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QUALIFICATION PAPER

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OF GRADUATE OF ACADEMIC DEGREE
«BACHELOR»

THEME: «Management of logistics processes in the airline»

Speciality 073 «Management»

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

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Kyiv 2024

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
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Київ 2024

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

Academic Degree Bachelor

Speciality 073 «Management»

Educational Professional Program «Aviation Logistics »

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TASK

FOR COMPLETION THE QUALIFICATION PAPER OF GRADUATE

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1. Theme of the qualification paper: «Management of logistics processes in the airline» was approved by the Rector Directive №624/с.т. 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 of the Windrose company, production and financial performance indicators of the Windrose company, literary sources on air transportation management processes, Internet sources.
5. Content of the explanatory notes: theoretical approaches to the management processes of the airline; general characteristics of the Windrose company; analysis of the production and financial performance of Windrose Airlines; analysis of the organization of transportation by Windrose Airlines; identification of directions for improvement of the airline's activities; development of recommendations for improving the management of logistics processes in the Windrose Airlines; calculation of the effect of project proposals.
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 work, 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 | 30.05.24-02.06.24 | Done |
| 6. | Submission paper to Logistics Department | 03.06.24 | Done |

Graduate _____
(signature)

Supervisor of the qualification work _____
(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, Molchanova K.M. | 13.05.24 | 13.05.24 |
| Chapter 2 | Associate Professor, Molchanova K.M. | 17.05.24 | 17.05.24 |
| Chapter 3 | Associate Professor, Molchanova K.M. | 21.05.24 | 21.05.24 |

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

Supervisor of the qualification paper: _____ Kateryna MOLCHANOVA
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Task accepted for completion: _____ Daniil VRUBLEVSKYI
(signature of graduate) (surname and name)

ABSTRACT

The explanatory notes to the qualification paper «Management of logistics processes in the airline» comprises of 88 pages, 20 figures, 12 tables, 50 references and 6 appendixes.

KEY WORDS: AVIATION LOGISTICS, AIRLINE, TRANSPORT AND LOGISTICS BUSINESS PROCESS, TRANSPORT AND LOGISTICS SYSTEM, OPTIMIZATION OF LOGISTICS PROCESSES

Qualidication paper is dedicated to the study of theoretical aspects of managing logistics processes with the requirements of the modern market.

The theoretical part presents the theoretical foundations of logistics process management at enterprises and the features of logistics process management at airlines.

In the analytical part describes the state of the aviation market of Ukraine, as well as the activity of Windrose Airlines, SWOT analysis was conducted on its strengths and weaknesses, opportunities and threats.

In the project part, recommendations for optimization of the logistics process management system were developed, organizational measures were defined, and the effect of their application was calculated.

The materials of the qualification paper can be used during scientific research, in the educational process and in the practical activities of specialists of logistics units.

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NOTATION

- ERP – Enterprise Resource Planning
- IATA – International Air Transport Association;
- SCM – Supply Chain Management;
- UkSATSE – Ukrainian State Air Traffic Service Enterprise;

INTRODUCTION

Relevance of work. The development of the market economy promotes increased competition and requires the search for new development niches. Logistics activity is an integral part of the functioning of a significant number of Ukrainian enterprises and is a prerequisite for the company's sustainable development. Transport logistics is one of the key components of the logistics system of the enterprise, the key task of which is to fully satisfy the needs of consumers in the transportation of their goods, in addition, effective transport systems provide economic and social opportunities and advantages, such as better access to markets, employment and additional investments, at the same time, transport affects such economic factors as geographic specialization, scale and scope of production, increased competition, increased land costs, and all this occurs against the background of growing requirements regarding the required level of logistics service and flexibility of logistics services. Therefore, it is an extremely necessary element of modern logistics projects is the involvement of the latest information and digital technologies, which open the way to the individualization of logistics solutions in accordance with the needs of each client. Optimization of logistics processes is one of the key elements of increasing the level of competitiveness of the enterprise and occurs with the help of the study of logistics processes, the definition of criteria and indicators for evaluating the efficiency of logistics at the enterprise, their analysis, and the search for solutions to problematic issues.

Creating a unified information system is a long and time-consuming process, so companies usually use ready-made software solutions, specialized adaptation to the specifics of their activities and training of personnel. The complex solution formed using modern computer technologies effectively works to simplify the process of data collection and systematization, as well as accelerates information processing and improves forecasting due to multifactorial analysis. In general, powerful information support for management decisions ensures the selection of the

optimal option, modeling of stages and the formation of a forecast, timely identification of weak points in the system, determination of interdependent elements

The purpose of the work is the development of measures to improve the management of the logistics process in the airline using the example of Windrose Airlines.

Based on the purpose of the work, the following **tasks** are defined:

- overview the theoretical framework of logistics processes management;
- outline the organizational and economic characteristics of Windrose Airlines;
- conduct an analysis of the logistics activities of Windrose Airlines and an assessment of its effectiveness;
- propose development measures for optimization of the logistic process management system
- evaluate the effectiveness of the proposed measures regarding improvement of logistics processes and justify them economically.

The object of the study is the logistics activity of Windrose Airlines.

The subject of the study is measures to improve logistics process management at Windrose Airlines.

Research methods. The theoretical and methodological basis of the work is the existing provisions of economic theory, the works of domestic and foreign scientists regarding the formation and development of international transport, and in particular, aviation networks. The main results were obtained using a system of all scientific and specialized research methods, in particular: induction and deduction, theoretical generalization, SWOT analysis, system analysis, economic analysis.

The scientific novelty of the obtained results lies in the development of the theoretical and methodological foundations of the study of international transport and, especially, aviation networks in the conditions of world globalization and the substantiation of practical recommendations and approaches for improving the logistics processes of international air transportation.

The practical significance of the research is that all research results in the work can be used in writing further scientific works, as well as in Windrose Airlines to improve the logistics of international air transportation.

Structure of work. The thesis consists of an introduction, three chapters of the main part, conclusions, references and appendices.

CHAPTER 1

A THEORETICAL FRAMEWORK OF LOGISTICS PROCESSES MANAGEMENT

1.1 Theoretical basics of logistics processes management at the enterprise

In economics, logistics, as a scientific direction, is most effective when applied to complex production and economic systems, such as modern enterprises. The main prerequisites for the use of logistics are the characteristics of enterprises as management objects, as well as the characteristics of production and sales of products:

- a significant area occupied by the management object;
- a large number of divisions;
- significant volumes and range of resources consumed and products produced;
- continuity of production;
- long production cycle;
- multi-stage production processes and, as a result, large volumes of work in progress;
- extensive markets for the supply of raw materials and sales of products, which means a large number of partners.

The listed features require effective and coordinated measures to manage material flows, both within the production system and outside it. That is why the most common definition of this scientific direction is the following: logistics is the science of managing material and related information and financial flows [1].

In an enterprise, any material flow is associated with other flows and with information flows. This information is reflected in production tasks, technological and job descriptions, shift reports, accompanying and reporting (economic planning,

financial, accounting) documentation, etc. To receive, transmit, analyze and display all this information, enterprise personnel perform actions that are not directly related to the material flow, but either generate or accompany it: collection, storage and transmission of information about the material flow; settlements with suppliers and customers; cargo insurance; transfer of ownership of goods, etc. Such actions are usually called logistics operations.

Due to the rapid development of the global economy and the integration of its processes into interactions with supply and sales, this has led to the emergence in the modern world of such a concept as integrated logistics or logistics supply chains [30]. Since the 1980s, the concept of Supply Chain Management (SCM) has gone through certain stages in its development (Fig. 1.1)

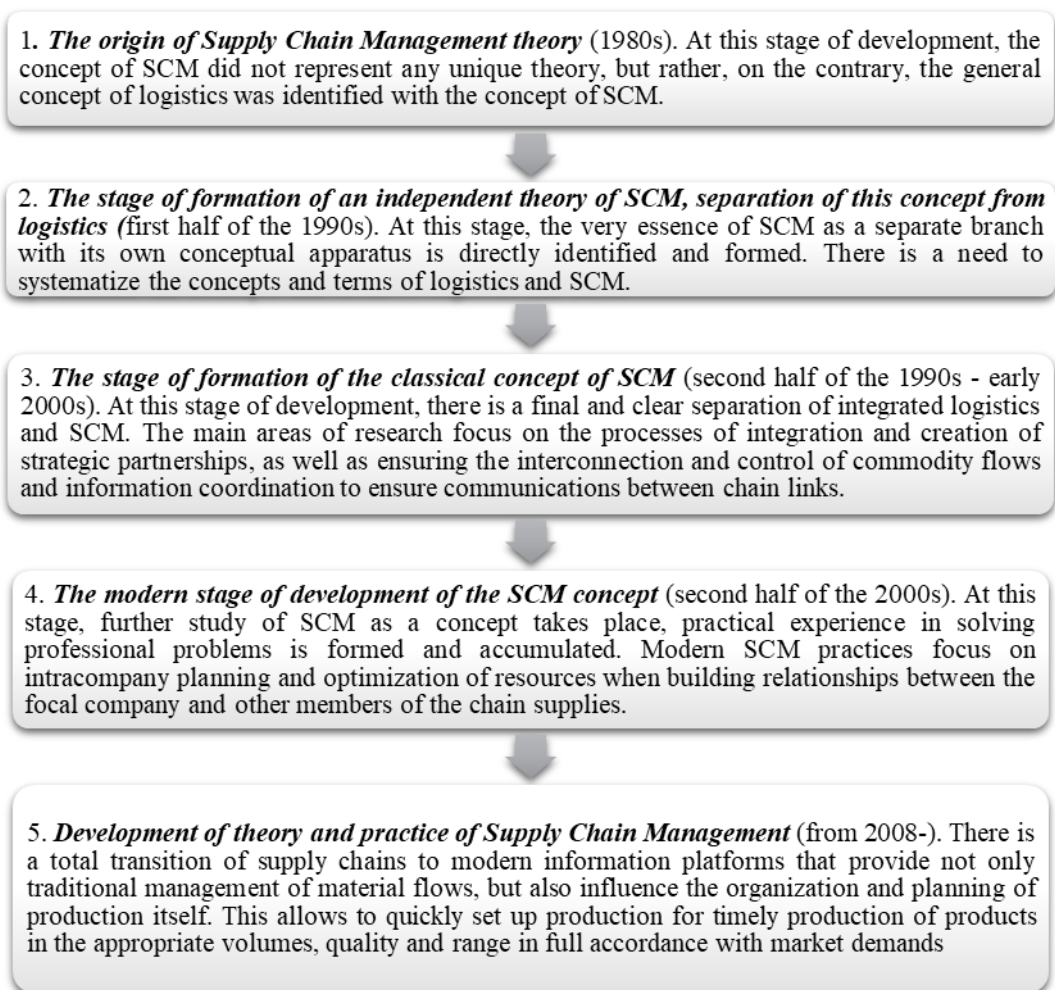


Figure 1.1 – Supply Change Management development stages

Source: [28; 36].

Analyzing the evolution of supply chain management concepts, one should note the objective reasons for the development of supply chain management:

- growing role of the client. In many branches of the economy, an individual approach aimed at a specific consumer is currently being used, individual goods and products are developed taking into account the tastes and interests of buyers, based on this, the speed of reaction of manufacturers to changes in consumer preferences on the market is also increasing;

- the globalization of markets led to the development of new sales markets, which, in turn, affected the increase in the volume of transportation and the development of outsourcing;

- the informatization of society has led to an increase in the role and use of Internet resources, the emergence of new business concepts and the introduction of information technologies in management [26].

The task of the logistics management of the enterprise is to coordinate the actions of specialists from various services that manage the logistics flow to achieve the required level of integration of logistics functions. Solving this task requires organizational changes in the management structure of the enterprise. However, the organizational structure alone does not yet guarantee the integration of logistics; for this, so-called "logistics thinking" is needed, according to which managers think and act based on the concepts of integrated efforts, and the top management must understand the essence and significance of logistics for the development of the enterprise [1, p. 34]. Matrix and program-oriented organizational structures and information technologies are actively introduced into the modern practice of logistics management. Global organizational structures are being formed. It is believed that in the future, the capabilities of information technologies will provide integrated management of logistics without grouping (aggregation) of functions into formal organizational units, and the formalized hierarchy may be replaced by an informal electronic network [11, p. 78].

