefficient of autonomy	> 0,5	0,32	0,26	-0,06	0,24	-0,02	-0,08
2. The coefficient of the ratio of own and borrowed capital	> 1	0,47	0,35	-0,12	0,33	-0,02	-0,14
3. Coefficient of financial stability	0,2- 0,5	0,37	0,32	-0,05	0,35	0,03	-0,02
4. Coefficient of manoeuvrability of own capital	0,7- 0,9	0,29	0,48	0,19	0,12	-0,36	-0,17
5. Coefficient of provision of own working capital	> 0,1	0,17	0,28	0,11	0,05	-0,23	-0,12

Source: compiled by author

The analysis of the coefficients of financial sustainability of JSC «Ukrposhta» for the years 2021-2023 made it possible to draw the following conclusions:

1. The coefficient of autonomy decreased by 0.08 over the three years of the study and did not correspond to the normative value during the entire study period.

2. The coefficient of the ratio of own and borrowed capital similarly decreased during the entire period of the study by 0.14 and had significant deviations from the normative value.

3. The coefficient of financial stability during the entire study period did not meet the normative value and at the end of 2023 had a negative value.

4. The coefficient of manoeuvrability of own capital increased by 0.19 in 2022, compared to the indicators of 2021, but decreased already in 2023 by 0.36. In general, the coefficient during the entire period of the study did not correspond to the normative value,

5. The coefficient of provision of own working capital during 2021-2023 corresponded to the normative value.

Therefore, it is important to understand what tools are available and what are the ways to achieve increased profitability for JSC «Ukrposhta»:

- modernization and reconstruction of the material and technical base of the enterprise
- development of strategy and tactics of activity and development of the enterprise, information support of the decision-making process
- financial planning of the enterprise, analysis and search for internal reserves of profit growth, tax planning
- increasing competitiveness in the provision of services

In order to maintain a competitive position in the postal market, an important aspect is the analysis of the financial condition of JSC «Ukrposhta».

As the status of the company is a joint-stock company, 100% of the shares belong to the state of Ukraine. The company's dividend policy is determined according to:

1. About postal communication: Law of Ukraine dated November 3, 2022 No. 29 [1].

2. On the approval of the Strategy for the implementation of the provisions of the European Union directives in the field of postal services and courier services («road map») [2].

3. Association Agreement between the European Union and Ukraine [23].

Therefore, the reduction of expenses and the increase of the company's income must be considered precisely in the perspective of strategic decisions that will affect a number of positions, including the company's financial condition.

2.3. Analysis of the digitalization of processes

Digitization of logistics is an integral part of enterprise development. It allows to reduce costs, automate routine processes, structure and organize data, receive reports in real time, and establish communication between the company, the contractor and the client. The main thing is that it solves certain business goals [7].

Considering the directions of digital solutions of JSC «Ukrposhta» demonstrate that the company is actively engaged in digitalization. So, back in 2020, «Ukrposhta» ordered the development of a new enterprise resource planning system (ERP system), which was supposed to replace 80 existing ones. The tender price of such a system was 96 million hryvnias. So, the transition to a new ERP system is a key step in the transformation towards full digitalization and automation of JSC «Ukrposhta» [21].

As of 2023, the company used more than 80 separate systems to control and account for resources. In order to improve work efficiency, the goal of implementing the ERP system was to combine data on financial, human, material and other resources in a new single system. It should be noted that the absence of a single integrated system leads to ineffective spending of resources on information input and processing, data synchronization and, most importantly, complicates the necessary process changes. The new system should combine all the functions of the existing programs in order to

build a fast and transparent system for planning and managing resources in all branches of all regions in real time.

On May 21, 2020, «Ukrposhta» announced a tender for the purchase of software, namely «Systems for managing information flows, business processes and resources of JSC «Ukrposhta»». The requirements for the same system were changed twice. Therefore, JSC «Ukrposhta» planned to implement changes in the following functional blocks:

- «Accounting and registration of contracts»,
- «Purchase Management»,
- «Inventory Management»,
- «Sales Management»,
- «Accounting and tax accounting»,
- «Financial Management»,
- «HR»,
- «Electronic Document Management System».

As noted in «Ukrposhta» [21], 8 companies initially submitted proposals. By the end of the bidding, only two of them remained - the Azerbaijani company «GNI SOFTWARE» LTD and the Ukrainian LLC «Information Technologies».

Both significantly reduced the price during the bidding process. «GNI SOFTWARE» LTD initially demanded almost 126 million hryvnias for the work, «Information Technologies» LLC - more than 139 million hryvnias. As a result, both reduced the cost to almost 96 million with a difference of 5 thousand hryvnias. Preference was given to the latter. On March 4, the tender was completed, the winner was announced, and on March 17, the parties signed the contract.

Schematically, the main data of the digitization project of JSC «Ukrposhta» are presented in fig. 1.15. It should be noted that the company «Information Technologies» LLC specializes in the digitalization of business processes. The systems of managing information flows, business processes and resources of JSC "Ukrposhta" had the following stages of digitization, which is shown in fig. 2.14.

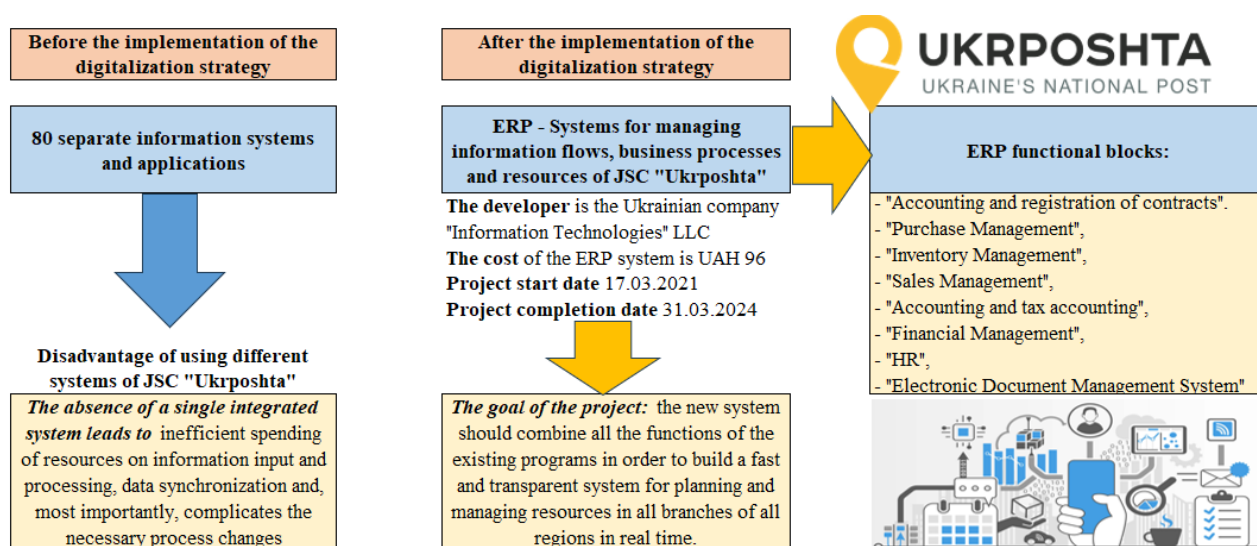


Figure 2.15 – Data of the digitization project of JSC «Ukrposhta» until 31.03.2026

Source: developed by author according to [21]

Digitization of logistics at JSC «Ukrposhta» is a big step on the way to growth and scaling. Implementation of modern tools helps to save time and resources. This is a solution that guarantees a result.

Analyzing the current state of project implementation, we note that JSC «Ukrposhta» in record time completed the stage of implementation of the ERP system for the transfer of all processes and systems in the company to a digital format. In total, more than 70% of business processes were transferred to digital format in 9 months from the moment of project implementation. By the end of 2023, the work of all 26 regional branches has been consolidated, about 6,000 «Ukrposhta» employees have moved to work within the framework of a single platform with unified end-to-end business processes.

Within the framework of this project, the processes of purchases, sales, inventory and contract management, as well as accounting, tax accounting and treasury calculations are fully automated. JSC «Ukrposhta» switched to internal, as well as external - with central bodies of executive power, partners and contractors - electronic document flow (fig. 2.16).



Figure 2.16 – Stages of implementation of digitization «Systems for managing information flows, business processes and resources of JSC «Ukrposhta»

Source: developed by author according to [21]

Digitization of JSC «Ukrposhta» includes the implementation of the IT-Enterprise ERP system. Implementation of mobile branches (2.5 thousand branches by the end of 2022) with further automation of these branches with laptops and 3-in-1 devices, additional automation of all rural stationary branches with a population of more than 1,200 — completion of automation of the entire network by the end of the year. Also, the installation of a new front-office system, which will significantly reduce the time spent on customer service.

In total, the ERP platform will integrate more than 400 disparate, decentralized and non-automated systems and databases in procurement, treasury, sales, inventory, budgeting, accounting, payroll, logistics and transportation, etc. They are transformed into electronic reporting (including for online customers) and document management.

As the company's management notes, «Ukrposhta» implemented an ERP system in record time – 9 months, which is one of the components of Ukrposhta's complete digitalization. Now, for the first time in the history of the company, the entire document flow has gone online, they conduct all purchases, monitor all settlements with counterparties and balances in warehouses in real time.

As part of the ERP system implementation project in accounting and tax accounting, the main achievement was the ability to conduct transparent accounting. Unified business processes, methods, and regulations were developed, which were adopted by all branches and all functional areas. This will make it possible to systematically manage the company and receive timely and as accurate as possible financial and other reporting in various sections of ERP analysts.

There was also a transition from separate commodity accounting databases to a single ERP database. In practice, this means that it is now possible to analyze data on stock balances, settlements with counterparties of various branches and generate a report in "one click" as of any date, not just at the end of the week/month. For example, for the direction of trade in essential goods, the daily summation of balances makes it possible to purchase products each time in the amount that is needed at the moment.

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The transition from separate manual processes to a single end-to-end business process was completed in JSC «Ukrposhta» procurement. Thanks to the integration with the Prozorro procurement system, procurements are now initiated and monitored online, and paper documents are only available at the contract signing stage. For «Ukrposhta», which buys more than 170 nomenclature units for more than 11,000 branches in a year of production materials alone, the automatic collection of leftovers makes it possible to significantly increase the efficiency of procurement processes. And also ensure the availability of materials in the required quantity in each department at the required time.

Treasury operations were also transferred from outdated «semi-manual» IT systems to the ERP system, which will allow the transition to a centralized payment centre in the future. An important stage in the implementation of the ERP system was integration with other front-line, financial and operational systems in the company through modern automated data exchange services.

In addition, as part of this ERP system implementation project, there was a transition from local unsynchronized paper and electronic directories to a single electronic centralized database of resources, materials, contracts, divisions, counterparties, etc. In particular:

- a single database of contracts has been created - 118,000 contracts are now entered into the system (more than 30 different programs have been disabled);
- the payment system is centralized - now it unites 358,000 counterparties and up to 200,000 payments are made daily;
- centralized accounting of goods and inventory – the system now has 11,000 warehouses, including postal offices (more than 390 different separate accounting programs have been disabled);
- unified system of accounting and tax accounting – about 30 local systems have been replaced.

The uniqueness of this project lies in the unprecedented completion of all tasks in a record short time. This is a breakthrough for the Ukrainian IT market. For the first time in Ukraine, the digital transformation of a large enterprise took place in 9 months. This case deserves special attention.

«Ukrposhta» completed the installation of automated sorting lines at the «Kyiv-Pravy» logistics terminal (fig. 2.17). New equipment for sorting lines of international, small and large shipments at this terminal allows the processing of 18,000 parcels per hour and about 400,000 shipments per day. It is about international large and small shipments.

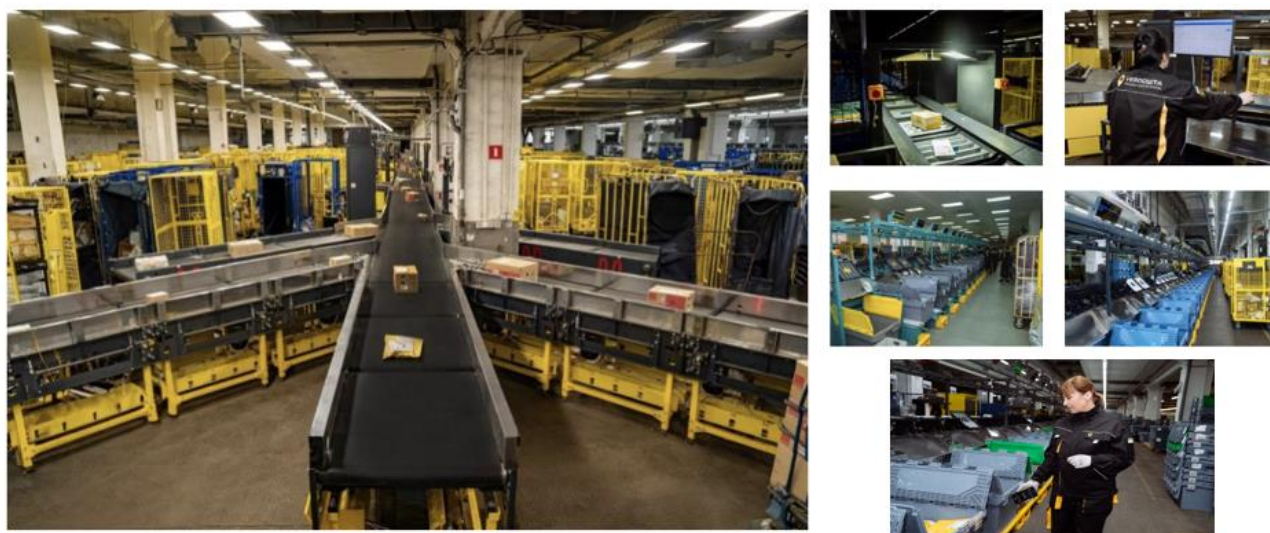


Figure 1.17 – The project of installing automated sorting lines of JSC «Ukrposhta» at the logistics terminal «Kyiv-Pravy»

Source: [21]

In the II quarter of 2024, it is planned to open the innovative logistics terminal «Kyiv Livy», which will house another processing center for international parcels, which will significantly reduce processing times.

During 2024, additional automated lines for sorting letters and newspapers will be installed. 14-16 logistics centers of «Ukrposhta» in other regional centers and large cities of Ukraine will receive automated lines of lower capacity for sorting parcels and small shipments. The layout of warehouses is presented in fig. 2.18. Note that this will

ensure 100% automatic processing throughout Ukraine. The total capacity will be about two million shipments per day.



Figure 2.18 – Project of construction of a new network of depots of JSC «Ukrposhta»

Source: [21]

In 2023, «Ukrposhta» increased the number of shipments by 40%. This means that customers trust the company. The new equipment will increase productivity and sorting quality eight times. And the parallel transformation of the logistics network will ensure fast delivery, first between regional centres and large cities, and later to every city and village in Ukraine [21].

JSC «Ukrposhta» planned modernization in 2022 and did not give up on this despite the full-scale war, although they were forced to adjust the plans for the construction of several terminals with the involvement of credit resources, because in the new realities this would be an ineffective solution. However, they implemented a different approach, while maintaining productivity and mainly with own funds. The company installs automated lines on 100% of terminals using Ukrainian-made equipment and software and builds new capacities where necessary.

The next step of «Ukrposhta» will be to automate the sorting of letters, newspapers and the completion of orders for medicines. Also, in 2024, «Ukrposhta»

plans to reboot key services and processes in order to digitize services as much as possible and make them more convenient for customers.

At the beginning of the full-scale invasion of russia, «Ukrposhta» helped with the relocation of enterprises to safer regions for free. Now the company continues to support Ukrainian business and population thanks to affordable prices for services and delivery to the most remote corners of the country, including front-line settlements. In 2024, «Ukrposhta» plans to reboot key services and processes in order to digitize services as much as possible and make them more convenient for consumers [21].

It is also worth paying attention to the mobile application of JSC «Ukrposhta». The application allows the client to find the nearest «Ukrposhta» branch, calculate the shipping cost, place an order and track the shipment. Another function of the application is to call a courier and deliver in the city. In the last update, an augmented reality (AR) ruler was added to the program, with the help of which the user can measure the length, width, and height of the sent. The program interface is presented in fig. 2.19.

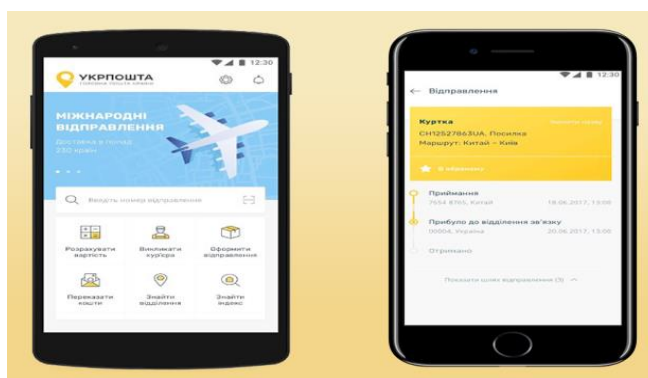


Figure 2.19 – Interface of the mobile application of JSC «Ukrposhta»

Source: [21]

In the «Ukrposhta» mobile application it possible to use the following functions:

- shipment tracking;
- registration of shipments;
- calculation of the cost of shipments;
- branch search;

- search for postal codes;
- transfer between cards;
- transfer from the card to the branch;
- transfer «From card to home».

Fast and high-quality postal service is not a dream, but a requirement of time. Despite the war and the destruction that the Ukrainian infrastructure undergoes every day, «Ukrposhta» provides delivery of postal items throughout Ukraine and abroad. Even during the war, more than 1 million Ukrainian goods are sold on American marketplaces. Automation of operational processes is an investment in the future that will allow the national postal operator to increase competitiveness and become a more service-oriented company. New equipment for sorting lines and updating of logistics routes will allow parcels to be delivered to all regional centers of Ukraine the very next day after their dispatch. In addition, the equipment and software installed on all terminals is an important support for Ukrainian business in difficult economic conditions.

Chapter 2 summary

The analytical and research part of the qualification work is devoted to the analysis of digital processes of the processes of the postal operator JSC «Ukrposhta».

Summarizing the conducted research, the following can be noted. JSC «Ukrposhta» is an enterprise operating on the postal market of Ukraine. JSC «Ukrposhta» as a national operator ensures the provision of not only universal postal services, the list of which is determined by the government, and the tariffs are approved by the National Communications Regulatory Commission, but also offers consumers more than 50 different types of services.

The analysis of the organizational structure of JSC «Ukrposhta» showed that the organizational structure of the enterprise consists of two levels and is built according to functional directions.

Describing the logistics supply chain, we note that cargo is delivered to Poland and Warsaw by rail and road transport, and then air transport is used. The main features of express delivery of goods with the participation of air transport of JSC «Ukrposhta» is the speed of delivery, since express deliveries offer their customers overnight or next-day service.

One of the disadvantages of air delivery is that integrated express delivery companies use a fixed schedule. The tight schedule and standardized service make the integrated express services of JSC «Ukrposhta» somewhat inflexible, since the service schedule is difficult to adapt to individual needs.

Thanks to the analysis of the key indicators of the financial and economic activity of JSC «Ukrposhta» for 2021-2023, it was possible to conclude that the development trends of the enterprise are heterogeneous, since some of these indicators show positive dynamics, and some - negative. The net profitability of product sales during the study period had a negative value. This situation confirms the presence of financial and economic problems of JSC «Ukrposhta».

The cost of goods sold for 2023 also increased by UAH 729 670 thousand, the growth rate was 7.4%. This financial situation indicates the effective management of expenses at the enterprise and only requires further improvement of the management policy of this aspect of the financial and economic activity of JSC «Ukrposhta».

Considering the directions of digital solutions of JSC «Ukrposhta» demonstrate that the company is actively engaged in digitalization. So, back in 2020, «Ukrposhta» ordered the development of a new enterprise resource planning system (ERP system), which was supposed to replace 80 existing ones. The tender price of such a system was 96 million hryvnias.

Digitization of logistics at JSC «Ukrposhta» is a big step on the way to growth and scaling. Implementation of modern tools helps to save time and resources. This is a solution that guarantees a result. Analyzing the current state of project

implementation, we note that JSC «Ukrposhta» in record time completed the stage of implementation of the ERP system for the transfer of all processes and systems in the company to a digital format. In total, more than 70% of business processes were transferred to digital format in 9 months from the moment of project implementation. By the end of 2023, the work of all 26 regional branches has been consolidated, about 6,000 «Ukrposhta» employees have moved to work within the framework of a single platform with unified end-to-end business processes.

The presence of such problems in the work of JSC «Ukrposhta» as: violation of delivery terms, transport that is 50% empty in the return direction, downtime or overloading of sorting centres, the presence of queues at post offices, inconvenient time of delivery of goods to the client, the management system needs to be reviewed, including by increasing the quality of information support. Despite the already partial automation of logistics processes of JSC «Ukrposhta», existing problems point to the need for full automation of business processes and digitalization of postal services.

CHAPTER 3

PROJECT PROPOSALS FOR DIGITALIZATION OF PROCESSES IN POSTAL LOGISTICS OF JSC «UKRPOSHTA»

3.1. Digitalization of the logistics process management system in the postal chain of JSC «Ukrposhta»

In modern market conditions, the development and effective functioning of a postal operator is not possible without the use of information technologies. The presence of such problems in the work of JSC «Ukrposhta» as: violation of delivery terms, transport that is 50% empty in the return direction, downtime or overloading of sorting centres, the presence of queues at post offices, inconvenient time of delivery of goods to the client, the management system needs to be reviewed, including by increasing the quality of information support. Despite the already partial automation of logistics processes of JSC «Ukrposhta», existing problems point to the need for full automation of business processes and digitalization of postal services.

Considering that the digitization of business processes is only a separate component of information provision, which is a complex of processes of collection, analysis, storage, transmission and provision of information necessary for making management decisions regarding the implementation of business processes of the enterprise, and the requirements for the registration of this management information, we will investigate the peculiarities of automating logistics business processes of JSC «Ukrposhta» and formulate recommendations for their improvement.

Investigating the features of the digitization of logistics business processes, we note that the most popular solution for automating logistics is automated logistics management systems (Logistic Management System or LMS), which combine software tools and optimize all logistics processes of postal operators (from accepting orders for shipment to delivery to door to the client). At the same time, taking into

account the specifics of enterprise activity, the implementation and integration of LMS can take place according to the following scenarios:

- Independent creation of software;
- purchase of ready-made modules and adaptation to existing business processes;
- transfer of business processes to outsourcing.

Regardless of the choice of scenario of use of any LMS module, it needs integration with the ERP resource planning corporate information system, which is designed to automate accounting and process management. The implemented ERP system of JSC «Ukrposhta» provides management of the following processes: finance, production, distribution of stocks, marketing, postal, projects, service, quality assurance. However, ERP and LMS share a common database, which allows you to synchronize reporting and automate back-end processes.

Therefore, one of the most optimal approaches to the automation of logistics business processes of the postal operator JSC «Ukrposhta» is the expansion and integration of the ERP system with the developed specialized LMS modules.

Determine and combine the necessary LMS software tools (modules) for JSC «Ukrposhta» with the corresponding business processes (fig. 3.1).

1. The postal chain planning (PCP) system is a system of coordinating assets to optimize the delivery of goods, services and information from the supplier to the consumer, balancing postal and demand. The PCP suite sits on top of the transactional system and provides constraint-based scheduling of demand-satisfaction scenarios.

The stage of planning and optimization of the postal chain provides 80% of the value in the optimization of the company's costs, and therefore the operational strategy must be considered from the point of view of the entire logistics chain, since changes in one element of the system lead to changes in the entire postal chain.

The postal chain planning system includes [5, P. 386]:

- comprehensive business planning of sales and operations;
- planning of joint work (including forecasting and replenishment);
- strategic network design;
- planning of direct sales points;

- event planning (promotion, life cycle);
- demand planning;
- capacity planning of the company's assets;
- planning the distribution of the movement of goods (finding the optimal shoulders of the logistics chain).
- optimization of stock strategy (simultaneous, multi-level).

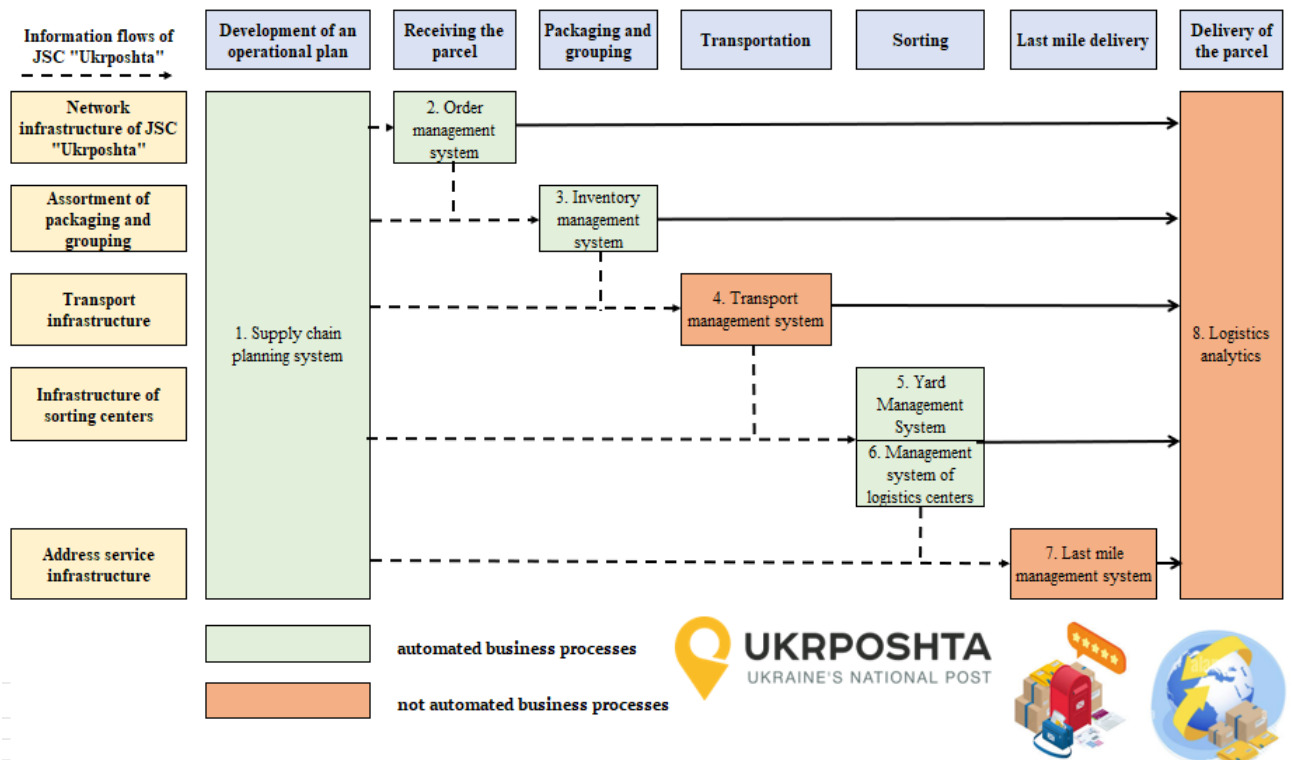


Figure 3.1 – Process model of automation of business processes of postal services

Source: developed by author according to [30]

The postal chain planning system provides [9]:

- making strategic and tactical decisions to meet the current demand for delivery services;
- planning the optimal method of transportation (air, rail, transport) to maintain a competitive price while increasing the speed of delivery;

- selection of the optimal plan for the postal and distribution of goods and material values that ensure the provision of services (the purchase price is not an optimal factor without the cost of delivery);

- selection of the best geographical location of capacities of sorting centres, depots, branches and other critically important facilities;

- determination of the time and place of opening or closing down the capacity of address service, container transportation, sorting centres, etc.