When designing the organizational structure of logistics management, it is necessary to determine the position of logistics in the enterprise management

hierarchy relative to other directions (sales, production, finance, and others). It is also necessary to take into account how the operational structure of various types of logistics activities (Appendix A) is built, which are directly subordinated to the manager who will head the logistics department [47]. That is why it is advisable to propose an external organizational structure of logistics management - the place of logistics in the organizational structure of the enterprise—and its internal organizational structure - the structure of the logistics department.

The general goal of logistics activities is the harmonization of the interests of manufacturers, suppliers and consumers, and the following areas are distinguished from this:

- improving indicators of incoming resource flows by improving relations with suppliers;
- improvement of internal flows, with the help of establishing communication between divisions, systematization and automation of business processes at various divisions of the enterprise;
- improvement of relations with consumers through undisputed quality of goods and services with appropriate service.

It is worth considering that logistics activity is the implementation of the main logistics process - coordination:

- activities with an operational calendar plan for the supply of raw materials, materials and semifinished products;
- transport and storage works with items of supply;
- activities with a physical distribution plan during production;
- movement of materials, raw materials, spare parts and finished products between warehouses and production units, loading and unloading transport and warehouse work from unfinished production, etc.;
- business activities with a marketing plan during product sales, demand forecasting, service, strategic planning, receiving and tracking customer orders, warehouse and transport work.

A logistic process is considered to be an organized sequence of logistic operations that is determined in time and aimed at achieving set goals. Logistics processes are actions related to changes in the parameters of space (location), time, form, and properties of logistics flows. For example, the formation of business relations for the supply of goods, the delivery of resources from suppliers, the management of warehouse operations, the forecasting of the need for transportation, the execution of transportation, loading and unloading, the delivery of products to points of sale, representative offices, as well as direct management, which allows effective planning, flow control and regulation. Logistics processes include technological regimes, means of technical support, material and labor costs, etc. [12].

The logistics process is divided into two main subsystems (flows): informational and material. The initial stage of the logistics process includes planning and organization; that is, it combines the collection and processing of information when there are no material flows yet. The information system includes operations with data collection, calculations, information systematization, negotiations with other participants in the logistics process, preparation of documentation, management decision-making, and others. The operations of the material subsystem consist of cargo transportation, warehousing, transshipment, formation and disassembly of cargo transport units (packages on pallets, containers), sorting of cargo, packaging of cargo, assembly of transport lots, and so on. During the stage of material cargo flow, the operations of the two systems mentioned above run in parallel because the material processes cause the acquisition of new information or changes in data. For example, the transportation of goods is accompanied by the preparation and execution of transport invoices. In general, there is a synergy between the information and material systems, which has a direct impact on the logistics process. Thus, delays in the formation of documentation can lead to the untimely transportation of cargo, which may have legal and financial consequences in the future. At the stage of control and analysis, when material operations are performed, only the operations of the information subsystem are carried out (collection of

operational information and analysis of the actions of consumers and competitors, the state of the market, generation of reports, forecasting, etc.).

Scientists consider logistics operations to be an integral part of the logistics process, which is carried out at one workplace or one technical means. There is also an opinion that a logistics operation is a set of actions that cause the transformation of the logistics flow, which cannot be decomposed. For example, the main actions of cargo processing (transportation, loading, unloading, etc.) and information or financial flow (formation of an order, preparation of documents, creation of a route, payment of goods, etc.) [2].

A logistics function is considered to be a set of logistics operations that implement certain tasks of the logistics system, such as transportation, unloading, acceptance of orders, inventory management, and others. Logistics processes are carried out within logistics functions.

The formation of logistics functions depends on the structural subdivisions of the logistics activity of the enterprise, which are responsible for the selected process. In general, transportation of goods, loading and unloading, packaging, warehousing, document management, warehouse management, and financial operations are distributed according to a special organization that exists at the enterprise.

Sometimes companies outsource or in source part of their logistics functions. This organization of logistics activities increases efficiency, but has a number of risks. The company should evaluate in detail the advantages and disadvantages of delegating logistics functions and make the optimal decision.

Outsourcing of logistics functions is the transfer of part of the processes to another enterprise that can provide a production or logistics process. For example, the use of finished parts of goods, the collection of products at other enterprises, transportation services, and the storage of products at other companies' warehouses.

Outsourcing can be used in the supply chain in different ways: limited (delegation of some functions) or widely (complex solutions for managing the entire supply chain). The level of logistics specialization of the enterprise determines how outsourcing will be implemented.

Insourcing is understood as the opposite of the previous scenario and is defined as the execution of processes directly at the enterprise. For example, a project is executed by an employee of the company without being transferred to an external executor.

Logistics activity can be classified by phases using the separation of material, financial and information flows. For further division, the transformation phases of the logistics flow are used, which correlate with the functional areas of logistics (that is, those areas of activity in which logistics actions are performed: functions and operations). The transformation of the material flow goes through the following phases: obtaining materials, production of products, sale of finished goods, return of containers and defects, and disposal of waste. Supply, distribution and recycling logistics include the planning, management and physical processing of the flow of materials, finished products, waste products, containers and waste. Production logistics involves the planning, management and implementation of intra-production transportation and intermediate storage in production units [12].

Financial logistics is a field of activity that includes financial flow as one of the components of logistics activity.

Order management involves the fulfillment of customer requests for products, that is, the process from receiving a request to placing an order with the consumer, which involves the creation of invoices for payment of goods and services. The function responsible for order management provides for a work algorithm that satisfies the consumer's needs. That is, there is coordination of the work of internal departments regarding order formation, delivery, and payment. The main task of the enterprise is to fulfill the client's request both within the organization and externally.

In addition to end customers who consume goods, the company also has divisions that need logistical support. Consumer orders can be divided into internal and external categories. The management process takes place both for external and internal consumers and requires a process of constant improvement, modernization, and automation [3].

As a result of effective order management, the enterprise can have a high level of logistics activity. The activity related to the processing and implementation of orders affects the formation of the information flow between the customer and the supplier regarding the supply of certain goods and the provision of services and requires the following actions: formation of orders according to the agreed form, transfer, acceptance, placement of the order, creation and transfer of invoices, assembly, dispatch at the specified time, and order fulfillment control.

The transportation process involves the transportation of goods, loading, unloading, forwarding and other related logistics operations. Transportation is divided into internal and external modes. Movement within the organization, i.e., between divisions, is called internal, and transportation to another enterprise, intermediary, or consumer is called external. Logistics functions involving transportation include planning, organization, and management of transportation processes: selection of carriers, forwarders, and formation of routes, as well as actual transportation of materials, goods, products, waste, and containers. The transportation process requires appropriate documentation, and an information flow is formed. For example, the receipt of materials to the warehouse is accompanied by a waybill, which enters information about the quantity into the database. Next, the materials are used during production, and the status data is changed and used in the work of other departments.

Logistics service involves establishing a sufficient level of service and its development, product nomenclature, standardization of the service process, and improvement of service.

1.2 Features of logistics processes management in airlines

Logistics, as a term, comes from the Greek word “logistike” - the art of reasoning (calculating). In practice, logistics, as a coherent system, appeared in

military affairs, ensuring the organization of the supply of material resources to troops.

In economics, logistics, as a scientific direction, is most effective when applied to complex production and economic systems, such as modern enterprises. The main prerequisites for the use of logistics are the characteristics of enterprises as management objects, as well as the characteristics of production and sales of products:

- a significant area occupied by the management object;
- a large number of divisions;
- significant volumes and range of resources consumed and products produced;
- continuity of production;
- long production cycle;
- multi-stage production processes and, as a result, large volumes of work in progress;
- extensive markets for the supply of raw materials and sales of products, which means a large number of partners.

The listed features require effective and coordinated measures to manage material flows, both within the production system and outside it [46].

Logistics support of airline innovation activities in the market should adhere to the following principles: the principle of unity, the principle of integrity, the principle of cohesion and functional interaction, synergy.

In the process of logistics support of innovation solutions, the implementation in the activities of airlines should use the essential logistics paradigm. The latter is the optimal allocation of materials, finance, information and labor resources to achieve the common strategic, tactical or operational business objectives of airlines and participants (elements of the logistics system) [43].

The term "air transport" is widely used in practice, denoting transport activities carried out in airspace using aircraft as rolling stock. The term "aviation" is traditionally used to denote activities in airspace.

Air transportation means the transport movement of goods or people in the airspace, carried out with the help of an aircraft along an established air line (route). Transportation of passengers and goods using aircraft is called air transportation.

An aviation enterprise is a legal entity that, regardless of its organizational and legal form and form of ownership, has the main purpose of its activity to carry out air passenger, cargo, baggage and mail transportation for a certain fee. An operator is a citizen or a legal entity that owns an aircraft under the terms of a lease and, on a legal basis, uses this aircraft for flights and has an operator's certificate. A carrier is an operator that has a permit or license to carry out any air transportation.

Aviation enterprise acts as a generic, generalizing concept because, with the presence of appropriate licenses and certificates, it can carry out its activities both as an operator and as a carrier. At the same time, only commercial operators of civil aviation, which carry out activities on a paid basis, can be classified as aviation enterprises.

Therefore, the air transportation market is always a relevant offer and fully solvent demand for passenger and cargo transportation. Among the conditions for the functioning of the air transport market can be mentioned the existence of the need for air transport and the carriers that can satisfy this need.

The main logistic performance indicators include:

- passenger flow, which is calculated by multiplying the number of transported passengers in a certain time by the distance of transportation;
- tonne-kilometer, which is calculated by multiplying the weight of the transported goods for the specified time by the distance of transportation;
- occupancy rate of passenger seats on company flights for a certain period of time (month, year).

Therefore, when analyzing the production activity of aviation enterprises, it should be understood that this will have a strictly objective assessment of the sphere and environment in which this enterprise operates and the place that the enterprise occupies in it. The improvement of the performance indicators of airlines is achieved

due to the growth of the ranking of airlines and the recognition of their leading position among air carriers.

In terms of product delivery, there are six modes of transportation engaged in the process, such as water, truck, digital, air, rail and pipeline. Even with these options, all of these modes are not viable for marketers [45]. There are various features of transportation logistics (Fig. 1.3)

1. Product Options

- This feature is related to the different products that are realistically shipped through a certain mode of transportation. For example, trucks are able to handle variety and large quantity of products easily as compared to pipelines.

2. Speed of Delivery

- This is referred to the movement of products originating from the shippers' location right to the location of the buyer.

3. Accessibility

- This is referred to as transportation to be suitable enough for final delivery that would occur at the desired location of buyer. It may also refer to the mode of delivery suitable to be off loaded to other modes prior to its arrival at the buyers' destination. For example, a majority of deliveries are made through air and these must be loaded into other transportation modes such as trucks, prior to the delivery of package to the final customer.

4. Cost

- The cost is evaluated as per the terms of the cost/item to cover the distance that can be measured in miles or kilometres. Large shipments and tangible products where costs are measured per tons/mile or as per metric tons/kilometre.

5. Capacity

- This is related to the products being capable of shipment at one time in a given transportation unit. High capacity of transportation would mean that the cost of transportation can easily be distributed over individual products. This would lead to lower cost per transportation per individual item shipped. It is a good bargain for the shipper and for those shipping the goods.

6. Intermodal Capable

- This shipping happens when there is a collaboration between two or more modes; these can be combined as per the orders that helps in gaining advantages that each mode of transportation can offer. For example, the method of piggybacking truck trailers are deployed and then the load goes on to railroad cars. When these cars reach a given destination then the truck trailers are off loaded to a given delivery destination.

Figure 1.3 – Features of transportation logistics

Source: [45].

Apart from this, when a firm or a customer is under time constraints, then the need is to find the fastest means of transportation, i.e., through air.

Logistics management process is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organization and its marketing channels in such a way that current and future profitability are maximised through the cost-effective fulfilment of orders [35].

Figure 1.4. outlines the logistics process for the travel industry, demonstrating the importance not just of physical resources but also of information.

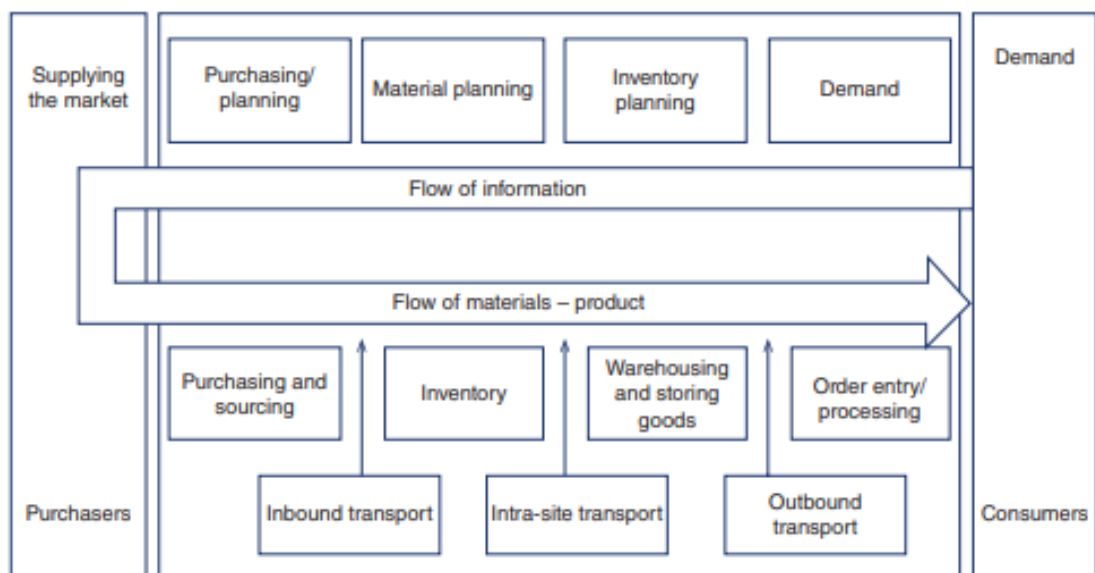


Figure 1.4 – The logistics process for the travel industry

Source: [35]

The main logistics processes in airline include:

- operation of the international lines assigned to them on the basis of the operator's certificate;
- ensuring safety, regularity of flights and a high standard of passenger and customer service on the relevant airlines;
- ensuring high-quality maintenance of aviation equipment and ground equipment;

- training of qualified personnel for flights;
- interaction of various ministries, departments, etc.

For the effective organization of the logistics of international air transport, the airline must develop and implement in its organization a flight production manual, a technical maintenance manual and a quality manual, which contain the rules, procedures and regulations for the organization and provision of flights established and accepted by the operator for implementation [8].

Also, the airline must ensure the availability of a production base equipped for the organization and operational management of aircraft flights, the performance of necessary work to maintain the airworthiness of aircraft, the analysis of flight information, the collection and processing of data on the reliability of aviation equipment and flight safety, the training of aviation personnel, and the accounting and storage of operational and technical documentation and documentation for the main and component parts of aircraft [10].

The main management functions of logistics system management are illustrated in Figure 1.5.

Planning is one of the main components of airline logistics management. It consists of determining the goals of the airline's logistics, which must be clearly formulated. If these conditions are not met, all the efforts of the company's management may turn out to be a waste of time, material means and human resources. All goals, regardless of whether they are long-term or short-term, should be specific for each logistics unit [10]. The development of strategy and tactics is the second stage of planning in the management of the airline's logistics activities. A strategy is a general plan of action aimed at achieving a given task. Tactics are detailed methods and techniques for implementing the strategic ideas of airlines.

The next stage of logistics planning is organization and regulation, i.e., the determination of ways to achieve set goals in accordance with the airline's market strategy. Among the most important functions of the organization of logistics are also analysis, audit and controlling, which ensure the maintenance of logistics at the

required level. Pricing also affects the functioning of the airline's logistics system because the quality of the services provided depends on their price.

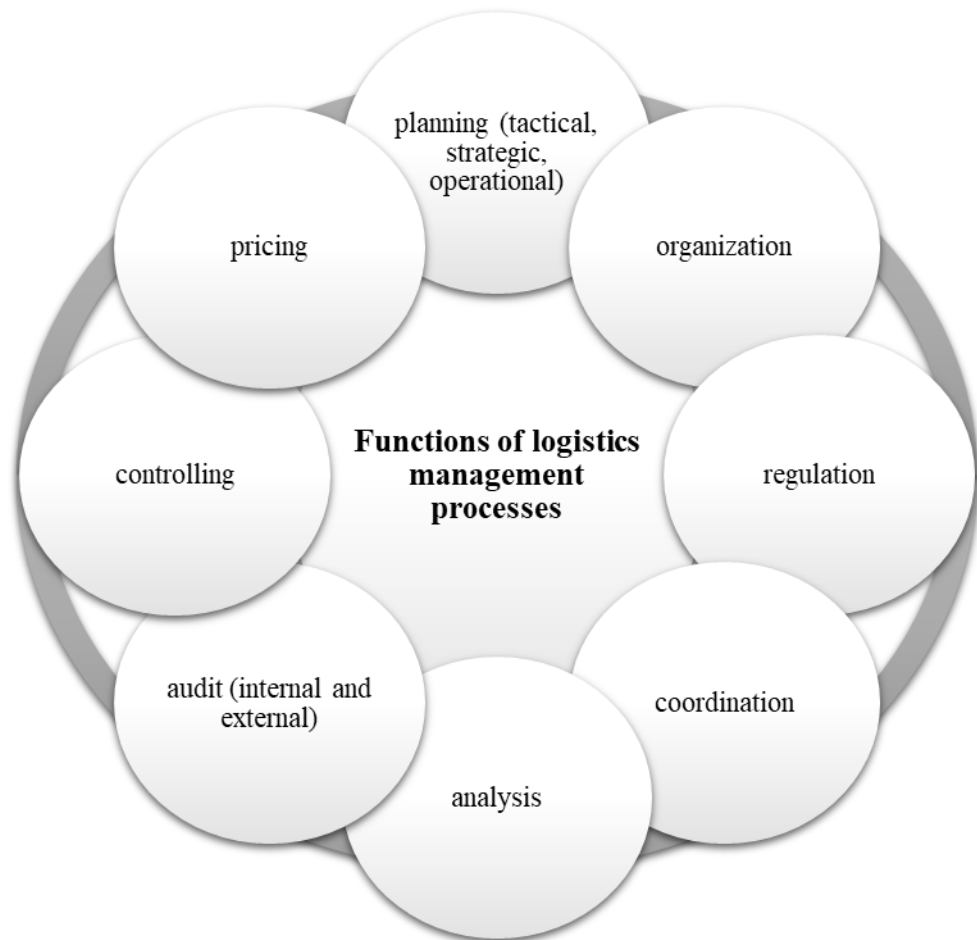


Figure 1.5 – The main functions of logistics management processes

Source: [20]

So, today, logistics allows you to solve many tasks with competent planning, and most importantly, in the difficult situation on the world economic market, logistics finds new methods of optimizing transportation.

Chapter 1 summary

The logistics management process in airlines is the process of managing the logistics system, namely the performance of basic management functions (using computer technologies) to achieve the company's logistical goals.

When analyzing the production activity of aviation enterprises, it should be understood that this will have a strictly objective assessment of the sphere and environment in which this enterprise operates and the place that the enterprise occupies in it. The improvement of the performance indicators of airlines is achieved due to the growth of the ranking of airlines and the recognition of their leading position among air carriers.

Features of effective management of logistics systems of enterprises make it possible to establish external factors of influence on the functioning of the logistics system and to evaluate their influence using modern scientific methods; identify internal factors influencing the logistics system and establish limitations of its functioning; systematically assess the possible consequences of the implementation of the chosen development option; carry out timely organizational changes in the logistics system due to changes in the external and internal environment; to obtain the maximum effect when optimizing the functioning of the logistics system in order to increase the competitiveness of the business entity.

Thus, the use of the principle of the system logistics approach can provide a modern enterprise with the opportunity to form strategic and tactical goals for the operation of the logistics system, identify all possible alternative ways of achieving the set goals in the short term and in the future, as well as choose the most effective of them, distinguish the elements of the logistics system, and establish relationships between them.

CHAPTER 2

ANALYSIS OF THE LOGISTICS PROCESS MANAGEMENT SYSTEM OF THE WINDROSE AIRLINE COMPANY

2.1 Overview of the state of aviation market

In modern society, there are several completely independent types of transport. Their distribution is due to the difference in the means of transport used to move cargo and passengers, as well as the different natural environment of their operation. The transport system of Ukraine is a large and complex economic complex located throughout the country. It includes: land transport (rail, road), water (sea and river), air and pipeline.

In Ukraine, the aviation industry is one of the most important, strategic sectors of the economy, as it has great potential for development not only within the national, but also on global markets. Unfortunately, with the start of the full-scale invasion on 02/24/2022 and the introduction of martial law in Ukraine, the country's airspace was closed to civilian aircraft. During the year of the war, the majority of civilian airports and military bases were damaged by shelling (in total, twelve civilian and nine military airports partially or completely lost their infrastructure, some need reconstruction). In such conditions, only the launch under certain conditions of unmanned cargo aviation from the EU to and in the middle of Ukraine is being considered [17]. Some Ukrainian airlines currently operate in a limited mode (on highly competitive markets) in European countries. Airport personnel, employees of the State Aviation Service, State-owned Enterprise UkSATSE and other related companies are on forced layoff, layoffs are ongoing, or people are resigning themselves, not seeing prospects. Therefore, a plan for the recovery of the air transport industry in Ukraine is already needed today.

The volume of air transportation of passengers and cargo between Ukraine and the EU was growing steadily several years before the start of the COVID pandemic. And although air transportation was not as popular as in European countries, Ukrainians increasingly chose air transportation over road, rail, or water transportation. Figure 2.1 shows the dynamics of the number of passengers transported by air transport in Ukraine in 2016–2021.

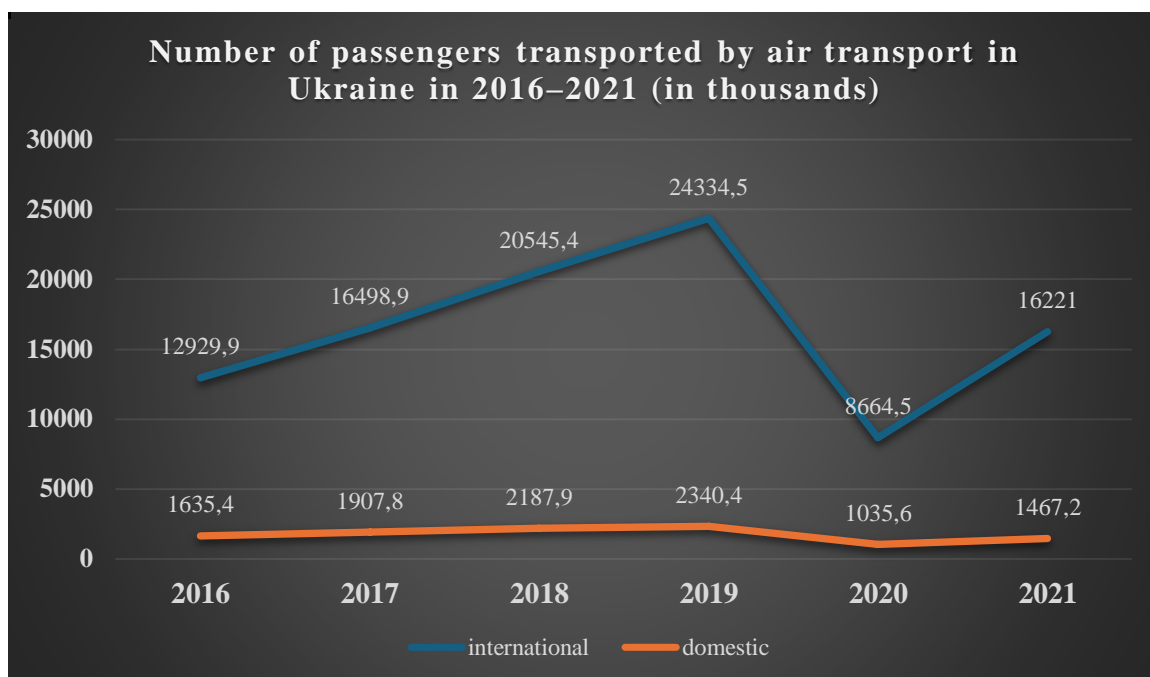


Figure 2.1 – Number of passengers transported by air transport in Ukraine in 2016-2021 (in thousands)

Source: [17]

In Fig. 2.1, we can see that in 2016–2021, a gradual increase in the number of passengers carried by air transport in Ukraine was observed. In 2020, the total passenger flow decreased by three times compared to 2021. This was caused by the start of the coronavirus pandemic in the world, the closure of countries for foreign tourists and the decrease in international air transportation. In 2021, there will be a rapid increase in the number of passengers transported by air transport, by almost 8 million people compared to the previous year.