2. Order Management System is a system that allows you to automatically ensure the sale of delivery services (packaging, delivery, return, money transfer) and coordinate the processes of purchasing, replenishment of branches, logistics and other actions without the participation of the user. The order management software (OMS) receives orders from all sales channels (mobile application, personal account, contact centre, mailboxes, address service, branches) and controls the delivery process from the moment of the order to the moment of confirmation by the customer of the service. This system displays all information about the order: routes, adherence to movement schedules, location, grouping and packing inventory, integration with accounting for creating invoices and receiving payments, processing complaints, checking for fraud, etc.

The order management system provides:

- visual access to inventory of shipments and accompanying services at postal units, assistance in accounting and analytics;

- effective planning and control of logistics operations;

- sales support, which allows you to accurately fulfil obligations to the client;

- optimization of business processes and document flow related to the closing of applications;

- reduction of logistics costs.

3. Inventory Management System is a combination of technology (hardware and software), processes and procedures that control the monitoring and maintenance of commodity values, regardless of whether these goods are assets of the postal operator, materials or products ready for shipment or receipt by the consumer.

Inventory management systems organize and centralize the process of controlling the flow and maintenance of commodity values (pallets, packaging materials, bulk containers, etc.) to ensure the availability of the right amount of stock at the right time and of the right quality.

A complete inventory management system consists of:

- systems for identifying each item of commodity and material values and related information, for example, barcode labels or radio frequency tags.
- hardware for reading barcode labels or radio frequency tags, such as data collection terminals or smartphones with barcode and tag scanning software.
- inventory management software that provides a central location database for all inventory, as well as the ability to analyse data, generate reports, forecast future demand, and more.
- automated processes and policies regarding labelling, documentation and reporting. Should include inventory management techniques such as «Just in Time», «ABC Analysis», «First-In First-Out (FIFO)», «Stock Review» or other proven methodology [36, P. 70].

The inventory management system provides:

- improved cash flow;
- improved reporting and forecasting capabilities;
- reduction of storage costs (overhead costs);
- reduction of labour costs;
- reduction of dead stocks;
- increased transparency and accounting of goods material values;
- improved relations with suppliers and partners.

4. A Transportation Management System is a logistics system that uses technology to help a logistics business plan, execute, and optimize the physical movement of goods and make sure that shipments meet the stated reliability.

Consumer expectations are constantly increasing not only for on-time delivery, but even same-day delivery, with real-time updates provided throughout the delivery

process. Strengthening trade standards (benchmarked by Amazon) are also forcing postal chains to keep up with innovation by investing in transport management.

The transport management system consists of the following modules:

- transportation planning. TMS helps businesses choose the optimal shipment mode and best carrier based on cost, efficiency and distance, including multi-shoulder route optimization. A powerful TMS system can provide scheduling at every stage of the postal chain (international, interregional and regional traffic schedules).

- execution of transportation. TMS ensures on-time delivery through automated asset tracking and timely alerts to both shippers and consumers if shipments are behind schedule. Implementation features of transportation management systems vary widely, but may include coordination of cargo delivery and carrier management, documentation and tracking of cargo, and assistance with invoicing for transportation services provided. Enhanced by GPS monitoring systems, TMS solutions also provide tracking services – real-time information on adherence to traffic schedules on a route. Such advanced systems may also have the functionality to manage complex international logistics, including providing proper import and export documentation.

- optimization of transportation. TMS optimization capabilities typically include the ability to measure and track performance with reports, dashboards, analytics and traffic data.

The transport management system provides [9]:

- reduced costs for the logistics business and the end consumer;
- simplification of postal chain processes between countries, between regions and within the region;
- automation of business operations for faster and more accurate presentation of acts of services performed;
- improvement of visibility and safety of transportation shipments;
- time savings – less manual dispatching leads to less delays and faster delivery;
- the ability to track cargo both locally and globally on one platform;
- compliance with import and export regulations, minimizing fines and shipment delays;

- update of statistical information about the business;
- improved customer service and increased customer satisfaction with real-time updates and fewer delivery delays;
- the ability to scale business by meeting customer requirements for fast and timely deliveries.

5. The yard management system (YMS) is a system that allows you to control the traffic located on the territory adjacent to the subdivision. Moreover, the system helps to plan loading/unloading processes, optimizes work and minimizes downtime (of vehicles, transshipment docks, personnel, goods, etc.).

The transport management system provides:

- organization of information about the state of resources and processes;
- checkpoint support during the identification of drivers/guests and verification of the purpose of the visit;
- registration and verification of entries/exits from the territory subdivision;
- traffic management on the territory;
- checkpoint support during service queue management;
- management of transshipment docks;
- integration of logistics processes of transport and warehouses;
- improving the efficiency of sorting centres;
- the possibility of viewing the history of visits;
- full management information about logistics processes on the territory.

6. The warehouse management system (Warehouse Management System) is an information system that provides automation of management of the business processes of warehouse work of a specialized enterprise. Includes receiving, sorting and moving goods, managing warehouse staff using KPIs, maintaining safe working conditions and using software and hardware to locate and track items.

The warehouse complex management system consists of the following modules:

- warehouse design. Providing a 3D map of the warehouse building allows you to maximize storage space, manage inventory placement and improve shipment and workforce flow by prioritizing areas, shipment queues that require additional attention;

- shipment processing. The program, synchronized with the scanning device (data collection terminal, sorting line scanner, radio frequency antennas, etc.), helps to accurately determine the movement of shipments throughout the warehouse building. The system also helps to track the location of the shipment for quick search;

- labour management. Control over human resources in warehouse operations involves the use of a labour management system integrated into the WMS. First, the system assigns tasks to individual employees of the warehouse using workforce planning capabilities. This allows you to monitor labour productivity, identify weak shifts or employees. The job history environment shows the entire history of employee activity, which can be used to analyse peak work, optimize workflow, and find solutions where bottlenecks occur. In the long run, this will lead to increased productivity and efficiency while reducing labour costs.

The warehouse management system provides:

- organization of rational placement of shipments;
- effective management of shipment reception and shipment, acceleration of grouping, elimination of errors during preparation of cargo for loading;
- performance of all functions, eliminates inefficient work with papers;
- the quality and controllability of the work of the warehouse staff;
- simplification of obtaining information about the number and location of shipments;
- optimization of the use of warehouse space;
- effective management of shipments with priority delivery speed;
- minimization of warehouse inventory work.

7. Last Mile Management System is an information system that provides management of the last step of the delivery process (from the address depot to the address of the final consumer). Automating the last mile management process enables same-day delivery speeds with a predictable delivery time window and cost optimization, as last mile delivery can account for up to a third or more of the total cost of delivering a product.

The last mile management system consists of:

- route optimization. The software can monitor the situation anywhere and suggest routes, making it easier for dispatchers and drivers to find the fastest and safest route in real time.

- dispatching in real time. Automatic service of drivers, dispatchers and customers. By tracking the courier's current location and estimated time of arrival, dispatchers know exactly what the situation is in terms of estimated time of arrival. It also allows postal operators to provide consumers with accurate information about when a shipment will arrive at an address.

- generation of reports. The system tracks, collects and analyses data, offering a variety of reports that can help fleet managers understand the current performance of their operations, including detailed logs of all door-to-door deliveries.

The last mile management system provides:

- automated route optimization;
- a smart delivery coordination algorithm;
- tracking in real time;
- delivery rescheduling;
- interactive information panel;
- electronic confirmation of delivery.

8. Logistics Analytics Software – software for analysis and coordination of the logistics function and postal chain to ensure smooth operations and effective resource management.

The development of digital technologies in postal chain management is driving rational changes in the logistics activities of JSC «Ukrposhta», the postal operator, and transforming business processes in online networks and the digital economy as a whole. Today, more and more of the world's leading postal operators are implementing so-called digital technologies in their postal chains. Digital postal chain management (digital postal chain) is an efficient process of creating value, using innovative approaches with the help of technological and analytical methods, and generating new forms of profit. In general, it is worth noting that the variety of technologies in postal chains can be grouped into the following groups, which are presented in table 3.1.

Table 3.1 – Digital areas in postal chains and their characteristics

Name of the group	Functions	Digital technologies
Data analysis and visualization	<ol style="list-style-type: none"> 1. Navigation of business processes 2. Postal chain monitoring 3. Planning of the company's activities in real time 4. Data processing and predictive analytics 	<ol style="list-style-type: none"> 1. Big data (Big Data) 2. Artificial Intelligence (AI) 3. Cloud computing 4. S&OP platform 5. Smart storage
Communication between participants of the postal chain	<ol style="list-style-type: none"> 1. Automated supplier search 2. Ensuring the process of electronic commerce 3. Synchronization of postal chain processes 4. Ensuring communication between elements of the postal chain 	<ol style="list-style-type: none"> 1. Smart Fulfilment Solution 2. Blockchain 3. Marketing in social networks 4. Feedback loop 5. Industrial cloud
Automation of management processes	<ol style="list-style-type: none"> 1. Flexible production automation 2. Development of virtual analogues of goods 	<ol style="list-style-type: none"> 1. Digital doubles 2. Sensors 3. Augmented reality 4. Virtual reality 5. Internet of Things (IoT)

Source: compiled by the author based on [5, 6, 9, 15, 16]

According to the table 3.1, there is presented three areas in postal chains: data analysis and visualization, communication between postal chain participants, automation of management processes. Digitization of the postal chain will allow JSC «Ukrposhta» to meet today's challenges, new requirements of potential customers, as well as expectations for improving work efficiency.

In fig. 3.2 present the Sources of increasing economic efficiency in the postal chain of JSC «Ukrposhta» and the main requirements for the integrated logistics information system of postal chain management, with the aim of logistical coordination of participants in the transport process of JSC «Ukrposhta».

Also, the integrated logistics information system of JSC «Ukrposhta» will be able to help in the coordination of partners during the delivery of goods to the final consumer, which in the modern world is called «last mile logistics» (fig. 3.3).

Note that in the last few years there has been an explosive growth of the E-commerce sphere. All over the world, including in Ukraine, online stores are opening e-shops. Under these conditions, courier delivery of JSC «Ukrposhta» becomes one of the most demanded services in the field of trade organization.



Figure 3.2 – Approaches of increasing economic efficiency in the postal chain of JSC «Ukrposhta with the aim of logistical coordination of participants

Source: developed by the author

In the logistics chain of JSC «Ukrposhta», it is possible to distinguish 3 key links, which are called miles:

1. The first mile. At this stage, the postal of products from the manufacturer to the general distribution centre is realized.
2. Middle mile. Transportation of goods to regional warehouses.
3. The last. Delivery to the final consumer.

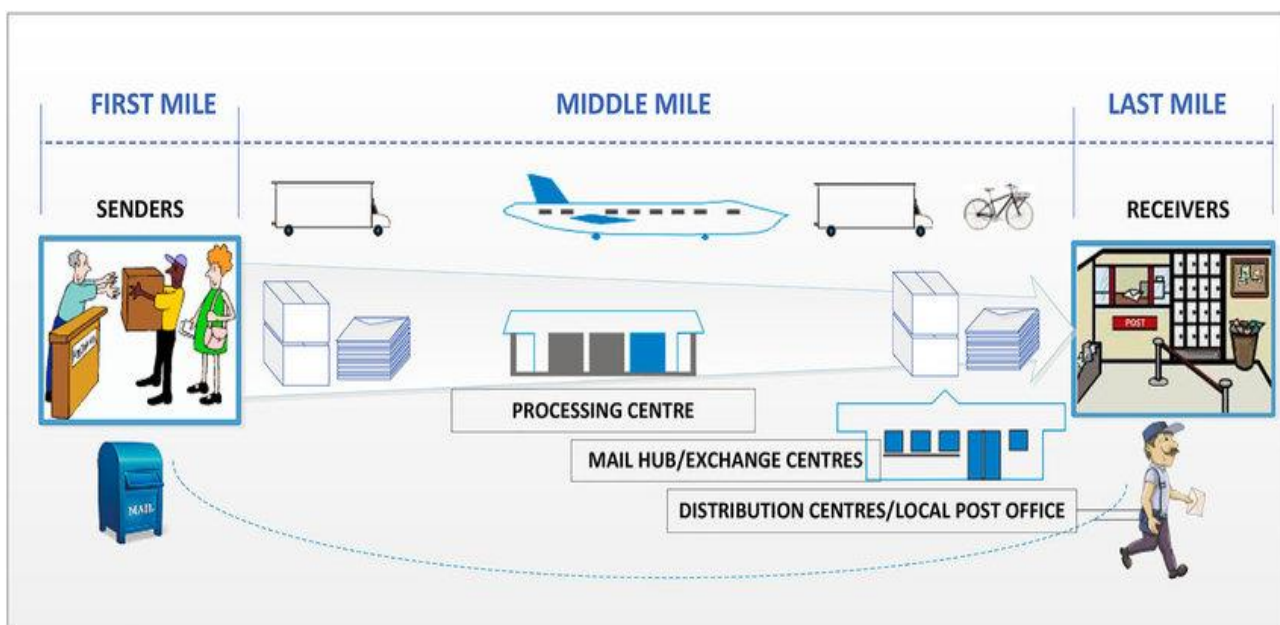


Figure 3.3 – The structure of the postal chain of JSC «Ukrposhta» with the participation of air transport

Source: [36]

That is, the last mile in logistics for JSC «Ukrposhta» is the final stage at which transportation from the warehouse to the customer is realized. For this purpose, JSC «Ukrposhta» engages other courier services or postal operators in other countries.