Three factors strongly influenced the growth of the air transportation market in the near future. The first is the global growth of e-commerce, the market of which, according to forecast data, will increase by 20% every year and reach approximately 5 trillion dollars in 2021. The second is the cost of airline fuel. Periods when jet fuel prices reach historic highs coincide with slowing growth in air cargo volumes. The third factor is the liberalization and globalization of the world industry, which significantly influenced international trade and the expansion of international air cargo markets. The total value of goods transported by air is 35% of world trade [27].

2020 has become a crisis year for the aviation industry of Ukraine. It started with a disaster – a UIA plane on a flight from Tehran to Kyiv was shot down by an Iranian anti-aircraft missile in the morning of January 8. Therefore, restrictions were introduced for flights over the territory of Iran and Iraq, which, with the closure of Russian airspace, made the Asian route almost completely uncompetitive for Ukrainian airlines. Then - the suspension of regular air traffic, the closing of state borders and other international measures to combat the spread of the coronavirus caused a catastrophic decrease in the number of air transportation [7].

According to the State Aviation Service of Ukraine, the total number of passengers carried by air transport in Ukraine in 2020 reached to 8.7 million passengers, which is 65% less than in 2019. The number of flights operated by Ukrainian airlines decreased by 55% - to almost 50 thousand flights. Thus, the number of scheduled flights performed by International Airlines of Ukraine in 2020 decreased by 80%, and the transit flow by 83%. Since the beginning of the pandemic, the airline has had to lay off a thousand of its employees and consider the option of reducing 140 pilots. According to the results of 2020, the SkyUp airline carried half a million fewer passengers and performed a third fewer flights than in 2019, although at the beginning of 2020 the carrier quantitatively doubled its fleet compared to the previous year [29].

In 2021, passenger transportation was carried out by 16 Ukrainian airlines. Over the course of the year, Ukrainian air carriers began operating international

regular passenger flights on 23 new routes, foreign ones on 28 new routes. According to the approved traffic schedule, regular flights to 42 countries of the world were carried out by nine domestic air carriers. The number of passengers who used the services of Ukrainian airlines on international flights in 2021 doubled compared to the previous year and reached 2,608,900 people. The percentage of passenger loading of international scheduled flights of Ukrainian airlines increased by 6.2 percentage and reached to 75.2% [9].

In October 2021, EU-Ukraine Common Aviation Area Agreement was signed, aimed at the gradual opening of the relevant aviation markets and the integration of Ukraine into the Common European Aviation Space. At the same time, Ukraine must comply with EU standards in the field of aviation, which requires large investments in the modernization of airports and aviation enterprises. Unfortunately, the implementation of the agreement and the development of the industry in general has been slowed down by a full-scale war since February 2022. And after the victory in the war, Ukraine will harmonize its legislation with EU aviation rules and standards in such areas as aviation safety, air traffic management, security, environment, economic regulation, competition, consumer protection and social aspects [34].

Today, increasing the level of competition among the world's airlines plays a key role in the industry. The result was the prevalence of web agencies in the common market for clients. Companies in one sector compete with each other regarding ticket rates and reservation restrictions; in the other - regarding service quality and customer satisfaction [38].

The competition between domestic and foreign airlines should be analyzed in two areas: international air transportation from/to Ukraine, as well as domestic transportation within the country. The vast majority of foreign airlines are European. This is due to regional proximity, which is important for consumers. Among the well-known airlines from Europe that operated flights to/from Ukraine until February 2022 were: Hungarian low-cost airline Wizz Air, Irish Ryanair, flagship airlines from various countries LOT (Poland), Air-France-KLM (Franco-Dutch airline), Lufthansa Group Airlines (Germany), Czech Airlines (Czech Republic), Swiss International

Airlines (Switzerland), Austrian Airlines (Austria), Airbaltic (Latvia), Norwegian Air Shuttle (Norway), Turkish Airlines (Turkey). According to DASU, nine new European airlines have appeared on the Ukrainian market since 2016 alone, namely in 2016 – SprintAir (Poland), AirSerbia (Serbia), in 2017 – Ernest SpA (Italy), in 2019 - Laudamotion (Austria), Aigle Azur (France), Scandinavian Airlines System (Norway), in 2021 - Cyprus Airways (Cyprus), Eurowings (Germany), Ryanair UK (Great Britain) (Fig. 2.2)[28].

Among the airlines listed above that carried out transportation from/to Ukraine until February 2022, the only indicator by which Ukrainian airlines prevailed was the number of countries to which flights were made, although the growth was more active among foreign airlines. The number of countries visited by Ukrainian airlines changed insignificantly, ranging from 42 to 48 (the average number was 45), and the number of countries between which Ukraine carried out transportation by foreign airlines (LOT, Lufthansa, Swiss International Airlines, Turkish Airlines, etc.) increased from 27 to 37 (the maximum was reached in 2018 and 2019), the average number was 33 countries.

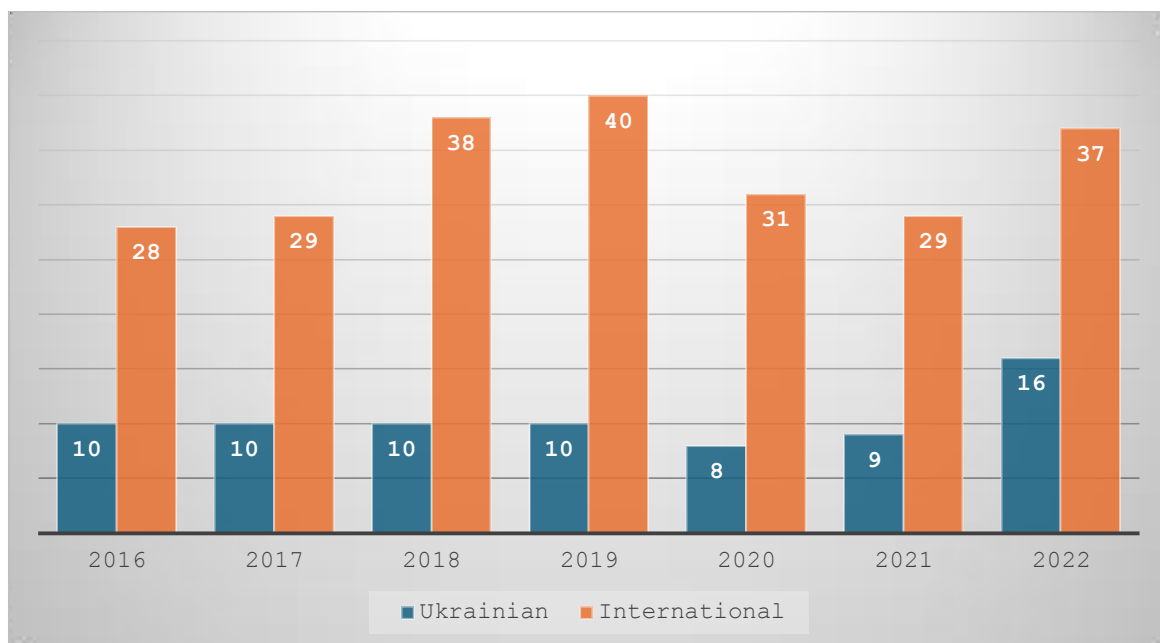


Figure 2.2 – Number of Ukrainian and international airlines that had flights to/from Ukraine in 2016-2022 (24.02.2022)

Source: [28]

Also, during the seven-year period (2016–2022), another indicator - the number of transported passengers - grew. Since 2018, according to this indicator, foreign companies have prevailed over Ukrainian ones. In 2016, Ukrainian airlines carried 4.95 million passengers, foreign airlines 3.85 million people, and in the peak year of 2019–7.11 and 9.42 million people, respectively (this is the maximum figure for seven years); in 2020, there was a decrease in both foreign and Ukrainian air carriers - 1.3 and 3.3 million people, respectively, and in 2021 - an increase - 2.6 and 6.1 million people.

It is worth paying attention to the annual increase in the number of passengers transported by Ukrainian airlines on irregular (charter) flights. In three years (2016–2019), it more than doubled - from 2.5 to 5.44 million people. And even after falling in 2020 to 3 million people, in 2021 this indicator increased sharply and reached 6 million people (almost as many passengers as transported by foreign airlines). This testified to the growing demand for charter transportation related to the development of tourism [28].

The increase in the number of foreign airlines, the number of countries to which flights were made until February 2022, the number of new air routes of foreign companies and the number of air passengers transported by foreign airlines, taking into account the dominance of European airlines among foreign airlines, indicated the expansion of the presence of European companies on the Ukrainian market international air transportation of passengers. In order to adequately compete with them in the future, domestic airlines will need to closely cooperate with the Ukrainian government and implement programs and measures to better satisfy the interests of Ukrainian market participants (airlines, airports, and consumers) [32].

Cooperation between air transport and tourism should be further promoted due to the strong global potential of the latter in our country. However, according to the statistics of the World Tourism Organization, the rate of annual visits to Ukraine before the start of the war had a downward trend, which was caused by the Russian invasion of Ukraine in 2014 and subsequent hostilities. Every year, tourists visit Ukraine on a short-term trip (for one or several days): in 2008 – 28.8 million people;

in 2013 – 26 million people; in 2014 – 13.2 million people; and in 2020–3.4 million people. The vast majority of tourists preferred land transport and very little air transport, although tourists began to use the latter more often. Thus, in 2008, these indicators were 93% and 6%, respectively (the rest - sea transport), in 2013 - 89% and 10%, and in 2020 - 76% and 21%, respectively [46].

After the full-scale Russian invasion, only two Ukrainian airlines - UIA and SkyUp - were able to continue their activities in a modified form. The rest of her was forced to pause. Some of the planes were simply "stuck" in Ukrainian airports after the start of the war because they did not have time to fly out of the country before the skies over Ukraine were closed for flights. In particular, the entire fleet of "Windrose" part of the fleet of UIA and Azur Air Ukraine, is idle.

The main source of work and income for those Ukrainian companies that were able to evacuate their planes is charter transportation for tour operators, humanitarian flights and the so-called "wet" leasing, the leasing of the plane together with the crew and maintenance. The demand for such services in Europe has grown significantly. Indeed, after two years of downtime during the coronavirus pandemic, when companies cut staff and limited flights, in the summer of 2022, travel became relevant and popular again, but there is a shortage of planes and pilots.

SkyUp met the war with the best preparation, and today it is the most successful among all Ukrainian airlines. Not only did it manage to take virtually its entire fleet out of Ukraine before the airspace was closed (only one plane got stuck in Boryspil). All this time, SkyUp has been actively flying and making money, only now in Europe. In total, in 2022, the airline made 7,713 flights and transported more than 1.08 million passengers to 204 airports around the world on 627 routes.

As for the main Ukrainian air carrier - UIA, the company actually has four left from more than two dozen boards. Lessors recalled some of the planes on the eve of the war, fearing a hypothetical escalation at that time. Some were "stuck" in Ukrainian airports when the skies were closed due to the war. At first, UIA managed to continue its activities. In the first six months of the war, the company focused on charter flights for European customers, as well as flights for sports teams from

European countries and Ukraine. But this activity did not have commercial success. In the first half of 2022, the turnover of UIA decreased by three times - to UAH 1.2 billion. If in January-June 2021 the company received 22 million UAH in profit, then in 2022 it suffered losses of 1.3 billion UAH. In recent months, the situation has worsened; in fact, all UIA planes have stopped flying [28].

As already mentioned above, it will be unprofitable for European airlines to fly within the territory of Ukraine, both before the start of a full-scale war and, apparently, after the victory, due to the high VAT on domestic flights. That is why domestic airlines have so far not been too concerned about potential competitors. If, after the end of the war, they will make such flights, then the motivation for this, most likely, will not be profit but marketing. With this approach, it is likely that European airlines will create several routes in Ukraine between large cities (Lviv, Kyiv, and Odesa), where there is potential for advertising promotion. However, it can be argued that with the appearance of foreign airlines on the domestic Ukrainian air market, consumers will prefer them because of lower prices and a higher level of service compared to Ukrainian air carriers. After all, one of the main shortcomings of Ukrainian airlines in the air transportation market was service.

According to the data of the British consulting company Skytrax [36], over the past ten years, no Ukrainian airline has entered either the TOP-100 best airlines or the regional ratings. In the Skytrax ranking of the best airlines in Europe in 2022, Air France led, while British Airways and Lufthansa took second and third places, respectively. Summarizing, it can be stated that the appearance of European air carriers on the domestic aviation market of Ukraine after the victory in the war is possible thanks to the signing of the agreement EU-Ukraine Common Aviation Area but it is unlikely. Mandatory conditions for their appearance are the restoration and modernization of Ukrainian airports to increase capacity and the revision of VAT on domestic air transportation [28].