Prompt, timely delivery to the final consumer for JSC «Ukrposhta» can significantly increase the reputation of the trading company in the eyes of the client. Thus, globalization and improvement of IT technologies are changing entire sectors of the economy. The postal operator JSC «Ukrposhta», which is on the threshold of transforming its business processes, is no exception. Digitization technologies open up new opportunities for the postal operator in increasing efficiency, improving speed and reliability, and developing innovative products and services. And therefore, the domestic postal operator JSC «Ukrposhta» needs to implement a modern delivery model, improved due to information technologies in the logistics process management system.

Logistics digital technologies are an innovative trend of sustainable development, improving the company's image and increasing investment attractiveness in the long term. Rational cooperation and effective interaction between

participants of the postal chain for JSC «Ukrposhta» is the key to increasing transparency and effectiveness at all logistical stages, starting from the moment of sending the product to its receipt by the end consumer.

Blockchain technology for JSC «Ukrposhta» can facilitate the logistics process of delivering goods and services. Thanks to the blockchains that make up this decentralized system, companies are able to improve their postal chains while ensuring fast and efficient delivery.

The main goal of blockchain technology is to ensure the process of recording and distributing digital information that cannot be forged or deleted by third parties [41].

The generalized scheme of blockchain functioning is illustrated in fig. 3.4.

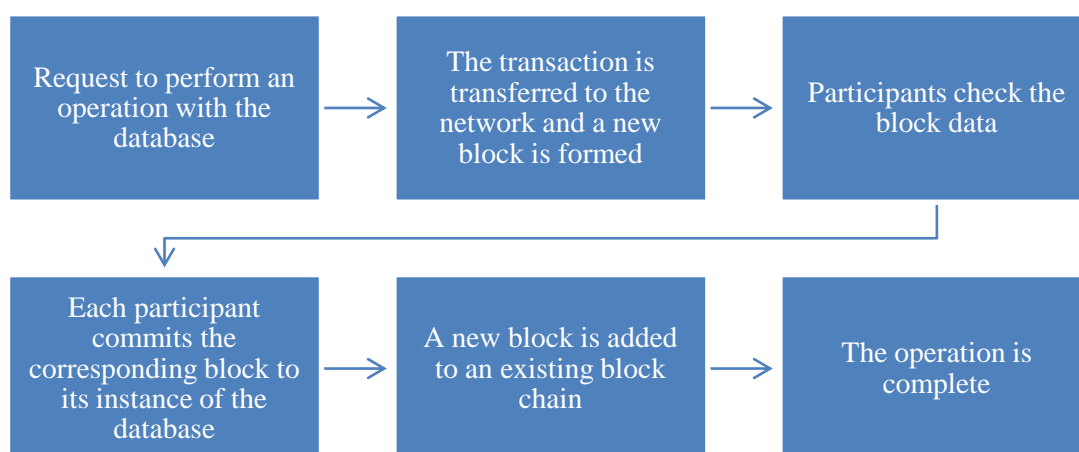


Figure 3.4 – Generalized diagram of blockchain technology functioning

Source: developed by the author based on [41]

According to fig. 3.4 highlighted the generalized scheme of the operation of the blockchain technology, based on which the processes of interaction of participants, formation of relevant blocks and keys, encryption of certain records take place.

Thus, the implementation of blockchain technology in the practice of JSC «Ukrposhta» makes it possible to reliably track the transparent process of parcel delivery from the manufacturer to the end consumer, to make it effective by reducing time, minimizing costs and risks. Such an Internet platform with transparent and

reliable information is a promising innovative business trend for the world's leading logistics operators.

It is worth noting that blockchain technology improves the postal chain management process by tracking processes, checking their compliance with regulatory requirements.

It is worth noting that innovation in the logistics postal chain based on blockchain technology will have the potential to create and deliver value by increasing postal chain transparency, minimizing risk and improving the overall efficiency of postal chain management.

It is worth presenting a modern approach to using blockchain technology from the point of view of postal chain participants (table 3.2).

Table 3.2 – Modern approach of using blockchain technology for JSC «Ukrposhta»

Postal chain participants	Current restrictions	The current impact of blockchain
Producer	The lack of an opportunity to transparently prove the origin and quality indicators of products	Tracking goods throughout the postal chain
Distributor	Limited possibility of certification, tracking of goods, problems with trust	The possibility of obtaining confirmation of the location of the product, its certification
Wholesaler		Checking the origin of the goods, complete information about the route
Retailer		Ability to effectively handle returns of defective products
Consumer	Lack of trust regarding product compliance with standards, its quality	Complete product information at all stages of the logistics chain

Source: developed by the author based on [43, 44, 45]

According to the table 3.2 presents a modern approach to the use of blockchain technology by participants in the logistics postal chain for JSC «Ukrposhta».

Thus, summarizing the above, it is worth saying that the implementation of blockchain technology in the postal chains of JSC «Ukrposhta» can bring many advantages for various parties, namely: transparency and traceability of the postal chain, inventory and tracking of cargo, verification of the origin of goods and quality assurance, increase operational efficiency and investment attractiveness for potential partners.

Consistency of the above-mentioned flows is necessary for the rational functioning of the enterprise's logistics activities, transparency of logistics processes and operations, and minimization of logistics costs. JSC «Ukrposhta» faces a number of problems that hinder and slow down the company's development.

The analysis of the conducted research revealed and allowed us to form the main problems of the logistics activity of JSC «Ukrposhta», which will present in fig. 3.5.

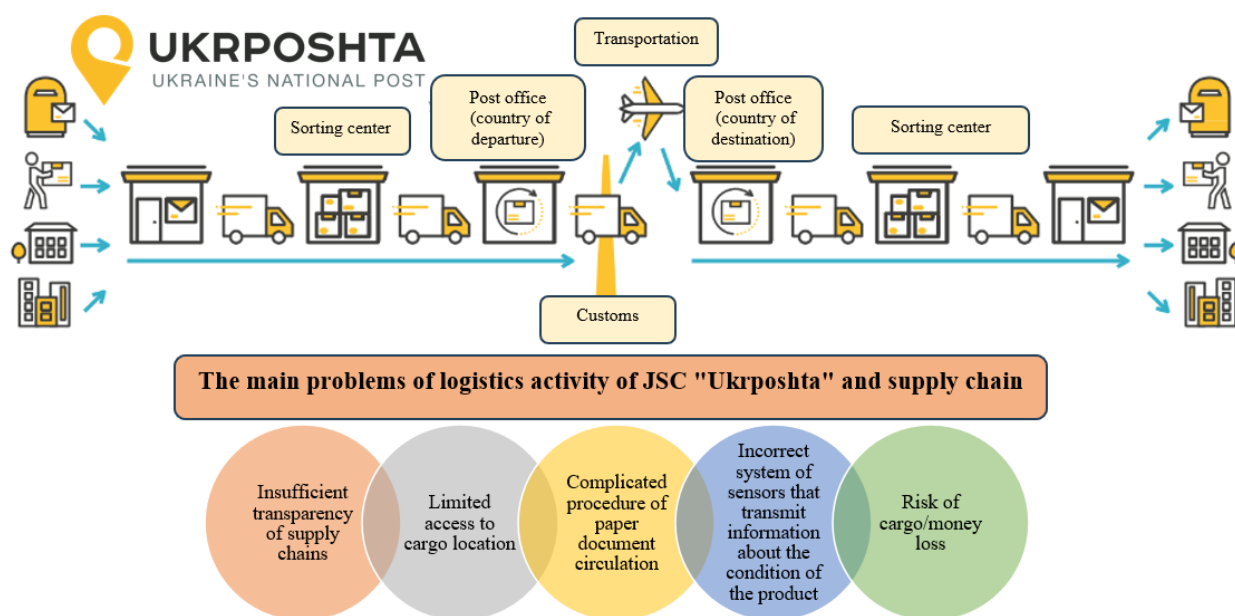


Figure 3.5 – The main problems of logistics activity and the postal chain of JSC «Ukrposhta»

Source: developed by the author

According to fig. 3.5 typical problems are multi-stage postal chains and lack of transparency in logistics stages. To avoid and minimize the consequences of the above-mentioned problems, constant control of the logistics cycle of goods or services is

necessary. Blockchain technology is able to control every process of the logistics chain, to provide timely and reliable information about the product. For the smooth functioning of such a chain, it is important to have complete and reliable information about the movement of the product with the help of decentralized records – blockchain technology. The very application of this technology is a universal solution to correctly and accurately record and control certain elements of the postal chain, as well as to ensure the safe tracking of specific operations (fig. 3.6).

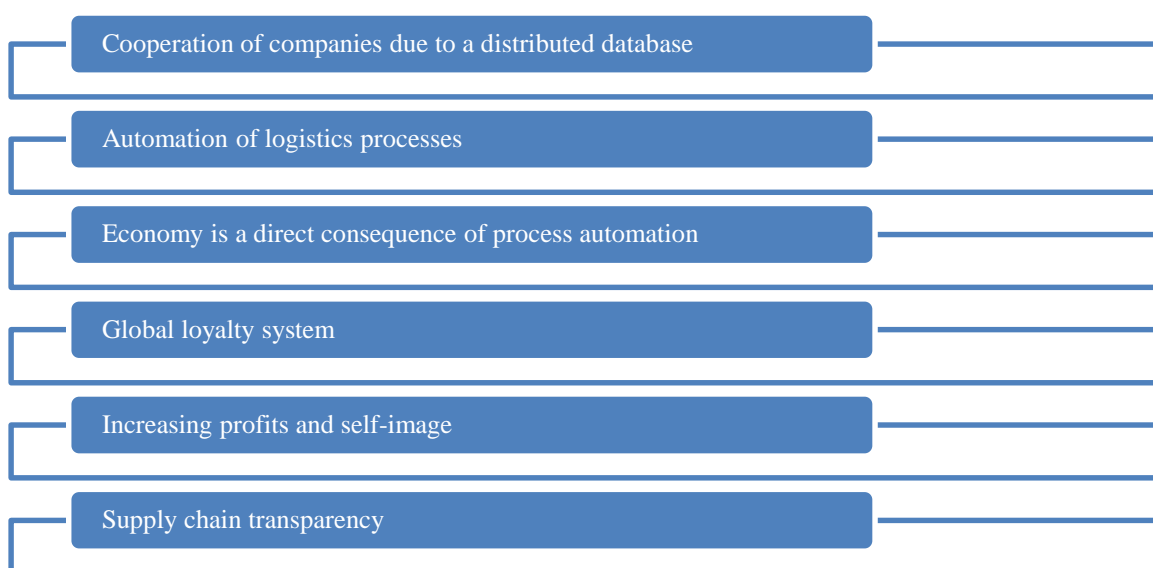


Figure 3.6 – Blockchain implementation prospects for JSC «Ukrposhta»

Source: developed by the author

According to fig. 3.6 presents the main prospects for the implementation of blockchain technology for the management of logistics postal chains for JSC «Ukrposhta».

The introduction of blockchain technology will allow solving the identified problems and will ensure: tracking of cargo in real time, reduction of the work process, minimization of time for financial procedures, reduction of material costs due to the absence of the need for powerful servers, reduction of the probability of market manipulation (monopoly of large companies at the expense of significant capital), increasing transparency at all stages of product postal chains.

3.2. Development of a project for the digitalization of postal logistics processes for JSC Ukrposhta based on blockchain technology

Having studied the economic and logistical activities of the postal operator and characterized the prospects of blockchain technology for JSC «Ukrposhta», it is worth noting the effectiveness and feasibility of its implementation in the practice of the company's logistics activities. For transparent tracking of postal chains, blockchain technology is a universal and optimal solution for JSC «Ukrposhta», since all participants in the logistics postal chain store a «live copy» of all data without a central server.

Any new entry in the book is always freely available to all participants in the process who are able to track the location of the cargo. Thus, every normal work process is digitized, and this, in turn, allows to accelerate the flow of information and leads to significant savings of time and money and is a guarantor of confidentiality.

It is worth highlighting the general scheme of the organization of the postal chain using blockchain technology (fig. 3.7).

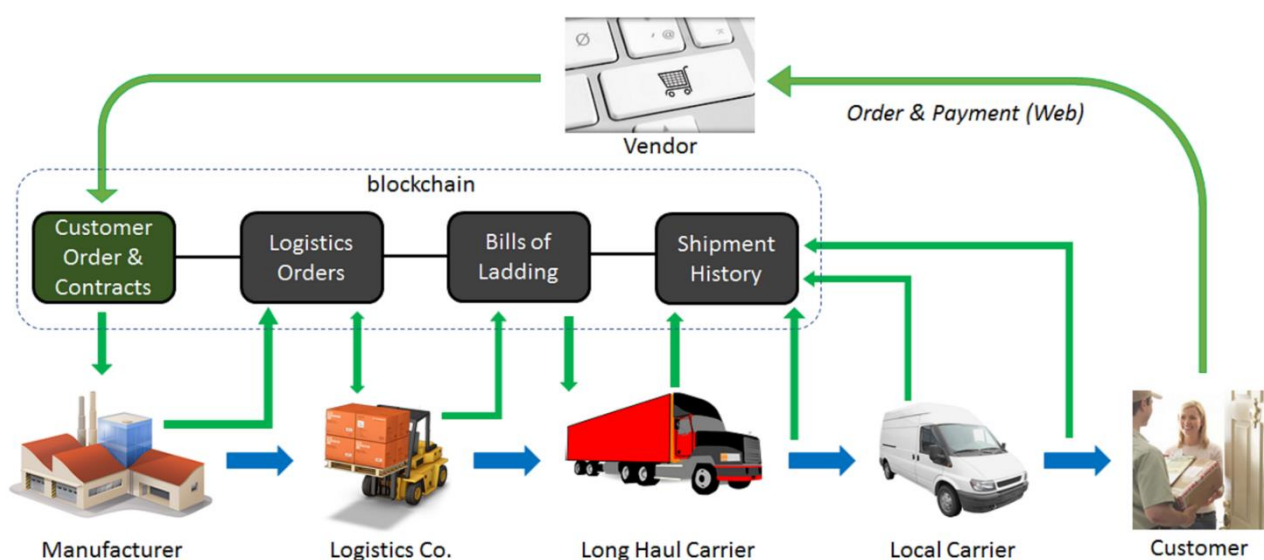


Figure 3.7 – Blockchain-based postal chain organization chart infographic
Source: [63]

Based on fig. 3.7 that presents a generalized diagram of a logistics postal chain based on blockchain technology was developed the main stages of implementation of the proposed blockchain technology in the postal chains of JSC «Ukrposhta», which is presented in fig. 3.8.

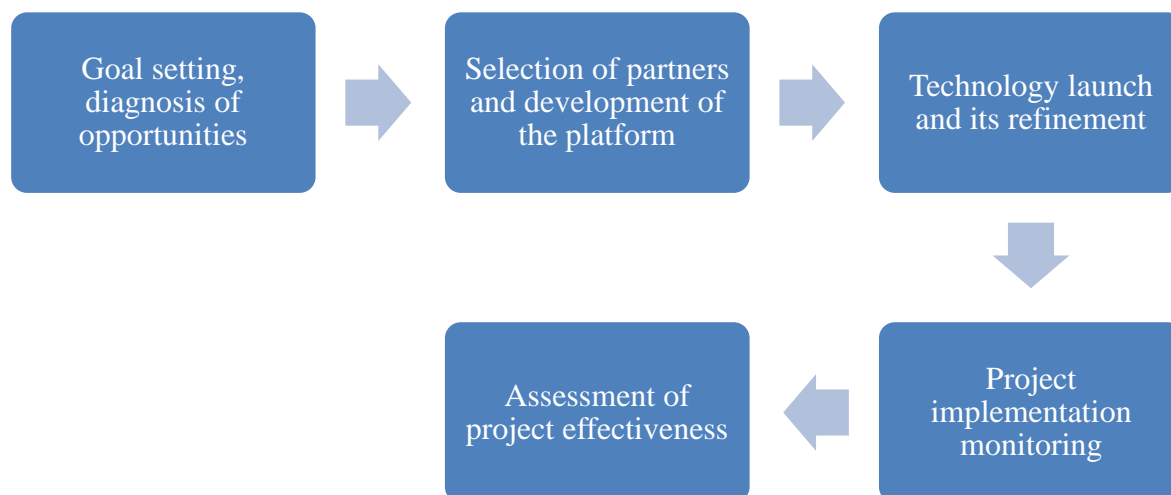


Figure 3.8 – Stages of implementation of blockchain technology at JSC «Ukrposhta»

Source: developed by the author

It is appropriate to highlight the option of possible partners for JSC «Ukrposhta» regarding the implementation of blockchain technology in postal chains (table 3.3).

According to the results of the table 3.3 presents and characterizes the main possible partners for JSC «Ukrposhta» and the results of implementing blockchain technology in their activities. Due to the fact that DHL is the leading European postal operator in Europe, it is worth choosing this company as a future partner.

Then in detail consider the TradeLens blockchain platform, its features and operating principle. The main characteristics of this blockchain platform are presented in fig. 3.9.

Figure 3.9 presents the general characteristics of the TradeLens blockchain platform. TradeLens is built on its global postal chain ecosystem (fig. 3.10).

Table 3.3 – Potential partners for JSC «Ukrposhta» for the introduction of blockchain technology

The company name	Blockchain project	Results of technology
Maersk, a shipping and logistics giant in Denmark, also works with Microsoft to provide marine insurance	Together with IBM, they created the TradeLens platform for the digitization of postal chain information	<ol style="list-style-type: none"> 1. Successfully takes on board almost 50% of container ships worldwide 2. In 2020, processed about 1 billion shipments, 12 million documents and about 30 million containers 3. The indicators of 2020 more than doubled the estimates of the previous year
"Boeing HorizonX" - using the power of Hyperledger Fabric and Go Direct has the potential to launch autonomous flying taxis	SkyGrid – serves as a blockchain air traffic control system for tracking and communicating with drones	<ol style="list-style-type: none"> 1. Received FAA approval for low altitude clearance for drone pilots 2. Available as a free iPad app 3. Creates a permanent record of data to aid in package delivery and industrial inspections
"Daimler" is one of the largest automotive multinational corporations, producing luxury cars such as Mercedes-Benz	Collaborating with Circular, working on a blockchain project that will track CO2 emissions in the Cobalt postal chain	<ol style="list-style-type: none"> 1. Significant reduction of CO2 transmission 2. Tracking any amount of secondary material that may come from cobalt mining
Sync.io combines deep industry expertise, dynamic software solutions and an award-winning digital platform	The Ssync.io Logistics Orchestration platform works to provide delivery accountability and analytics	<ol style="list-style-type: none"> 1. Management of documents 2. Automation of orders 3. Access to a common business network
DHL is a global delivery logistics giant	The TradelX platform maintains a digital ledger of shipments and supports the integrity of transactions	<ol style="list-style-type: none"> 1. Automation of the company's work 2. Reducing the probability of errors
ShipChain – Based in Los Angeles, aims to modernize the \$8.1 trillion postal chain market. dollars USA using blockchain	ShipChain is a fully integrated blockchain system that serves the end-to-end shipping process	<ol style="list-style-type: none"> 1. Transparent tracking from the moment the cargo is sent to the destination 2. Documentation of each cargo movement

Source: developed by the author based on [15, 16, 63]

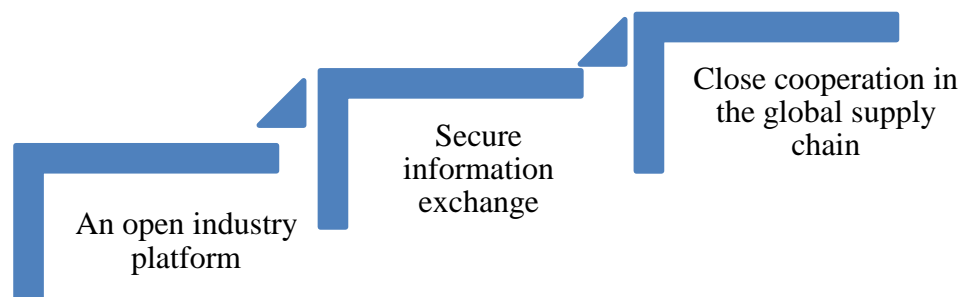


Figure 3.9 – The main characteristics of the TradeLens blockchain platform

Source: [63]

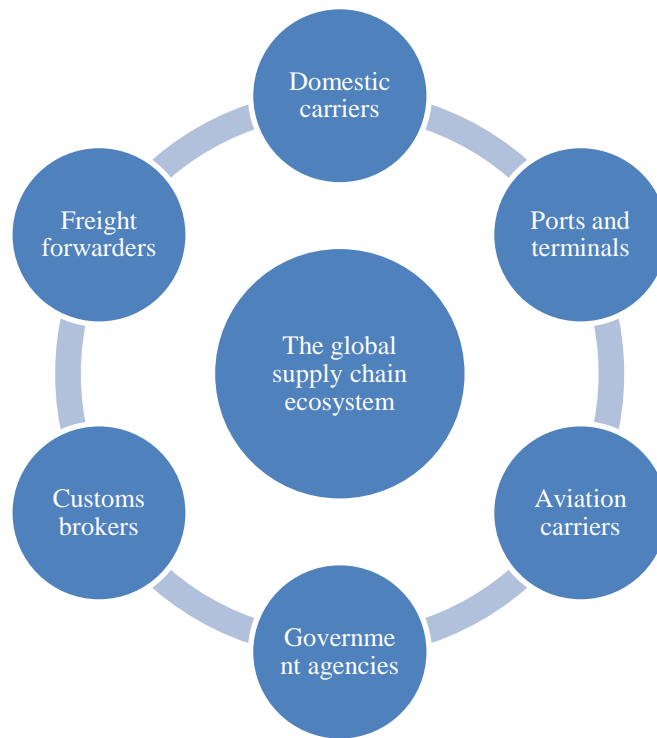


Figure 3.10 – TradeLens global postal chain system

Source: [63]

Figure 3.10 presents the business network of the logistics postal chain, which consists of shippers, forwarders, inland carriers (including air, road transport), ports and terminals, sea carriers, intermodal operators, government agencies, customs brokers, etc. Each organization shares information that can be tracked, stored and used within a common neutral network throughout the entire logistics chain of cargo.

The TradeLens blockchain platform is accessible through an open API (Application Programming Interface) and unites the ecosystem through a set of certain open standards.

The Marketplace is an environment that allows TradeLens and third parties to develop, test and deploy applications and smart contracts. Testing takes place in the so-called virtual environment of a platform with similar properties and a set of data as a regular network, which operates with fake money and does not affect the real world in any way.

The TradeLens Marketplace accelerates postal chain innovation by offering applications and services that seamlessly integrate with the TradeLens platform, facilitating postal chain innovation and creating value for potential customers.

It is appropriate to highlight the potential advantages of the TradeLens blockchain platform for JSC «Ukrposhta», which are highlighted in fig. 3.11.

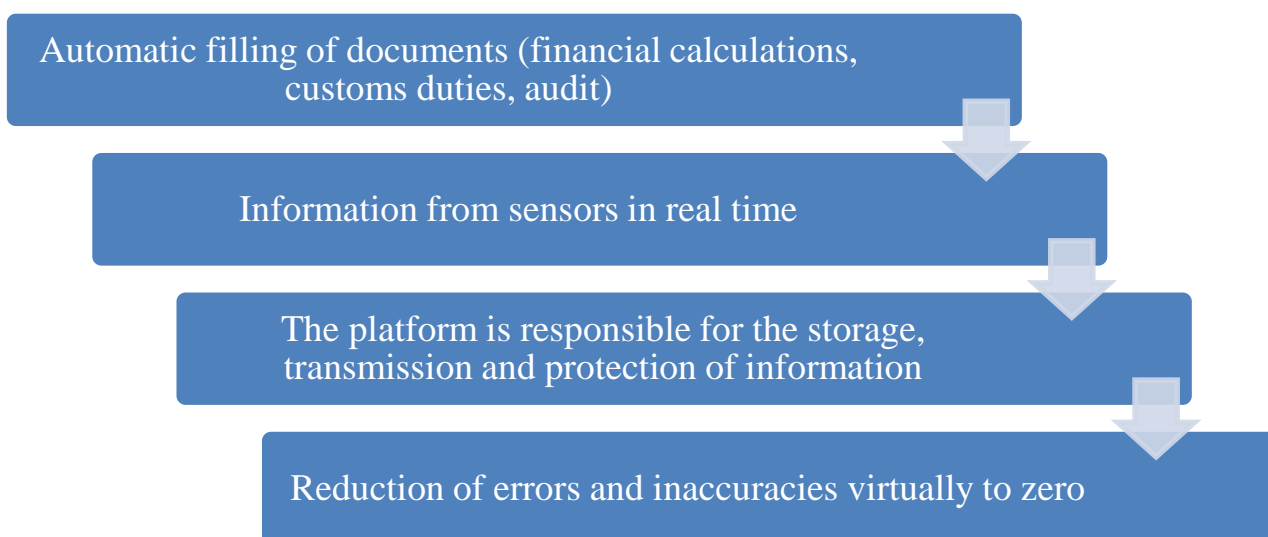


Figure 3.11 – Advantages of TradeLens for JSC «Ukrposhta»

Source: developed by the author

According to fig. 3.11 data is used for automatic filling of documents and other interactions: financial calculations, payment of customs duties, audit, etc. Thanks to these automatic interactions, the system significantly speeds up and simplifies document flow, makes financial calculations more reliable and secure. So, the blockchain in this scheme plays the role of a database that is responsible for storing, transmitting and protecting information, and also serves as a guarantor that the information entered into the system is genuine and does not contain errors or any inaccuracies. That is, the TradeLens system is a transparent and secure access to data.

At the heart of the TradeLens project is a business network that directly consists of senders and receivers, forwarders, carriers, terminals, customs brokers, government authorities - all of these are participants in the logistics postal chain.

Now let's take a closer look at the working principle of TradeLens for JSC «Ukrposhta», which is presented in fig. 3.12 Tradelens blockchain.