Since European airlines have long won the unequivocal advantage and loyalty of consumers on international flights to/from Ukraine, domestic carriers will have to make radical decisions to improve service in order to restrain the entry of foreign

airlines into the Ukrainian domestic air transportation market or to create a worthy competition for them, at least in Ukraine .

Of course, the longer the war lasts, the more difficult the situation will be for Ukrainian civil aviation, and the longer it will have to recover. The optimal option would be to launch flights even in wartime. Today, Ukraine is in the group of seven countries with the highest first level of risk in terms of flight safety. Civilian aircraft operators are advised to avoid such areas entirely, as aircraft may be misidentified by air defense systems and mistakenly targeted, or come under crossfire during air attacks, etc.

The newly created Agency for the Reconstruction and Development of Infrastructure will begin to develop a reconstruction plan, which should provide for [17]: sequence of reconstruction of airports, in accordance with the Master Plan and the Transport Model of Ukraine; reconstruction of the destroyed airport infrastructure; development of priority and cargo airports; creation of transit hubs; return plan of airlines and other subjects of the air market and unimpeded access to activities at airports; coordination with EU regulations on the cost of aviation fuel and service standards; optimization of taxes for business entities in the aviation industry; creation of favorable conditions for starting the activities of aircraft maintenance service companies (MRO); terms of preferential lending and subsidies for restoration from partner countries and at the expense of reparations; creation of concessions for airports (BOT – build-operate-transfer); creation of supervisory boards at airports, involvement of professional managers for reconstruction and management, etc. Hopefully, such measures will be able to restore Ukrainian air traffic.

2.2 Organizational and economic characteristics of Windrose Airlines

Windrose Airlines is the first charter airline in Ukraine, the main activity of which is the organization and execution of corporate, tourist and VIP flights [19].

Windrose Airlines was registered in Kyiv in October 2003, and at the end of 2007 it received an operator's certificate. The company's central office is located in Kyiv, and the airlines itself is based at Boryspil Airport [48]. The company provides passenger air transportation services, performs international and domestic flights. In 2020, the airline launched a new flight program called "Let's Connect Ukraine" and operated regular flights from Kyiv to Kharkiv, Zaporizhzhia, Dnipro, Mykolaiv, Kherson, Odesa, Lviv, and Ivano-Frankivsk.

In 2021, the airline expanded the directions of the country's air traffic with the routes Kyiv – Kryvyi Rih – Kyiv, Kyiv – Uzhgorod – Kyiv, Kyiv – Chernivtsi – Kyiv, thus connecting 12 cities of Ukraine. Along with the opening of new domestic air routes in 2021, Windrose airlines increased the number of frequencies on some existing routes.

It is also worth noting that in addition to domestic scheduled flights in 2021, the Windrose Airlines operated weekly international scheduled flights in the Kyiv-Sofia-Kyiv directions. Kyiv-Zagreb-Kyiv, Kyiv-Podgorica-Kyiv, Kyiv-Belgrade-Kyiv, Kyiv-Skopje-Kyiv. The network of regular flights was built in such a way as to connect the cities of Ukraine with each other, as well as the cities of Ukraine with the cities of Europe.

The main goal of the Company is to ensure the safety and comfort of passengers. Flight safety is the priority task of the Company.

For fifteen years Windrose Aviation Company has passed the path of transformation from an aviation broker to the largest Ukrainian charter airline with high standards of service.

The Company was making international flights in such destinations: Egypt (Hurghada, Sharm El-Sheikh, Taba), Turkey (Antalya, Bodrum), Greece (Heraklion, Rhodes, Corfu, Kos, Chania), Spain (Barcelona, Girona, Malaga, Alicante, Canary Islands, Tenerife), Cyprus (Larnaca), Croatia (Dubrovnik, Split, Pula), Montenegro (Tivat), Bulgaria (Sofia, Varna, Bourgas), Romania (Bucharest), Italy (Rimini, Forli, Venice, Brescia), United Arab Emirates (Dubai, Sri Lanka (Colombo), Austria

(Innsbruck, Salzburg), Finland (Rovaniemi, Kuusamo, Kajaani, Kittila) and others [49].

The activities of Windrose Airlines are carried out on the basis of the Certificate of the State Aviation Service of Ukraine, which grants the right to sell air transportation, the license of the State Agency of Ukraine for Tourism and Resorts for the right to carry out tour operator activities, the accreditation of the agency in the international organization IATA (Appendix B, Appendix C).

The certificate for the right to sell air transportation is a document that allows airlines to sell transportation on the territory of Ukraine, which is issued to the airline by Ukraviatrans and indicates that this company meets all current requirements of the Ministry of Infrastructure of Ukraine.

As already mentioned, Windrose Airlines is accredited by the International Air Transport Association IATA, which is a guarantee of reliability and creditworthiness of the airlines. IATA accreditation allows airlines to work with any airports in the world, the hotel industry, and car rental companies. If the accreditation is positive, the agency is assigned an IATA code.

Windrose Airlines carries out the following activities:

- international passenger air transportation;
- activity according to the scheme "airport - airport";
- international air transportation of cargo;
- cargo transit through Boryspil airport;
- cargo air transportation under customs control from/to Boryspil airport and others;
- customs clearance of all types of cargo;

Windrose Airlines carries out air transportation of the following types of cargo:

- general;
- valuable;
- perishable products;
- dangerous;

- loads that have large dimensions or weight;
- goods that require immediate delivery in a short period of time;
- animals.

Air freight is the fastest way to deliver any type of cargo to other countries or deliver cargo to Ukraine from abroad. But the cost of such services is much more expensive than the price of similar services by other modes of transport. Among the factors affecting the cost of air cargo transportation, the main ones are:

- type, dimensions, weight, and volume of cargo;
- direction of delivery;
- terms of delivery;
- cargo support at all stages of transportation;
- insurance;
- packaging;
- other factors related to individual features of the cargo that is transported [49].

Air transportation today is the most promising direction of international freight transportation. Undisputed advantages include speed and reliability.

At the end of 2020, the airline began a new request for pump-operated cargo on rock-configured vehicle cargo trains (p21) on the routes: Kyiv - Hong Kong - Kyiv and Kyiv-New York-Kyiv, performing 12 flights a month. In 2021, the airlines expanded its cargo flight program, and by the end of 2021, it had operated a total of 180 regular cargo (RT) flights. For this, aircraft were brought into operation under ASMI conditions with Airbus A-330 crews (operators Maleth Aero, Wamos, Smartlynx) and Boeing B-767 (operator EuroAtlantic). Cargo air transportation was carried out by order of two permanent partners from Ukraine - Ukrposhta and Nova Poshta, as well as from China - Joom Logistics, Rosan Express, and Teleport Logistics. The Ukrainian representative office of one of the world leaders in the field of ESC Group - the company Globe Air Cargo - was also involved in the sale of air freight as a general agent [33].

According to the State Register of Aircraft of Ukraine, three aircraft have entered the fleet of Windrose Airlines in 2023 from UIA: Embraer 190, Boeing 737-800, and Boeing 737-900ER. Appendix D shows the fleet of Windrose for all the years of its existence [24].

The figure below shows the timeline of the Windrose Aviation fleet (2009-2024)

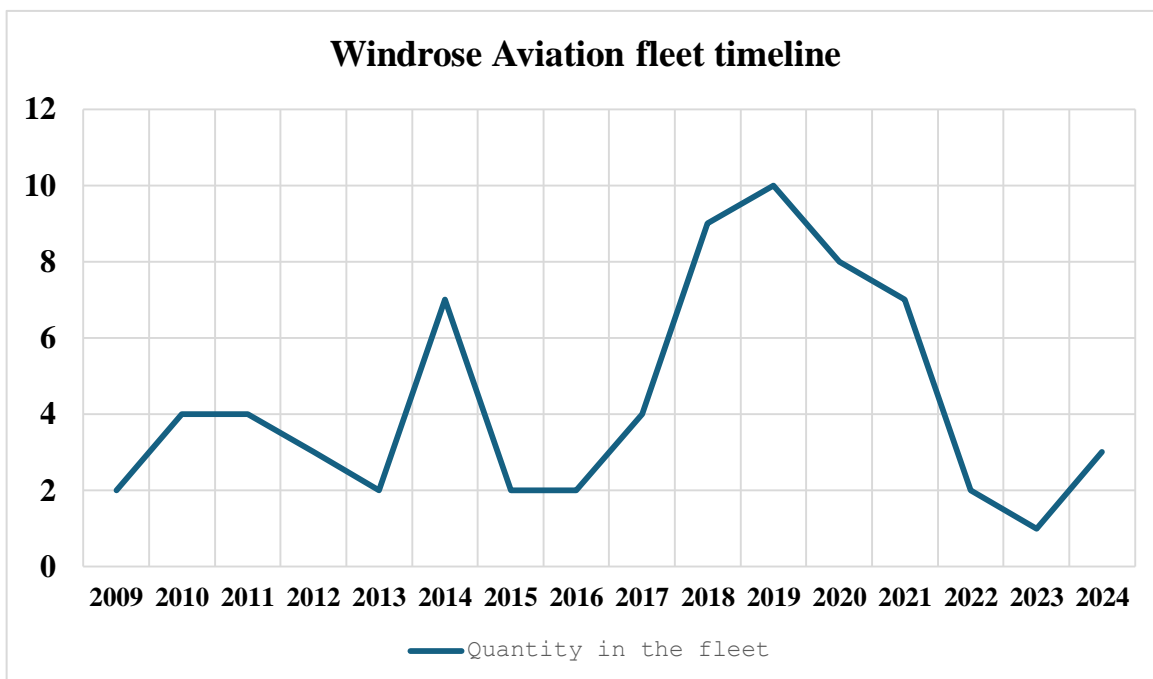


Figure 2.3 – Windrose Aviation fleet timeline (2009-2024)

Source: [47]

The main units of measurement for the airline's products are the number of passengers, take-off and landing operations, and the amount of processed cargo, in transit.

Other main units of measurement of the airline's activity are financial indicators, which include, first of all, revenue, which should be divided into aviation and non-aviation.

In the conditions of economically and legally independent functioning of the airline, when developing methods for evaluating the airline's activity, the peculiarities of this company in the general system of air transportation should be taken into

account. Taking into account these features, the concept of "economic efficiency of the functioning of the airline" implies an economically independent and stable state of the company, which constantly and regularly interacts with other subjects of the transportation process, carrying out certain defined volumes of commercial and technical operations, guided by a system of economic indicators that determine this effective state [8].

Analyzing the performance indicators of the Windrose airlines, it can be noted that the revenues of the main activity of the airlines are divided into aviation and non-aviation.

Aviation revenues are those related to the use of the airline's own infrastructure, in particular fees for a package of services, such as the transportation of passengers and cargo, the provision of customs services, etc. The costs include costs related to aircraft maintenance at the airport, technical support, etc.

Incomes and costs from the main activity of the airline are presented in hryvnas in table 2.1.

Table 2.1 – Incomes and costs of Windrose Airlines (in hryvna)

| Budget indicators | 2021 | 2020 | Difference (2021 vs. 2022) | Change in % |
|---------------------|-------------|-------------|-------------------------------|-------------|
| Incomes | 4 559 387 | 2 030 909 | + 2 528 478 | 55.45 |
| Costs | (4 909 572) | (2 609 217) | + (2 300 355) | 46.85 |
| Gross profit (loss) | (350 185) | (578 308) | - (228 123) | -65.14 |

Source: [31].

Data was taken from the last published financial report for 2021. It is clear from this table that revenues have increased significantly, which is due to an increase in the number of aircraft and active low-cost activities, thereby increasing aviation revenues. Costs also increased due to increased prices for aircraft maintenance. The increase in costs is caused by the increase in the price of fuel, the wage fund, and insurance contributions. There is also an increase in costs for the modernization and maintenance of the infrastructure of the Windrose airlines.

The company costs' structure is shown in Figure 2.4.