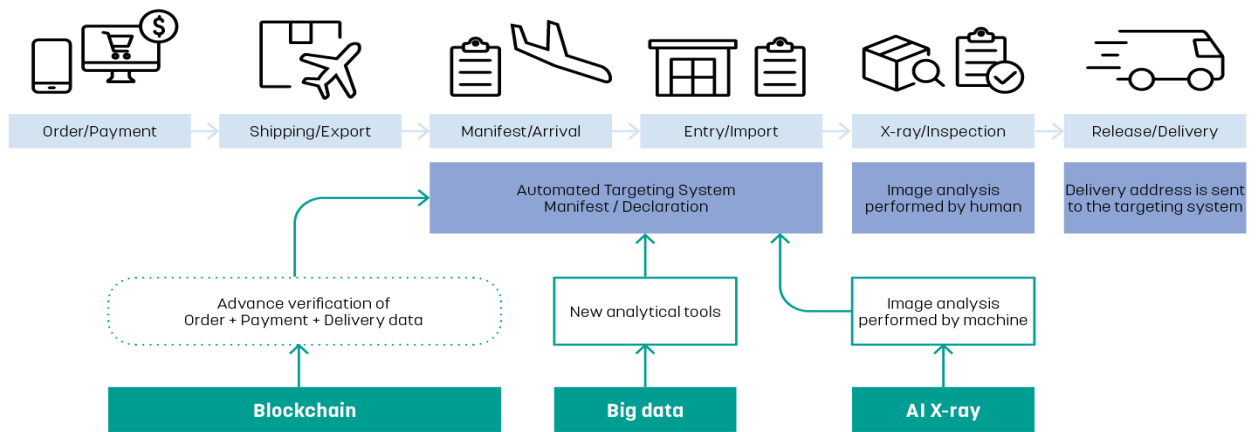


Figure 3.9 – Infographic of the principle of TradeLens work for JSC «Ukrposhta»

Source: [63]

Sensors are attached to the cargo, transport and necessary equipment that monitor the location and other indicators: temperature, humidity of the cargo, etc. This allows to track the cargo and its condition. In predefined cases, individual sensors can interact with each other using smart contracts. It looks like this: if the box sensor gets into the truck, it transmits information about itself and what is inside to the truck sensor. Thus, the truck always knows what it is transporting. When this truck arrives at the terminal, its sensor transmits information about the box and what it is carrying to the terminal.

Taking into account the above, it is worth saying that the proposed concept of the functioning of the TradeLens blockchain platform in the logistics postal chains of JSC «Ukrposhta» is worth considering and implementing into the company's practice.

3.3. Calculation of project proposals and justification of the results of the proposed project

Blockchain technology in postal chains significantly increases their manageability and transparency, and also allows to identify the main causes of delays

or losses of one or another cargo. It is worth noting the main advantage of the technology - provision of synchronized audit between partners and optimization of logistics processes in real time.

According to DHL's research, after the implementation of blockchain, the company saw a reduction in document processing costs, so with the use of the blockchain platform, costs were reduced by 70-90% (depending on the specific postal chain, as well as its participants). The time of transportation has also decreased. Within Europe, the time of delivery of goods was reduced by 40% due to the reduction of time at customs (operations in seaports and airports) and acceleration of document processing.

In general, DHL declares the following reductions in logistics costs from the implementation of blockchain technologies [64]:

- As part of the cost of goods sold (3% of logistics costs);
- As part of administrative costs (12% of logistics costs);
- As part of costs for product sales (8% of logistics costs).

The implementation of the proposed project requires certain costs, and as mentioned earlier, the project requires significant costs, because it is the IT field. Since cooperation with the German international transport and logistics company DHL is proposed, which has already developed and implemented a blockchain platform, the costs will be significantly lower.

To begin with, it is necessary to present a table with the total costs for the implementation of the proposed project on the implementation of blockchain technology in the postal chains of JSC «Ukrposhta» (table 3.4).

According to the table 3.4 initial total costs for the implementation of the proposed blockchain project for JSC «Ukrposhta» will amount to UAH 1,355.00 thousand. Since the implementation of this project requires significant costs at the initial stage, it is advisable to use investments.

It is appropriate to present the necessary costs for the implementation of the proposed project for JSC «Ukrposhta» (table 3.5).

Table 3.4 – Initial investment for the implementation of the proposed blockchain project for JSC «Ukrposhta»

Required resources	Cost, thousand UAH.
Licensing purchase	35
TradeLens blockchain platform business plan	50
Development of own website, acquisition of digital content	20
An additional level of security (in the digital space)	150
New business models of calculations (sensors)	950,00
Training and retention of personnel, involvement of mentors	150
In total	1 355,00

Source: [65]

Table 3.5 – Operating costs for implementing blockchain technology

Cost components	Years			
	1 st	2 nd	3 ^d	4 th
The process of preparing for the introduction of blockchain technology, thousand UAH	120	-	-	-
Development of a corporate logistics solution based on technology, thousand UAH	230	-	-	-
Professional support of mentors, thousand UAH	380	-	-	-
Advanced training courses (continuous development of employees), thousand UAH	360	360	360	360
Electricity costs, thousand UAH	1 100,00	1 200,00	1 300,00	1 400,00
Other expenses (breakdown of equipment, additional resources), thousand UAH	210	210	210	210
Total, thousand UAH	2 400,00	1 770,00	1 870,00	1 970,00

Source: compiled by author according to [64, 65]

According to the table 3.5 having a license to use the TradeLens platform, a business plan and a developed site for the process of preparing for the implementation of blockchain technology will require approximately UAH 120,000. The development of a corporate logistics solution based on blockchain technology will amount to UAH 230,000.

In order to provide professional support, three mentors from the international companies «DHL» and «IBM» will be involved in the implementation of the project for a period of three months. On average, their salary per month will be UAH 150,000,

and taking into account the period of support, it turns out that the costs of their maintenance will amount to UAH 380,000.

It is important to attract highly qualified personnel and maintain the quality of the existing postal chains for efficient operation and smooth management of postal chains. Therefore, the company must allocate considerable funds for the continuous development of its own employees. The costs will be approximately UAH 360,000. in a year.

Possible economic effects in terms of cost components from the implementation of blockchain technology in the practice of the postal operator JSC «Ukrposhta» are presented in the table 3.6.

Table 3.6 – Possible economic effect of blockchain technology

Possible economic effect	Value, thousand UAH
As part of the cost of goods sold (3% of logistics costs)	223787,088
As part of administrative costs (12% of final costs)	120093,204
As part of costs for product sales (8% of logistics costs)	15750,112
In total	359 630,40

Source: compiled by the author

According to the table 3.6 highlighted the possible economic effects of the functioning of the blockchain technology in the practice of the activity of the postal company. That is, in the case of the functioning of the technology in 2023, JSC «Ukrposhta» could save UAH 359,630.40 thousand logistics costs.

The cost of goods sold includes such logistics costs as fuel and energy costs, transport costs (namely, internal movement of parcels), repair and maintenance of own trucks, fees for packing parcels, etc. Since these costs are essentially unchanged for the efficient functioning of the postal chain, the implementation of this technology will reduce the cost of production by approximately 3%. This possible economic effect occurs precisely at the expense of reducing the labour intensity of performing certain functions during the automation of business processes and rationalization of the document flow process necessary for registration of trucks/parcels, etc.

Administrative and logistics costs include payments to employees of branches, terminals, drivers, as well as depreciation deductions for office furniture and office equipment of logistics departments. Blockchain technology provides for a significant reduction in costs due to the rationalization of the distribution of functions between employees of the logistics department and the reduction of the physical presence of employees in the company's offices, so as a result of a 12% reduction in costs directly for office equipment and stationery of logistics departments.

Costs for the sale of parcels include costs for insurance of goods, costs for transportation of finished products (namely, delivery of parcels to a distribution warehouse or directly to the customer), costs for repairing containers and repackaging parcels. Reduction of costs by approximately 8% when working with potential customers due to the use of a system with a fixed interval between orders and rational management of an information system with feedback.

A significant part of the costs of the implementation of the blockchain project is precisely the cost of electricity, since the process of functioning of a powerful digital information network and the direct operation of the TradeLens platform is supported thanks to electricity. JSC «Ukrposhta» will spend almost 46% in the first year specifically on electricity. Take into account possible other costs, approximately 9% in case of equipment breakdown, purchase of necessary additional resources, etc.

The distribution of the effect from the implementation of the blockchain by the period of implementation by years for the calculation of project efficiency indicators is presented in the table 3.7.

Table 3.7 – Distribution of the effect of blockchain implementation by implementation period by year

Distribution of the effect of the implementation of blockchain by the period of implementation by years	Percentage distribution of the possible economic effect, %	Value, thousand UAH
1	15	1893,454
2	25	3155,757
3	30	3786,908
4	30	3786,908

Source: compiled by the author

It is appropriate to highlight the calculation of actual cash flows with a discount rate of 14% and 20% in the case of implementing the proposed project in the company's practice, which is presented in the table 3.8.

Table 3.8 – Calculation of actual cash flows of the project with a discount rate of 14% and 20%

Years, t	Investments, thousand UAH.	Benefits Bt, ths. UAH	Costs Ct, ths. UAH	Net benefits Bt – Ct, ths. UAH	Discount factor, i=14	Net discounted cash flow, ths. UAH	Discount factor, i=20	Net discounted cash flow, ths. UAH
0	1 355,00	-	-	-	-	-1 355,00	-	-1 355,00
1	-	1 893,45	2 400,00	-726,55	0,88	-637,32	0,83	-605,45
2	-	3 155,76	1 770,00	1 385,76	0,77	1066,29	0,69	962,33
3	-	3 786,91	1 870,00	1 916,91	0,67	1293,86	0,58	1109,32
4	-	3 786,91	1 970,00	1 816,91	0,59	1075,76	0,48	876,21
Total		12 623,03	9 365,00	3 258,03		838,05		407,43

Source: compiled by the author

According to the calculations in the table 3.8 project benefits were calculated according to the data in the table 3.7. All calculations were made in Excel. According to the calculations, it can be seen that the net present value of NPV is 838,05 thousand UAH at a discount rate of 14% and 407,43 thousand UAH at a discount rate of 20%. The obtained data indicate a positive result, that is, the investor receives this amount of money in case of payback of the initial investments involved in the implementation of the project.

Next, we will calculate the discounted investment payback period:

At a discount rate of 14%: $DPP = 1 + |-1802,97| / 1066,29 = 2,531$.

At a discount rate of 20%: $DPP = 1 + |-1551,29| / 962,33 = 2,612$.

This indicator indicates the payback of the project in 2nd year and 6 months in two cases, and therefore, the implementation of the proposed project on the implementation of blockchain technology in the postal chains of JSC «Ukrposhta» is economically feasible.

The next step is to calculate the profitability index (return on investment):

At a discount rate of 14%: $PI = 1802,97 / 1,355.00 = 1,331$.

At a discount rate of 20%: $PI = 1396,57 / 1,355.00 = 1,031$.

The profitability index in two cases is more than 1, which indicates that the project to improve postal chains based on blockchain technology is effective and feasible for implementation.

Then calculate the discounted rate of return on investment:

At a discount rate of 14%: $DROI = 1,331 - 1 = 0,331$.

At a discount rate of 20%: $DROI = 1,031 - 1 = 0,031$.

The DROI coefficient must be more than 0, since in these cases the discounted coefficients are $0,331 > 0$ and $0,031 > 0$, that shows that the project is accepted.

It is also worth calculating the benefit/cost ratio, which shows how much the firm receives from one UAH invested:

At a discount rate of 14%: $BCR = 8887,386 / 7084,412 = 1,254$.

At a discount rate of 20%: $BCR = 7787,122 / 6390,548 = 1,219$.

It is advisable to finance the project in the case when $BCR \geq 1$, i.e. the proposed project can be accepted in both cases, since one UAH invested accounts for 1,254 UAH ($r=14\%$) and 1,219 UAH, respectively, of profit ($r=20\%$).

So, in the conclusion present a generalized table of results of the proposed project (table 3.9). The main components of the formulas described in table. 3.9 following:

B_t – project benefits in year t ;

C_t – project costs in year t ;

$1 / (1 + i)^t$ – discount factor;

i – discount rate;

KPV_t – cumulative cost of year t (last negative value), UAH;

PV_{t+1} – discounted cash flow value in year $t+1$, UAH.

$(B_t - C_t)$ - net benefits of the project in year t ;

t – duration of the project;

IC – volume of investments, UAH.

According to the table 3.9 presents a generalized table of indicators for evaluating the effectiveness of the proposed blockchain project. Thus, taking into account the above-mentioned calculations of indicators in two cases (with a discount

rate of 14% and 20%), this project is expedient in implementation and financing for JSC «Ukrposhta».

Table 3.9 – Generalized table of project performance indicators

Formula	Calculation at a discount rate of 14%	Calculation at a discount rate of 20%	Result
$NPV = \sum_{t=1}^n \frac{B_t - C_t}{(1+i)^{t'}}$	NPV = 838,05 ths. UAH	NPV = 407,43 ths. UAH	Economically beneficial
$DPP = t + \frac{[KPV_t]}{PV_{t+1}},$	DPP = 2,531	DPP = 2,612	Payback period is 2 year and 6 months
$PI = \frac{\sum_{t=1}^n \frac{(B_t - C_t)}{(1+i)^t}}{IC}$	PI = 1,331	PI = 1,031	Effective
$DROI = PI - 1,$	DROI = 0,331	DROI = 0,031	Advisable
$BCR = \frac{\sum_{t=1}^n \frac{B_t}{(1+i)^t}}{\sum_{t=1}^n \frac{C_t}{(1+i)^t}},$	BCR = 1,254	BCR = 1,219	Investment attractive

Source: compiled by the author

Therefore, the implementation of the blockchain technology project in the activities of the postal enterprise JSC «Ukrposhta» can improve the security, efficiency and transparency of operations, contribute to the optimization of the postal chain and reduce costs. As a result, the postal company can gain a competitive advantage, meet customer needs and improve its overall performance.

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Chapter 3 summary

Postal chain management is one sector that can really make the most of blockchain technology. A proposed project to improve postal chain management based on blockchain technology for the postal operator JSC «Ukrposhta».

DHL and the TradeLens platform (formerly known as Global Trade Digitization), which was developed together with IBM, were selected as a potential partner in the qualification work. The TradeLens blockchain platform is an open industry platform that is able to securely share information within the logistics postal chain and closely collaborate beyond it with potential partners.

Thanks to the blockchain technology (software product base) of Hyperledger Fabric and IBM Cloud, this platform enables the industry to record, store and exchange transport documents, information and values, and collaborate securely. The exchange takes place directly or indirectly with the help of smart contracts.

The principle of operation of TradeLens for JSC «Ukrposhta»: sensors are attached to the cargo, transport and necessary equipment (it can be a vehicle of our own or of partners in Europe, in order to make the postal chain transparent for all participants), which track the location and other indicators: temperature, humidity, cargo, etc. Information from sensors in real time is recorded on the blockchain and becomes available to all interested parties. This allows you to track the cargo and its condition. In predefined cases, individual sensors can interact with each other using smart contracts. It looks like this: if the box sensor gets into the truck, it transmits information about itself and what is inside to the truck sensor.

Thus, the truck always knows what it is transporting. When this truck arrives at the terminal, its sensor transmits information about the box and what it is carrying to the terminal. Taking into account the above principle of operation of such a blockchain platform, it is worth predicting possible shortcomings that may arise in the information logistics postal chain.

The total costs for the implementation of the proposed blockchain project for the JSC «Ukrposhta» will amount to UAH 1,355.00 thousand. Since the implementation of this project requires significant costs at the initial stage, it is advisable to use investments. Financial incentives will make up 100% of the required total amount. The calculation of the actual cash flows of the project with a discount rate of 14% and 20% indicates the feasibility of implementing the project. The net present value of the NPV is UAH 838,05 thousand and UAH 407,43 thousand respectively, which is a positive result.

The discounted investment payback period of the blockchain project is 2 years and 6 months in two cases, which indicates economic feasibility. The profitability index is equal to 1.331 and 1.031, which also indicates the effectiveness of implementation. The discounted rate of return on investment at a discount rate of 14% is 0.331, at a discount rate of 20% - 0.031, the project is accepted.

Thus, the implementation of the blockchain technology project in the activities of the postal enterprise JSC «Ukrposhta» can improve the security, efficiency and transparency of operations, contribute to the optimization of the postal chain and reduce costs. As a result, the postal company can gain a competitive advantage, meet customer needs and improve its overall performance.

CONCLUSIONS AND RECOMMENDATIONS

The qualification paper is devoted to digitization of processes in postal logistics on the example of JSC «Ukrposhta».

The theoretical part of the qualification work is devoted to issues of the basics of digitalization of postal logistics processes. The conducted research allows us to draw the following conclusions.

The growth of e-commerce and online shopping leads to an increase in the volume of parcels that need to be delivered. Postal logistics is an important element in the e-commerce ecosystem, as it ensures the delivery of goods from sellers to buyers. The demand for postal logistics services continues to grow, which supports its relevance.

According to the analysis of normative acts, conventions, scientific works of domestic and foreign scientists, it was possible to understand the concept of postal logistics as a branch of logistics responsible for the management and organization of transportation, sorting, delivery and distribution of postal items. Postal logistics deals with all stages of the postal process, starting from receiving the shipment from the sender and ending with its delivery to the addressee.

Considering the essence of logistics services in the postal market, the following were distinguished: collection and sorting, transportation, tracking, special handling services, storage, return processing, special services for business, etc.

In the theoretical part, it was determined that postal logistics includes effective planning, coordination and execution of all these processes in order to ensure fast and reliable delivery of postal items. It is of great importance to postal services, e-commerce and many other industries.

The work examines in detail the components of influence on the digital transformation of postal operators' business, which include the implementation of digital tools such as cloud computing, the Internet of Things (IoT), artificial intelligence (AI), data analytics and process automation. It found that digital

transformation can change the way we interact with customers, manage supply, optimize business processes and create new digital products or postal services.

Conducted studies have shown that the main goal of digital transformation for modern postal enterprises is to become more flexible, competitive and adaptable to the rapidly changing business environment in accordance with Industry 4.0. The main areas of digitization of postal logistics are considered in detail in the work.

Thus, the digital transformation of postal logistics consists in the application of modern digital technologies and innovations to optimize and improve processes in the field of postal logistics. The main goal of digital transformation is to improve the efficiency, convenience and reliability of postal services.

The analytical and research part of the qualification work is devoted to the analysis of digital processes of the processes of the postal operator JSC «Ukrposhta».

Summarizing the conducted research, the following can be noted. JSC «Ukrposhta» is an enterprise operating on the postal market of Ukraine. JSC «Ukrposhta» as a national operator ensures the provision of not only universal postal services, the list of which is determined by the government, and the tariffs are approved by the National Communications Regulatory Commission, but also offers consumers more than 50 different types of services.

The analysis of the organizational structure of JSC «Ukrposhta» showed that the organizational structure of the enterprise consists of two levels and is built according to functional directions.

Describing the logistics supply chain, we note that cargo is delivered to Poland and Warsaw by rail and road transport, and then air transport is used. The main features of express delivery of goods with the participation of air transport of JSC «Ukrposhta» is the speed of delivery, since express deliveries offer their customers overnight or next-day service.

One of the disadvantages of air delivery is that integrated express delivery companies use a fixed schedule. The tight schedule and standardized service make the integrated express services of JSC «Ukrposhta» somewhat inflexible, since the service schedule is difficult to adapt to individual needs.

Thanks to the analysis of the key indicators of the financial and economic activity of JSC «Ukrposhta» for 2021-2023, it was possible to conclude that the development trends of the enterprise are heterogeneous, since some of these indicators show positive dynamics, and some - negative. The net profitability of product sales during the study period had a negative value. This situation confirms the presence of financial and economic problems of JSC «Ukrposhta».

The cost of goods sold for 2023 also increased by UAH 729 670 thousand, the growth rate was 7.4%. This financial situation indicates the effective management of expenses at the enterprise and only requires further improvement of the management policy of this aspect of the financial and economic activity of JSC «Ukrposhta».

Considering the directions of digital solutions of JSC «Ukrposhta» demonstrate that the company is actively engaged in digitalization. So, back in 2020, «Ukrposhta» ordered the development of a new enterprise resource planning system (ERP system), which was supposed to replace 80 existing ones. The tender price of such a system was 96 million hryvnias.

Digitization of logistics at JSC «Ukrposhta» is a big step on the way to growth and scaling. Implementation of modern tools helps to save time and resources. This is a solution that guarantees a result. Analyzing the current state of project implementation, we note that JSC «Ukrposhta» in record time completed the stage of implementation of the ERP system for the transfer of all processes and systems in the company to a digital format. In total, more than 70% of business processes were transferred to digital format in 9 months from the moment of project implementation. By the end of 2023, the work of all 26 regional branches has been consolidated, about 6,000 «Ukrposhta» employees have moved to work within the framework of a single platform with unified end-to-end business processes.

The presence of such problems in the work of JSC «Ukrposhta» as: violation of delivery terms, transport that is 50% empty in the return direction, downtime or overloading of sorting centres, the presence of queues at post offices, inconvenient time of delivery of goods to the client, the management system needs to be reviewed, including by increasing the quality of information support. Despite the already partial

automation of logistics processes of JSC «Ukrposhta», existing problems point to the need for full automation of business processes and digitalization of postal services.

Postal chain management is one sector that can really make the most of blockchain technology. A proposed project to improve postal chain management based on blockchain technology for the postal operator JSC «Ukrposhta».

DHL and the TradeLens platform (formerly known as Global Trade Digitization), which was developed together with IBM, were selected as a potential partner in the qualification work. The TradeLens blockchain platform is an open industry platform that is able to securely share information within the logistics postal chain and closely collaborate beyond it with potential partners.

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The principle of operation of TradeLens for JSC «Ukrposhta»: sensors are attached to the cargo, transport and necessary equipment (it can be a vehicle of our own or of partners in Europe, in order to make the postal chain transparent for all participants), which track the location and other indicators: temperature, humidity, cargo, etc. Information from sensors in real time is recorded on the blockchain and becomes available to all interested parties. This allows you to track the cargo and its condition. In predefined cases, individual sensors can interact with each other using smart contracts. It looks like this: if the box sensor gets into the truck, it transmits information about itself and what is inside to the truck sensor.

Thus, the truck always knows what it is transporting. When this truck arrives at the terminal, its sensor transmits information about the box and what it is carrying to the terminal. Taking into account the above principle of operation of such a blockchain platform, it is worth predicting possible shortcomings that may arise in the information logistics postal chain.

The total costs for the implementation of the proposed blockchain project for the JSC «Ukrposhta» will amount to UAH 1,355.00 thousand. Since the implementation

of this project requires significant costs at the initial stage, it is advisable to use investments. Financial incentives will make up 100% of the required total amount. The calculation of the actual cash flows of the project with a discount rate of 14% and 20% indicates the feasibility of implementing the project. The net present value of the NPV is UAH 838,05 thousand and UAH 407,43 thousand respectively, which is a positive result.

The discounted investment payback period of the blockchain project is 2 years and 6 months in two cases, which indicates economic feasibility. The profitability index is equal to 1.331 and 1.031, which also indicates the effectiveness of implementation. The discounted rate of return on investment at a discount rate of 14% is 0.331, at a discount rate of 20% - 0.031, the project is accepted.

Thus, the implementation of the blockchain technology project in the activities of the postal enterprise JSC «Ukrposhta» can improve the security, efficiency and transparency of operations, contribute to the optimization of the postal chain and reduce costs. As a result, the postal company can gain a competitive advantage, meet customer needs and improve its overall performance.

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Table A.1 – Portfolio of JSC «Ukrposhta» services

Segment	Services	Characteristics
1	2	3
1. Postal services	1.1. Written correspondence	- converted written items, including documentation weighing up to 2 kg and up to A4 format (parcels), as well as secograms: non-converted (addressed) written items, hybrid written items (e-mail + paper)
	1.2. Parcels	delivery of parcels and parcels with the exception of: - periodicals (newspapers and magazines) weighing up to 2 kg, - documentation (official or unofficial) in format up to A4 and weighing up to 2 kg, - assigned to the "Written Correspondence" section
	1.3. Subscription press	- subscription periodicals of Ukraine and foreign countries, including: commercial, state (national and municipal)
	1.4. Payment and delivery of pensions, social benefits	- services for the payment of pensions to the population with home delivery or at the post office, - services for the payment of social benefits (state material assistance, subsidies and other payments to the population, determined by legislation)
2. Financial services	2.1. Postal transfers	- postal transfers within Ukraine - acceptance and payment are carried out in cash and non-cash forms in the national currency, - postal transfers from/to Ukraine - acceptance and payment is carried out in cash and non-cash forms in national currency and cash foreign currency from/to individuals, - urgent postal transfers within and outside the borders of Ukraine - the forwarding period is up to 15 minutes, acceptance and payment are carried out at designated postal facilities, - cash-on-delivery postal transfer within Ukraine and outside Ukraine - accepted in national currency after issuing a cash-on-delivery postal item (for goods ordered, including through online stores)
	2.2. Acceptance of payments	Periodic payments: - communal services, Internet, television, telephone communication, security, - repayment of credit debt, - real estate tax, land tax. Non-periodic payments: - administrative payments (fines, state duty, court fees, registration fee), - replenishment of deposit and card accounts
3. Retail trade	3.1. Philatelic and souvenir products	- philatelic products: original postage stamps, books with stamps, booklets with stamps, framed stamps, canceled products, - souvenir products: books about stamps, gift stamps, souvenir stamps, unmarked postcards, unmarked envelopes, souvenirs with the image of a postage stamp
	3.2. Retail trade of the press	- Ukrainian periodicals (commercial and state), - periodical foreign publications
	3.3. Retail trade of non-postal assortment	- consumer goods: food and non-food goods (household chemicals, textiles, knitwear, household goods), - payment cards of mobile operators, - lottery tickets

1	2	3
4. Commercial services	4.1. Electronic messages	- a message submitted by the sender on a paper or electronic medium, forwarded using information and communication technologies, delivered (handed) to the addressee (recipient) reproduced on a paper medium or transmitted to an electronic address on the Internet.
	4.2. Advertising services	- advertising placement, - delivery of advertising and/or information products
	4.3. Transport services	- cargo transportation by the «Autotransposhta» directorate, - car maintenance services, routine repairs, car wash, car parking, pre-race (post-race) medical examination of vehicle drivers, briefings
	4.4. Services under Agency Agreements	- registration of insurance contracts (poles), - issue/acceptance of cash hryvnias, - execution of credit and deposit agreements, - payment of transfers by international payment systems
	4.5. Registration of passenger transportation	- the possibility of purchasing an electronic travel document for bus, plane, railway transport, etc

АТ «Укрпошта»
БАЛАНС (ЗВІТ ПРО ФІНАНСОВИЙ СТАН)
 Усі суми наведені у тисячах гривень

Підприємство: АТ «Укрпошта»
 Територія: Україна, м. Київ, Шевченківський р-н
 Організаційно-правова форма господарювання: Державна акціонерна компанія (товариство)
 Вид економічної діяльності: Діяльність національної пошти
 Середня кількість працівників: 34 751
 Адреса, телефон: вул. Хрещатик 22, Київ
 Одиниця виміру: тис. грн., без десяткового знаку
 Складено (зробити позначку "v" у відповідній клітинці):
 за Положеннями (стандартами) бухгалтерського обліку
 за Міжнародними стандартами фінансової звітності

v

БАЛАНС (ЗВІТ ПРО ФІНАНСОВИЙ СТАН)