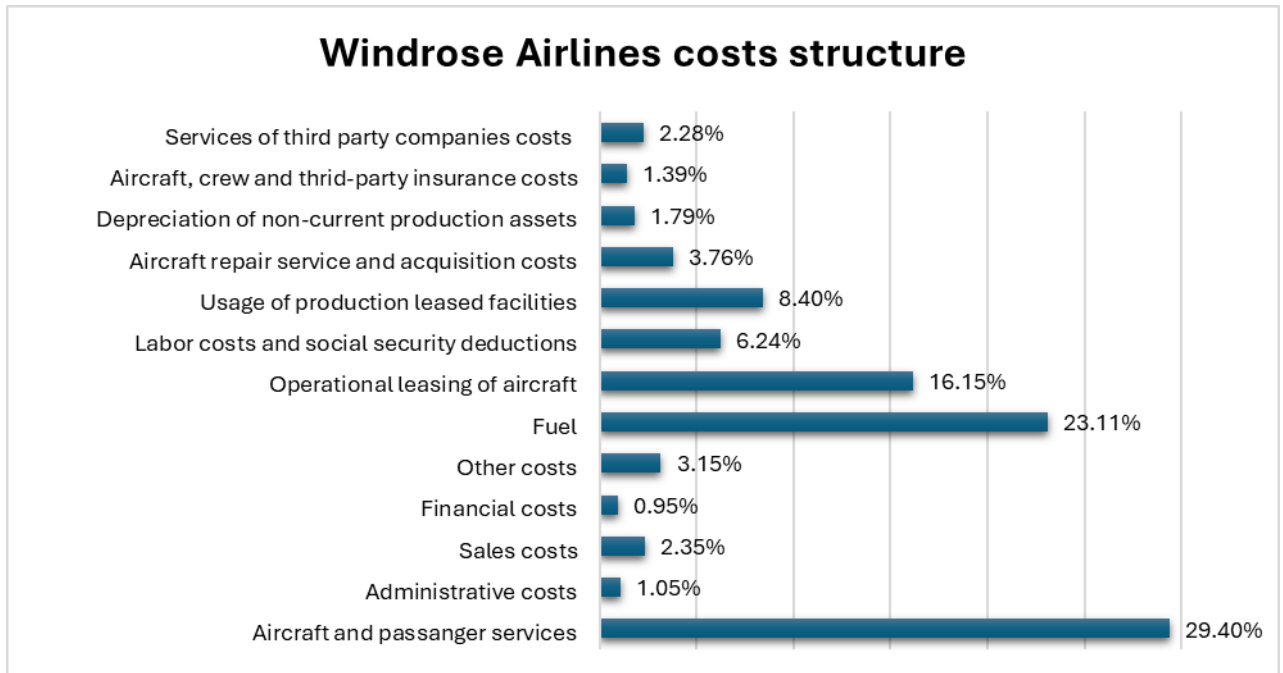


Figure 2.4 – Windrose Airlines costs structure 2021

Source: developed by author based on [31]

From the Fig.2.6 above, it can be seen that the largest share of costs at the Windrose airline is the cost of aircraft and passenger services, fuel, operational leasing of aircraft, and wages.

Income of Windrose Airlines from sales in 2020 and 2021 by activity (in terms of production and trade) is presented in table 2.3:

Table 2.3 below shows a comparative analysis of the company's profits for 2020-2021, from which it is clear that profits have increased. But comparing incomes and expenses, it's seen that expenses according to the company's latest financial report in 2021 were more than income.

Table 2.2 – Windrose Airlines income for 2020–2021 (in hryvna)

| Sales income | 2021 | 2020 |
|---|------------------|------------------|
| Income from air transportation of passengers and baggage on charter flights | 2 506 657 | 1 504 949 |
| Income from air transportation of passengers and baggage on regular flights | 1 032 673 | 364 311 |
| Income from air cargo transportation | 957 909 | 92 818 |
| Income from transport services (ASMI) | 37 228 | 25 534 |
| Income from other related aviation services | 24 078 | 6 103 |
| Income from aircraft maintenance services | 806 | 1 188 |
| Income from the sale of assets | 36 | 6 |
| TOTAL | 4 559 387 | 2 030 909 |
| Other income | | |
| Profit from the operational exchange rate difference | 185 007 | 167 153 |
| Income from asset recovery | 14 259 | 178 |
| Received fines, penalties, penalties | 12 149 | 4 995 |
| Income from assets received free of charge | 8 933 | 8 634 |
| Income from writing off accounts payable | 4 661 | 9 057 |
| Income from the sale of currency | 236 | 20 |
| Profit from the sale of other current assets | 2 | 2 |
| Other income | 146 | 1 342 |
| TOTAL | 225 493 | 191 381 |
| Financial income | | |
| Financial income from the long-term bank loan | 206 | - |
| Financial income from the provided interest-free financial assistance | 201 | 169 |
| Financial income from receiving interest-free financial assistance | - | 5 918 |
| TOTAL | 407 | 6 087 |

Source: developed by author based on [31]

Windrose airlines employs highly qualified pilots with extensive professional experience and a flight of more than 10,000 branches. The crews are certified by aviation regulatory authorities and undergo training in modern training centers around the world, and the aircraft meet all international flight safety requirements [49].

The SWOT analysis of Windrose Airlines, based on the analysis of the market and development opportunities, is presented in table 2.4.

Table 2.3 – SWOT analysis of Windrose Airlines

| Strengths | Weakness |
|---|---|
| <ul style="list-style-type: none"> - A large number of travel directions; - The most punctual Ukrainian air carrier; - Freight transportation; - A large share of international air transport; - was included in the register of IOSA airlines; - Visa-free regime with EU countries | <ul style="list-style-type: none"> - Dependence on seasonal demand; - Low frequency of flights compared to competitors; - A small fleet |
| Threats | Opportunities |
| <ul style="list-style-type: none"> - Cancellation of airline flights in all directions due to the full-scale war between Ukraine and Russia; - Activities of competing airlines; - An increase in inflationary processes, a decrease in the hryvnia exchange rate, and a decrease in the solvency of the population; - The threat of rising credit resources. | <ul style="list-style-type: none"> - Expansion of the airline; - Partnerships and alliances; - Geographical position, which contributes to the expansion and development of the route system; - Delayed demand for air transportation, which will be satisfied after the situation in the country improves. |

Sources: made by author

Having done a SWOT analysis, can be determined the following priority directions:

- expansion of the airline's sphere of activity, i.e. increase of travel destinations;
- expansion of freight transportation;
- active implementation of measures to increase the level of passenger service, first of all, in relation to the provision of non-aviation services;
- strengthening of measures to maintain the appropriate level of security;
- cost cutting, including reducing the cost of services.

2.3 Analysis of logistics management processes in the Windrose Airlines

In order to determine Windrose's place among air carriers and to analyze its logistics management processes, it is first necessary to consider the industry in which the airline operated and existing competitors.

According to the latest UkSATSE data, the number of flights operated by Ukrainian airlines in 2021 is 230,513, which is 62.3% more than in 2020 and 31.2% less than in pre-crisis 2019.

In particular, 29,637 domestic flights were made in the airspace under the responsibility of Ukraine in 2021 (40.4% more compared to 2020 and only 3.7% less compared to 2019), 116,932 international flights (+69.8% and -28.2%, respectively) and 83,944 transit flights (+61.2% and -40.8%, respectively).

In 2021, Ukrainian airlines performed 81,747 flights (this is 64.4% more than in 2020 and 25.5% less than in 2019), foreign - 148,766 flights (+61.2% and -34.1%, respectively) [21].

In December 2021, the volume of transportation in the country's airspace almost reached the level of 2019 with an indicator of 92.3%. It should be noted separately that the number of transit flights in the last month of the year almost equaled the corresponding indicator of 2019 - primarily due to the resumption of flights in the Simferopol Flight Information District.

According to UkSATSE, in 2021 the largest volumes of air navigation services were provided to the following airlines:

- Turkish Airlines – 24 323 flights;
- UAI 20 626 flights;
- SkyUp – 16035 flights;
- Windrose – 15 102 flights;
- Wizz Air – 14 323 flight;
- Ryanair – 11 554 flights;
- Azur Air – 8 692 flight;

It shows that among the main competitors of Windrose Airlines among Ukrainian airlines are UIA, SkyUp and Azur, among international ones - Turkish Airlines, Wizz Air and Ryanair, which are also low-cost airlines [21].

As for logistics management of Windrose and its efficiency, the strategic mission of the airline is fast, safe, comfortable and timely transportation of passengers from point to point. At the same time, the logistics mission is designed to

increase the company's competitiveness on the world market by introducing logistics concepts into the organization of transportation.

According to the latest financial report 2021 of the airline, the company made 8,383 domestic regular flights, which were used by 437,914 passengers. International regular flights for 2021 of Windrose Airlines are shown on tables 2.4.

Table 2.4 – International regular flights 2021

| City | Number of passenger | Number of flight | Average number of passengers per flight |
|------------------|---------------------|------------------|---|
| Sofia | 15 742 | 393 | 40 |
| Podgorica | 11 061 | 248 | 45 |
| Belgrade | 9 765 | 242 | 40 |
| Zagreb | 9 017 | 208 | 43 |
| Skopje | 2 374 | 80 | 30 |

Source: developed by author based on [31]

The share of the Company's charter air transportation in the Ukrainian market is about 60%. Table 2.5 below shows the flight directions and the number of flights performed in 2021.

Table 2.5 – Windrose charter flights (2021)

| Direction | Number of flights |
|------------------------------|-------------------|
| Boryspil-Antalya- Boryspil | 1 073 |
| Boryspil-Sharm- Boryspil | 524 |
| Boryspil-Hurghada- Boryspil | 407 |
| Dnipro-Antalya-Dnipro | 343 |
| Lviv-Antalya-Lviv | 305 |
| Dnipro-Sharm-Dnipro | 227 |
| Boryspil-Heraklion- Boryspil | 146 |
| Lviv-Hurghada-Lviv | 131 |
| Boryspil-Dalaman- Boryspil | 128 |
| Boryspil-Bodrum- Boryspil | 82 |
| Boryspil-Tivat- Boryspil | 78 |
| Dnipro-Bodrum-Dnipro | 78 |
| Odesa-Antalya-Odesa | 77 |
| Kharkiv-Sharm-Kharkiv | 68 |
| Boryspil-Pula-Boryspil | 34 |
| Boryspil-Split- Boryspil | 28 |
| Dnipro-Hurghada-Dnipro | 26 |
| Boryspil-Tel Aviv-Boryspil | 24 |
| Kharkiv-Antalya-Kharkiv | 16 |

The end of the Table 2.5

| | |
|------------------------------------|----|
| Dnipro-Burgas-Dnipro | 10 |
| Odesa-Tel Aviv-Odesa | 6 |
| Zaporizhzhia-Hurghada-Zaporizhzhia | 2 |

Source: developed by author based on [31]

An expert assessment of the effectiveness of logistics activities of Windrose Airlines was conducted and strengths and weaknesses were identified (see Appendix E). The overall score is 2.21, which is above the industry average. Graphic interpretation of the conducted research is shown in Fig. 2.5.

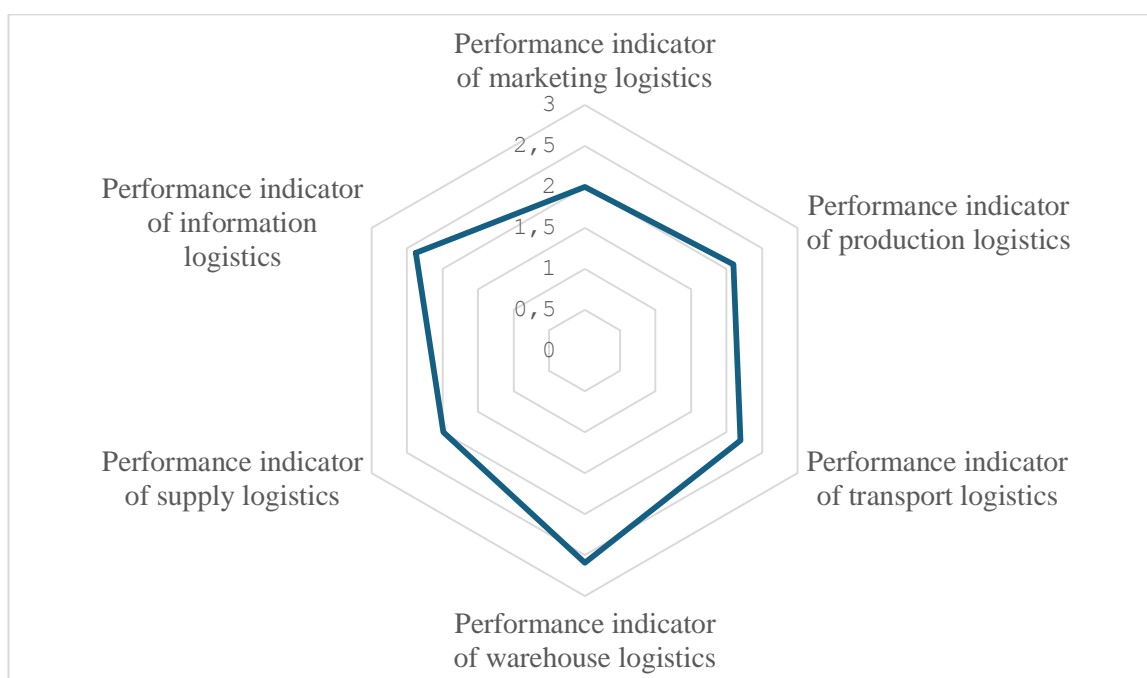


Figure 2.5 – Generalized characteristics of logistics activities

Source: developed by author

The value of the indicator was calculated as the average value of the products of the estimates, which were determined by various factors and their weighting factor. Thus, the most important directions had the greatest influence on the formation of the final understanding of the state of logistics activity of the enterprise.