		Форма № 1	Код за ДКУД	1801001
Актив	Прим.	Код рядка	31 грудня 2022 р.	31 грудня 2023 р.
I. Необоротні активи				
Нематеріальні активи	9	1000	115 895	123 622
первісна вартість		1001	143 589	153 625
амортизація		1002	(27 694)	(30 003)
Незавершені капітальні інвестиції	9	1005	295 454	324 447
Основні засоби	9	1010	3 870 901	4 041 107
первісна вартість		1011	6 847 341	7 521 947
знос		1012	(2 976 440)	(3 480 840)
Інвестиційна нерухомість	9	1015	68 961	65 522
первісна вартість		1016	79 104	78 166
знос		1017	(10 143)	(12 644)
Інші фінансові інвестиції	11	1035	12 579	13 418
Довгострокова дебіторська заборгованість		1040	180	166
Відстрочені податкові активи	30	1045	87 652	255 571
Усього за розділом I		1095	4 451 622	4 823 853
II. Оборотні активи				
Запаси	10	1100	564 624	455 388
виробничі запаси		1101	348 417	331 631
незавершене виробництво		1102	-	-
готова продукція		1103	-	-
товари		1104	216 207	123 757
Дебіторська заборгованість за товари, роботи, послуги	11	1125	325 063	555 585
Дебіторська заборгованість за розрахунками: за виданими авансами	11	1130	74 177	150 544
з бюджетом	11	1135	9 193	8 481
у тому числі з податку на прибуток		1136	20	20
з нарахованих доходів	11	1140	19 958	7 802
Інша поточна дебіторська заборгованість	11	1155	114 114	130 809
Поточні фінансові інвестиції	12	1160	585 098	-
Грошові кошти та їх еквіваленти	12	1165	3 132 038	5 233 842
Готівка		1166	339 238	118 937
Поточні рахунки у банку		1167	2 792 800	5 114 905
Інші оборотні активи		1190	68 977	76 110
Усього за розділом II		1195	4 893 242	6 618 561
III. Необоротні активи, утримані для продажу, та групи вибуття	9	1200	73 819	60 539
Баланс		1300	9 418 683	11 502 953

Figure B.1. - Balance Sheet (Financial Status Report)

АТ «Укрпошта»
БАЛАНС (ЗВІТ ПРО ФІНАНСОВИЙ СТАН)
 Усі суми наведені у тисячах гривень

Пасив	Прим.	Форма № 1	Код за ДКУД	1801001
		Код рядка	31 грудня 2022 р.	31 грудня 2023 р.
I. Власний капітал				
Зареєстрований (пайовий) капітал	14	1400	6 518 597	6 518 597
Ефект переоцінки при корпоратизації	14	1416	(5 254 038)	(5 254 038)
Нерозподілений прибуток		1420	155 241	(641 120)
Усього за розділом I		1495	1 419 800	623 439
II. Довгострокові зобов'язання і забезпечення				
Відстрочені податкові зобов'язання	30	1500	-	-
Довгострокові кредити банків	15	1510	863 115	795 276
Інші довгострокові зобов'язання	15	1515	266 211	451 034
Усього за розділом II		1595	1 129 326	1 246 310
III. Поточні зобов'язання і забезпечення				
Короткострокові кредити банків	15	1600	3 381	-
Поточна кредиторська заборгованість за: довгостроковими зобов'язаннями	15	1610	431 583	485 913
товари, роботи, послуги	16	1615	2 778 229	3 498 755
розрахунками з бюджетом		1620	72 700	96 248
у тому числі з податку на прибуток		1621	-	-
розрахунками зі страхування		1625	55 209	47 310
розрахунками з оплати праці		1630	202 725	185 917
Поточна кредиторська заборгованість за одержаними авансами		1635	213 236	172 698
Поточна кредиторська заборгованість за розрахунками з акціонером		1640	-	-
Нарахування та інші забезпечення	17	1660	619 143	919 501
Доходи майбутніх періодів	18	1665	319 253	344 135
Інші поточні зобов'язання	19	1690	2 174 098	3 882 727
Усього за розділом III		1695	6 869 557	9 633 204
БАЛАНС		1900	9 418 683	11 502 953

Затверджено до випуску та підписано 24 квітня 2024 року.



 Я. Смілянський
 Генеральний директор



 М.Палій
 Заступник генерального
 директора з фінансових
 питань



 К. Клименко
 Головний бухгалтер

Figure B.1 - Balance Sheet (Financial Status Report)

АТ «Укрпошта»
ЗВІТ ПРО ФІНАНСОВІ РЕЗУЛЬТАТИ (ЗВІТ ПРО СУКУПНИЙ ДОХІД)
 Усі суми наведені у тисячах гривень

ЗВІТ ПРО ФІНАНСОВІ РЕЗУЛЬТАТИ (ЗВІТ ПРО СУКУПНИЙ ДОХІД)

за 2023 рік

Форма № 2

Код за ДКУД

1801003

I. ФІНАНСОВІ РЕЗУЛЬТАТИ

Стаття	Прим.	Код рядка	За звітний період - 2023 рік	За попередній період - 2022 рік
1		2	3	4
Чистий дохід від реалізації продукції (товарів, робіт, послуг)	20	2000	11 581 111	10 323 419
Собівартість реалізованої продукції (товарів, робіт, послуг)	21	2050	(10 656 528)	(9 926 858)
Валовий:				
Прибуток		2090	924 583	396 561
Збиток		2095	-	-
Інші операційні доходи	27	2120	305 082	179 762
Адміністративні витрати	23	2130	(1 429 681)	(1 148 387)
Витрати на збут	22	2150	(281 252)	(207 900)
Інші операційні витрати	24	2180	(379 726)	(411 903)
Фінансовий результат від операційної діяльності:				
Прибуток		2190	-	-
Збиток		2195	(860 994)	(1 191 867)
Інші фінансові доходи	25	2220	127 299	140 419
Інші доходи	28	2240	99 216	126 412
Фінансові витрати	26	2250	(177 920)	(115 054)
Інші витрати	29	2270	(151 881)	(493 072)
Фінансовий результат до оподаткування:				
Прибуток		2290	-	-
Збиток		2295	(964 280)	(1 533 162)
(Витрати) дохід з податку на прибуток	30	2300	167 919	275 073
Чистий фінансовий результат:				
Прибуток		2350	-	-
Збиток		2355	(796 361)	(1 258 089)

II. СУКУПНИЙ ДОХІД

Стаття	Прим.	Код рядка	За звітний період - 2023 рік	За попередній період - 2022 рік
1		2	3	4
Переоцінка необоротних активів		2400	-	-
Інший сукупний дохід		2445	-	-
Інший сукупний дохід до оподаткування		2450	-	-
Податок на прибуток, пов'язаний з іншим сукупним доходом		2455	-	-
Інший сукупний дохід після оподаткування		2460	-	-
Сукупний дохід (сума рядків 2350, 2355 та 2460)		2465	(796 361)	(1 258 089)

Figure C.1 - Report on the financial results of JSC «Ukrposhta»

АТ «Укрпошта»
ЗВІТ ПРО ФІНАНСОВІ РЕЗУЛЬТАТИ (ЗВІТ ПРО СУКУПНИЙ ДОХІД)
 Усі суми наведені у тисячах гривень

ЗВІТ ПРО ФІНАНСОВІ РЕЗУЛЬТАТИ (ЗВІТ ПРО СУКУПНИЙ ДОХІД)
 за 2023 рік
 (продовження)

Форма № 2

III. ЕЛЕМЕНТИ ОПЕРАЦІЙНИХ ВИТРАТ

Стаття	Прим.	Код рядка	За звітний період - 2023 рік	За попередній період - 2022 рік
1		2	3	4
Матеріальні витрати		2500	1 122 506	942 235
Витрати на оплату праці		2505	5 974 643	5 469 472
Відрахування на соціальні заходи		2510	1 300 245	1 275 354
Знос/амортизація		2515	718 363	582 986
Інші операційні витрати		2520	3 298 839	3 074 363
Собівартість реалізованих товарів		2530	332 591	350 638
Разом		2550	12 747 187	11 695 048

IV. РОЗРАХУНОК ПОКАЗНИКІВ ПРИБУТКОВОСТІ АКЦІЙ

Стаття	Прим.	Код рядка	За звітний період - 2023 рік	За попередній період - 2022 рік
1		2	3	4
Середньорічна кількість простих акцій		2600	-	-
Скоригована середньорічна кількість простих акцій		2605	-	-
Чистий прибуток (збиток) на одну просту акцію		2610	-	-
Скоригований чистий прибуток (збиток) на одну просту акцію		2615	-	-
Дивіденди на одну просту акцію		2650	-	-

Затверджено до випуску та підписано 24 квітня 2024 року.


 І. Смілянський
 Генеральний директор


 М.Палій
 Заступник генерального
 директора з фінансових
 питань



 К. Клименко
 Головний бухгалтер

Figure C.2 - Report on the financial results of JSC «Ukrposhta»

АТ «Укрпошта»
ЗВІТ ПРО РУХ ГРОШОВИХ КОШТІВ
 Усі суми наведені у тисячах гривень

ЗВІТ ПРО РУХ ГРОШОВИХ КОШТІВ (ЗА НЕПРЯМИМ МЕТОДОМ)


за 2023 рік

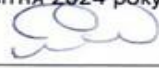
Форма №3

Код за ДКУД 1801004

Стаття	Прим.	Код рядка	За звітний період - 2023 рік	За попередній період - 2022 рік
1		2	3	4
I. Рух коштів у результаті операційної діяльності				
Прибуток/(збиток) до оподаткування		3500	(964 280)	(1 533 162)
Коригування на:				
Знос, амортизацію та знецінення необоротних активів		3505	724 518	799 895
Збільшення (зменшення) забезпечень		3510	315 356	55 753
Збиток (прибуток) від нереалізованих курсових різниць		3515	242 006	401 316
Збиток (прибуток) від неопераційної діяльності та інших негрошових операцій		3520	103 286	(65 383)
Фінансові витрати	26	3540	177 920	115 054
Фінансові доходи	25	3524	(127 299)	(140 419)
Зменшення (збільшення) оборотних активів		3550	(238 245)	(228 980)
Збільшення (зменшення) поточних зобов'язань		3560	2 387 458	39 899
Збільшення (зменшення) доходів майбутніх періодів		3566	24 882	(179 802)
Рух коштів від операційної діяльності		3570	2 645 602	(735 829)
Сплачений податок на прибуток		3580		(23 748)
Сплачені відсотки		3585	(189 928)	(108 993)
Чистий рух коштів від операційної діяльності		3195	2 455 674	(868 570)
II. Рух коштів у результаті інвестиційної діяльності				
Повернення коштів короткострокових депозитів		3200	585 098	924 136
Надходження від реалізації необоротних активів		3205	44 173	94 714
Проценти отримані		3215	138 265	126 494
Розміщення короткострокових депозитів		3255		-
Придбання основних засобів та нематеріальних активів		3260	(455 363)	(662 107)
Чистий рух коштів від інвестиційної діяльності		3295	312 173	483 237
III. Рух коштів у результаті фінансової діяльності				
Отримання позик		3305	59 335	192 611
Дивіденди сплачені		3355		(55 075)
Погашення зобов'язань з фінансової оренди		3365	(306 066)	(225 132)
Погашення позик		3350	(177 306)	(141 948)
Чистий рух коштів від фінансової діяльності		3395	(424 037)	(229 544)
Чистий рух коштів за звітний період		3400	2 343 810	(614 877)
Залишок грошових коштів та їх еквівалентів на початок року		3405	3 132 038	3 893 395
Вплив змін валютних курсів на залишок коштів		3410	(242 006)	(146 480)
Залишок грошових коштів та їх еквівалентів на кінець року	12	3415	5 233 842	3 132 038

Затверджено до випуску та підписано 24 квітня 2024 року.


 І. Смілянський
 Генеральний директор


 М. Палій
 Заступник генерального
 директора з фінансових
 питань



 К. Клименко
 Головний бухгалтер

Figure D.1 - Cash Flow Statement of JSC «Ukrposhta»

АТ «Укрпошта»
ЗВІТ ПРО ЗМІНИ КАПІТАЛУ
 Усі суми наведені у тисячах гривень

ЗВІТ ПРО ЗМІНИ КАПІТАЛУ

за 2023 рік

Форма № 4

Код за ДКУД 1801005

Стаття	Код рядка	Зареєстрований (пайовий) капітал	Ефект переоцінки при корпоратизації	Нерозподілений прибуток	Разом
1	2	3	4	5	6
Залишок на початок року (до перерахунку)	4000	6 518 597	(5 254 038)	155 241	1 419 800
Скоригований залишок на початок року	4095	6 518 597	(5 254 038)	155 241	1 419 800
Чистий збиток за звітний період	4100	-	-	(796 361)	(796 361)
Разом змін у капіталі	4295	-	-	(796 361)	(796 361)
Залишок на кінець року	4300	6 518 597	(5 254 038)	(641 120)	623 439

ЗВІТ ПРО ЗМІНИ КАПІТАЛУ

за 2022 рік

Форма № 4

Код за ДКУД 1801005

Стаття	Код рядка	Зареєстрований (пайовий) капітал	Ефект переоцінки при корпоратизації	Нерозподілений прибуток	Разом
1	2	3	4	5	6
Залишок на початок року	4000	6 518 597	(5 254 038)	1 413 330	2 677 889
Скоригований залишок на початок року	4095	6 518 597	(5 254 038)	1 413 330	2 677 889
Чистий прибуток за звітний період (перераховано)	4100	-	-	(1 258 089)	(1 258 089)
Разом змін у капіталі	4295	-	-	(1 258 089)	(1 258 089)
Залишок на кінець року	4300	6 518 597	(5 254 038)	155 241	1 419 800

Затверджено до випуску та підписано 24 квітня 2024 року.


 І. Смілянський
 Генеральний директор


 М.Палій
 Заступник генерального
 директора з фінансових
 питань

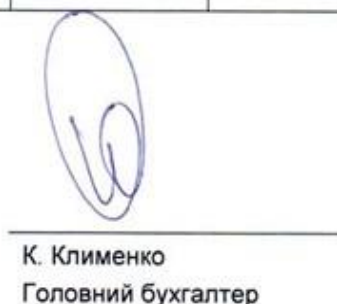

 К. Клименко
 Головний бухгалтер

Figure E.1 - Report on capital changes of JSC «Ukrposhta»