The work of the logistics department should be focused on improving procurement logistics and inventory management. Therefore, the logistics activity of the enterprise has positive indicators, a tendency towards growth and potential. After

the establishment of production processes, the logical continuation of the company's exit from the crisis is the improvement of logistics process management.

The specificity of the organization of the Windrose airline is due to the high degree of influence of external factors on the existing passenger flow. In turn, the flow of passengers using the services of transport companies generates:

- financial flows that go to pay for the services of suppliers, airports, air traffic organization structures;
- flows of material resources (park, equipment, spare parts, energy, etc.);
- flows of labor resources;
- the flow of aircraft making flights.

Thus, for the effective processing of emerging heterogeneous flows, the most important resources of the air carrier include:

- personnel, primarily flight and technical personnel;
- the fleet and its operational characteristics;
- a network of airlines that sell the main product and satisfy the consumer's needs;
- sales network - a key factor in efficiency and service;
- management is an integral resource, as is a set of methods and the effect of the synthesis of previous resources [23].

In this regard, the main mutually influencing commercial processes of the airline are:

- network and schedule planning;
- formation of the budget for revenues and costs of air transportation;
- sales management;
- income management;
- cost management;
- budget execution control.

Comprehensive accounting of aircraft operation factors allows you to reduce costs for PMM, eliminate downtime and choose the most optimal aircraft option to achieve the set goal. This process is iterative and can be divided into two stages:

- 1) determination of the cost per flight hour by aircraft type;
- 2) based on the results of the previous stage, selection is made for airline aircraft.

To solve the tasks, the following parameters are analyzed:

- total number of routes (domestic regular, non-regular, charter);
- number of passengers (per year, per month, per week, per flight); - number of flights (per year, per month, per week, per day);
- fuel consumption (per year, per month, per week, per day, per flight for each type of aircraft);
- the total amount of expenses for all flights (per year, per month, per week);
- expenses for one flight;
- flight time of one aircraft, flight distance, cruising speed of flight.

The optimization processes described above form planned production indicators for forecasting revenues from flights, which allow you to assess the feasibility of the chosen air transportation strategy using the company's aircraft fleet, transportation capacities and economic potential of the company, which ensure the fulfillment of the schedule.

Windrose strives to meet all passenger requirements from the moment of purchase of a plane ticket to the moment of boarding the plane at the final destination:

- Information about routes, flights, applicable tariffs, discounts, as well as the air ticket itself, can be obtained by the passenger at any agency around the world thanks to the international reservation systems used by the airline.

- The plane ticket can be paid for anywhere in the world, in any currency and by any type of payment, and it can also be delivered to any place at the request of the passenger. - In addition to the plane ticket, the passenger can order a hotel and a car in any city in the world, which will be fulfilled by the company's agent without fail.

- Passengers can also pre-order service in business lounges at the airport, food in the plane cabin, if necessary, an additional seat in the plane, a first-aid kit for a specific illness, a nurse, etc.

There are also departments on which the successful development of the Windrose airline depends. This is the organizational and technical support of foreign economic relations, marketing research conducted by the department of marketing and foreign economic relations. Its functions include:

- coordination of relations between the airline's structural divisions and foreign and domestic economic, financial and other organizations;
- development of proposals for the development and strengthening of relations with third-party organizations based on the study of their capabilities;
- organization of negotiations and meetings of airline managers with representatives of foreign organizations;
- analysis of demand satisfaction according to the airline's activities and the service market;
- development of recommendations regarding the organization of the development of the airline's commercial activity and ensuring its efficiency;
- advertising activity.

The development and implementation of new areas of high-quality passenger service, improvement of the efficiency and quality of the airline's work, which must meet certification requirements and current standards, is carried out by the quality service. Units that implement the development of information systems in airlines based on modern computer technologies ensure [23]:

- development and improvement of the general concept and plan for building the airline's information system;
- coordination of activities and methodical management of the structural units of the airline regarding the use of modern information technologies.

It is also important to note that thanks to the timely reorientation of the airline's activities from passenger to cargo transportation during the quarantine, the company managed not only to stop its activities and not incur large losses, but also to gain government support and a reputation on the Ukrainian and international air cargo transportation market. as a reliable partner.

Chapter 2 summary

Before the start of the full-scale war, Ukraine had great potential for the development of the air transport industry due to its geographical location, the presence of several international airports, and active European integration. However, post-pandemic conditions of COVID-19 and war have created certain challenges and limitations for the development of air transport in the country.

As a result of European integration, Ukraine must comply with EU standards in the field of aviation, which requires large investments in the modernization of airports and aviation enterprises. This can be a challenging task in the face of financial constraints and economic instability.

The pandemic has had a significant impact on the air transport industry, reducing demand for air travel and causing airline revenues to decline. But after the decrease in demand, there was a rise in the industry again, until the war began and the airspace over Ukraine was closed.

The war in the country not only had a negative impact on the air transport industry of Ukraine, but also essentially made it impossible to function. Of the four domestic airlines (UAI, SkyUp, Azur Air and Windrose), only Windrose and SkyUp is now operating.

During 2024, all efforts of Windrose, together with UkSATSE, will continue to be directed at creating conditions for the post-war phased restoration of civil aircraft flights in the airspace of Ukraine.

CHAPTER 3

DEVELOPMENT OF PROJECT PROPOSALS FOR THE OPTIMIZATION OF THE LOGISTICS PROCESS MANAGEMENT SYSTEM IN WINDROSE AIRLINES

3.1 Development of recommendations for optimization of the logistic process management system

The efficiency of the enterprise's functioning depends on the optimization of its logistics management processes. Under conditions of crisis phenomena in the economy, the issue of logistics optimization takes on special importance, as it allows the company to adapt to new economic conditions, increase the efficiency of flow process management, reduce costs and overcome the crisis with minimal losses.

Any enterprise is an open system, which is a set of interconnected business processes, the ultimate goal of which is to sell products and make a profit. As a rule, among the main logistics business processes, the following are distinguished:

- planning of goods movement;
- resource process (delivery of materials from suppliers);
- organization of warehouse processes and accounting of products in warehouses;
- product sales process;
- performance of service logistics functions [4].

Considering the importance of the listed logistics processes in the activity of industrial enterprises, one of the key tasks for them should be the optimization of the management system of these processes. The peculiarities of the functioning of production-oriented enterprises allow us to determine certain principles that determine the specifics of the optimization process:

1. The principle of information security, according to which the optimization of logistics processes is possible only under the condition of ensuring coordination and the formation of a single information space, will contribute to the design of an optimal logistics system.

2. The principle of integration, which determines the need to design supply chains that ensure an increase in the level of internal and external logistics integration due to the formation of a stable and long-term relationship between the elements of the logistics chain.

3. The principle of innovativeness, according to which it is envisaged to involve as many innovative organizations as possible in cooperation, to strengthen the production potential of the enterprise, and to increase competitiveness.

4. The principle of ensuring strategic cooperation, according to which the expansion of long-term economic cooperation between the participants in the logistics chain is ensured.

5. The principle of ensuring the development of logistics infrastructure involves the involvement and development of business activity of all participants in the logistics chain [13].

Thus, the process of optimizing the logistics business process management system involves obtaining the following results: reducing costs, increasing the speed and quality of management decision-making, as well as expanding the scope of the company's activities.

As already mentioned, the control of the results of this optimization is extremely important in the process of optimizing logistics processes. Therefore, a necessary condition for the functioning of enterprises today is the implementation of a controlling system, which is designed to provide information and analytical support in making management decisions. The tasks that controlling is aimed at solving will be able to provide the company's management not only with information about the current state of affairs, but also help predict the consequences of changes in the internal and external environment (Table 3.1).

Table 3.1 – The main task of controlling business processes is

| Types of controlling | Problems to be solved |
|---------------------------------------|---|
| Controlling in the management system | The purpose of strategic controlling is to ensure the long-term functioning of the enterprise. The basic purpose of operational controlling is to provide methodical, informational and instrumental support to the company's management. |
| Financial controlling | Maintaining profitability and ensuring liquidity for the enterprise |
| Controlling production | Information support for production processes and their management |
| Controlling the market | Informational support for effective management in the field of satisfying consumer needs |
| Controlling provision of resources | Information provision about the process of purchasing production resources, analysis of resource purchases, and calculation of the efficiency of the supply department |
| Controlling in the field of logistics | Current control of the cost-effectiveness of the processes of storage and transportation of material resources, as well as the movement of information and finances |
| Controlling in SCM | Control and optimization of supply chains and reliability analysis of SCM elements |

Source: [31]

Understanding and applying best practices and strategies in the field of logistics in the context of crisis management becomes an integral part of successful business planning. Let's consider the key aspects of optimizing logistics processes in Table 3.2.

Table 3.2 – Optimization of logistic business processes in anti-crisis management

| A key aspect of optimizing logistics business processes | Description |
|--|--|
| Analysis of the current state of logistics processes | Identification of existing processes, functioning and inefficiencies |
| Supply chain flexibility | Adaptation to changes in the market, diversity of suppliers |
| Technological integration | Use of IT solutions and automation to improve efficiency |
| Risk management | Identification and minimization of potential risks |
| Stock optimization | Effective inventory management to reduce costs |

The end of the Table 3.2

| | |
|------------------------------------|--|
| Continuous monitoring and analysis | Regular evaluation of the efficiency of logistics processes |
| Interaction with partners | Communication and cooperation with the supplier and partners |
| Personnel training | Increasing the competence of the staff |

Source: [22]

Table 3.2 shows a comprehensive approach to the optimization of logistics processes in the context of anti-crisis management. Analysis of the current state of logistics processes is fundamental for identifying potential improvements. Supply chain flexibility and technological integration play a key role in ensuring adaptability and efficiency in responding to crisis situations. Risk management and inventory optimization are critical to minimizing costs and conserving resources. Constant monitoring, interaction with partners and staff training ensure long-term efficiency and flexibility of logistics systems.

The conditions of a full-scale war in Ukraine bring fundamental changes to the paradigm of optimization of logistics management processes, requiring special attention to the adaptation and flexibility of management solutions. The need to reorganize supply chains comes to the fore. Traditional routes and methods of delivery may be unavailable or dangerous, so it becomes important to find alternative sources of raw materials and components. With this in mind, companies should focus on developing and maintaining more localized and secure supply chains (Figure 3.1).

In times of war, the role of information integration grows significantly. Rapid collection, analysis, and processing of information are vital for an adequate response to rapid changes in environmental conditions. This includes not only operational information on the state of markets and supply chains, but also data on the security situation on routes to the pond. Safety and reliability become key factors in the transportation and storage of goods. It is necessary to carefully plan delivery routes, taking into account potential risks, and to develop contingency plans in case of force majeure.



Figure 3.1 – Optimization of logistics processes in war conditions

Source: [22]

Particular attention should be paid to flexibility in inventory management. On the one hand, it is necessary to ensure sufficient stocks to guarantee the continuity of production, but on the other - to avoid too large accumulations, which can become too burdensome in view of the costs of their storage and management.

Crisis planning and risk management are of particular importance. Businesses must develop clear strategies in case of various crisis scenarios, including military action. This helps minimize potential losses and quickly resume normal operations after the crisis is over. Adaptation to rapidly changing conditions is also an important aspect. This means the ability to quickly change logistics strategies and operational plans in accordance with the current situation [22].

The modern concept of the resource management system - Enterprise Resource Planning (ERP) combines planning of material support, financial accounting, and the management of logistics channels. ERP is an organizational strategy for the integration of production and operations, management of labor resources, financial management and asset management focused on continuous balancing and optimization of enterprise resources with the help of a specialized integrated package

of application software that provides a common model of data and processes for all areas of activity. In general, ERP allows you to combine modern approaches to managing an organization with innovative technologies.

By using an ERP, aviation businesses will have full control, visibility, and data collection that can improve overall business performance. Maintaining aircraft in good working order and on schedule is essential for airlines to provide the appropriate level of customer experience.

To establish external activities, enterprises use a strategy modification that includes Supply Chain Management (SCM) and Customer Relationship Management (CRM). SCM covers supply chain planning, management and control of logistics operations. CRM is aimed at managing interactions with customers, including information collection and demand analysis.

The use of the ERP system allows you to automate and optimize processes at the enterprise, improve interaction in the internal environment of the organization and communication with counterparties, quickly analyze the current situation, and make operational decisions. The implementation of ERP can be considered a promising direction for the development of medium and large enterprises. In Appendix E presented the top Airline ERP Platforms.

Function capabilities of the ERP system:

- Production. Modern systems combine opportunities for process, discrete and lean production. The module supports the entire life cycle— from planning to delivery to the client.

- Supply chains. The systems allow you to organize effective management of purchases, stocks, supply chains, and warehouse management. Automation provides full visibility of the balance and reduces storage costs.

- Finances. Maintain regulatory, accounting, management and accounts and store all reliable data in one system.

- Cost price. They provide a correct and quick cost calculation.

- Personnel. Automation of personnel accounting and payroll calculation. This is the formation of regulated reporting and support for changes in labor legislation.

- Repairs. It provides information about the state of the production equipment, allows you to plan and control repair work.

Windrose Airlines strives to increase the functional efficiency of the management of logistics processes as well as all areas of activity, including operational. Optimization of supply chains and centralized formation of a production master plan based on sales forecasts are strategic tasks of the logistics department, for which the company should choose an Oracle Airline Data Model (Oracle Cloud ERP) solution that optimally meets its requirements.

3.2 Development of organizational measures to implement recommendations

Implementation of an ERP system is a complex and long process, but if all stages are performed correctly, the organization will receive significant advantages in logistics management processes and increased work efficiency.

Here are some steps that Windrose Airlines should be taken into account during implementation:

1. Analysis and planning. At this stage, it is necessary to conduct an analysis of business processes, determine the requirements for the system, and develop an implementation plan.

2. Selection and adjustment of the system. The next step is to choose a suitable system and adjust it to the needs of the organization.

3. Testing and training. After setting up the system, it is necessary to test its functionality and train employees.

4. Gradual implementation. It is recommended to implement in stages, starting with one department or process, to minimize risks and problems.

5. Support and development. After successful implementation, it is necessary to ensure its support and constant development, taking into account changes within the organization and markets.

Preparation for the implementation of the ERP system is a complex and large-scale process that requires careful preparation and planning. For successful implementation, it is necessary to perform several stages, including the analysis of business processes, the definition of goals, and the setting of expectations from implementation.

The first and one of the most important stages of preparation for implementation is the analysis of business processes. It is necessary to conduct a detailed study of all current processes of the company to identify their weak points and opportunities for optimization. Only after careful analysis can it be determined which ERP system will be the most effective and meet the company's needs.

The second stage is the definition of goals and expectations. The company must clearly formulate what problems and tasks it hopes to solve. For example, in case for Windrose Airline it can be the automation of logistics management processes, improvement of inventory management, or improvement of employee performance. A clear definition of the goals will help to choose a suitable system and plan the implementation with the greatest efficiency [49].

Stages of ERP system implementation for Windrose Airlines:

1. Planning phase. First, a project plan is drawn up, in which the goals and objectives of the project are defined, as well as its budget and deadlines are estimated. Then the roles and responsibilities of each project participant are defined. An important stage is the development of business requirements, which will be taken into account during setup.

2. Development and configuration phase. At this stage, IT infrastructure is being prepared. This includes installation and configuration of the necessary hardware and software. Then there is the development and adjustment of the functionality of the ERP system in accordance with business requirements. After that,

the system is tested and debugged to make sure it works correctly and meets the requirements.

3. Implementation and training phase. At this stage, preparations are being made for the transition to the new system. This includes transferring data from the old system, as well as carrying out the necessary settings and checks before starting. Next, employees are trained to have confidence in their readiness and ability to work with the new system. After the training, there is a start-up and adaptation in the working environment.

Using Oracle Cloud ERP Windrose Airline will have airline-specific features such as fuel-cost accounting, route forecasting, airplane catering, and mileage program management.

The benefits Windrose might receive from Oracle's Airline Data Model are shown in figure 3.3. below.

Rapid Implementation, predictable costs - can be deployed on Database Cloud Service, Exadata Cloud Service or on-premises Oracle EE database. Tables and optimizations are pre-defined based in industry standards. Easily extended and customized, it avoids 'Build from Scratch' costs and associated risks. The integrated enterprise schema can be used as an Operational Data Store, as well as a platform for data science.

Delivers Insight Quickly -Embedded models provide sophisticated trending and predictive analysis. Can be extended with Oracle Big Data Appliance or Big Data Cloud Service to further enhance analytic capabilities, perform time-series or streaming analytics on fast data, integrate external data, or create a data lake for additional analytic opportunities

Industry standards - based on International Air Transport Association (IATA) standards for aviation vocabulary, data definitions and relationships, and inter-operability.

Figure 3.3 – Benefits of Oracle’s Airline Data Model

Source: developed by author based on [41]

Aimed at increasing the efficiency of business processes and optimizing costs, choosing the most modern solutions, Windrose Airlines should implement a medium-

and long-term planning system that makes it possible to continuously assess the impact of each decision on the company's costs and revenues throughout the global supply chain.

Supply chain optimization using the Oracle Cloud tool consists of the following steps:

- use of demand scenarios as input to the optimization system;
- the comparison changes over time in the configuration of the network structure of the supply chain;
- modeling of all elements of the supply chain (production sites, warehouses, volumes of production, transportation methods, location of suppliers and consumers, etc.);
- simulation of changing business conditions (new business and new markets, sales/sales plans);
- optimization of the network structure taking into account aggregate costs, including costs for transportation, storage, extraction, processing, opening and closing of facilities, etc. Options for optimizing the supply chain structure can be:
 - optimization according to the income maximization criterion: max (revenue - expenses);
 - optimization according to the criterion of minimization of variable costs: chess (-costs);
 - maximum satisfaction of the sales plan;
 - maximum / target value of recycling loading;
 - minimum / target value of stocks in storage [15].

In the process of implementing the developed business project, Windrose Airline may face certain risks. The following risks will have the most significant impact on this business:

- Financial and economic (decrease in the planned level of net profit, decrease in planned demand, increase in taxes, etc.);
- Marketing (suppliers' refusal of previously concluded contracts, insufficiently substantiated segmentation of the sales market, erroneous sales strategy, etc.);

- Risks associated with unpredictable competition (appearance of an alternative product, reduction of prices by competitors for similar products, increase in production by competitors);
- Risks of unforeseen costs and increase in the estimate (increase in market prices for resources, unforeseen costs);
- Organizational risks (inadequate training and instruction leads to a lack of knowledge among end users of the system. This situation does not provide an opportunity to effectively use the planning capabilities available in the ERP system. Thus, the increase in the level of supply reliability can be only 5% instead of 11%. There is also the risk of low involvement of key users, which leads to a decrease in all indicators. This does not give the opportunity to use all the possibilities of the ERP system in full).
- Social (deterioration of consumers' purchasing power, increasing influence of the role of information carriers, and increasing importance of the Internet);
- Ecological (state of the ecological environment);
- Demographic (aging population, population decline).
- Technological risks (risks of inadequate reengineering of business processes can cause a decrease in indicators that affect the effectiveness of indicators after project implementation. Errors during reengineering lead to a decrease in the target indicator in order to fulfill the level of 1%. When this risk occurs, income from using the system is significantly reduced);
- Management risks (in particular, low levels of support from top managers and internal organizational resistance to changes). The occurrence of this risk may lead to an increase in the period of implementation of the system by a year. At the same time, if we take into account the structure of project costs, then in this additional year the costs will include the monthly salary of the supplier of the ERP system, the salary of the project manager, the payment of a consultant and unforeseen expenses $P1 = 40,000 + 52,000 + 9,000 + 2,000 = 103\ 000$ UAH. At the same time, the total cost of the project will increase by 10%. Calculations of development costs are given in fig.3.4

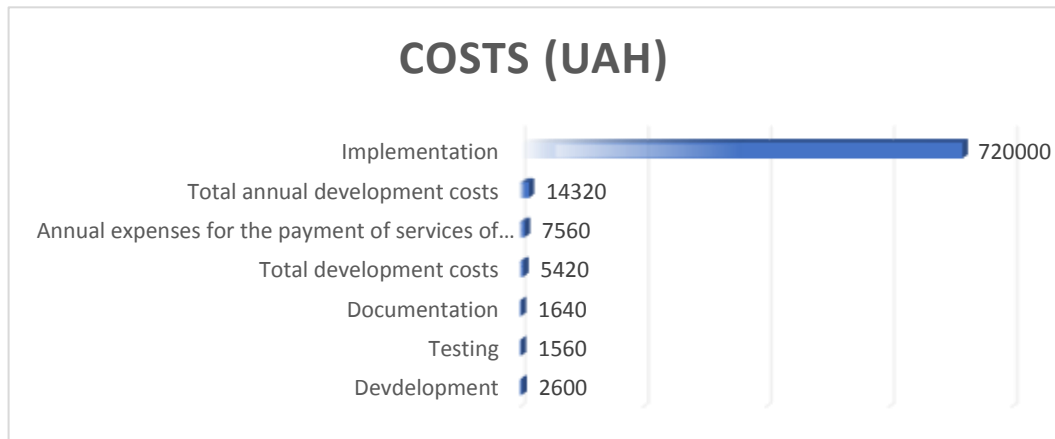


Figure 3.4 – ERP system software development costs

Source: developed by the author

Next is the ERP system implementation algorithm for Windrose Airlines. Implementation of the software is a complex and lengthy process that includes the following stages: diagnostics of the company's activities, identification of problems and potential needs, formalization of business process management, description of current tasks for the system, staff adaptation and training, and technical testing. The start-up of the enterprise's real activity takes place only after the successful completion of the stages of preparation for use, which on average last from 3 to 6 months. Next, a regular analysis of the functioning of the system is carried out, problem areas are refined, and business processes are improved. New modules will be added to the existing ERP system, and functionality will be increased [42].

In global practice, a logical sequence of implementation of ERP system modules has been formed. It takes 2-4 years to fully implement a solution at a large enterprise. To understand the sequential algorithm of the implementation of the ERP system, we will consider the functional stages:

- inputting information about all financial and economic operations into the system, forming appropriate accounting reports, and the possibility of comparing indicators for different periods (financial and accounting module);
- management of material flows of the enterprise, i.e., operational information of orders, stocks, etc.;

- management of information flows; formation of an electronic document circulation system in compliance with established procedures and rules;
- conducting sales in the system for recording data about counterparties, contract terms, delivery schedule, etc.;
- use of software to control the synchronicity of actual data and electronic information;
- production planning based on a single database; - carrying out interaction with the staff - forming tasks and monitoring their implementation; - control of a high level of product quality at each stage of the logistics chain; - feedback from consumers [5].

Diagnostics of business processes: A significant part of the implementation work must be carried out by the organization before the start of process automation and software involvement. The airline needs to conduct a detailed analysis of its internal functioning. The main points are related to the organization of production, the preparation of documents, relations with suppliers, intermediaries and end consumers. In the future, it will be possible to carry out a comprehensive analysis based on the ERP system. It is also worth standardizing the decision-making processes, the interaction of the units and developing reporting forms.

The purpose of the analysis is:

- formation of recommendations for the improvement of the technological process;
- determining the procedure for entering information into databases;
- formation of effective interaction of various divisions of the system;
- drawing up a strategic plan for the implementation of the information system at the enterprise;
- identification of patent obstacles and problems of using the latest technologies;
- formation of favorable conditions for the use of new software in everyday work.

An important part of diagnostics is the assessment of the technical capabilities of the information support. This will make it possible to understand whether there is a need to update or increase equipment for processing and storing information. Usually, enterprises decide to start using cloud technologies, server rental and network equipment configurations [16].

The result of the conducted analysis forms a specific report that demonstrates the current state of affairs at the enterprise and determines the main features of the organizational structure. Next, the principles of the ERP system are established. Formed requirements are consistent with the solution proposed by the development team. At this stage, there are already goals and expected results of the functioning of the software at the enterprise.

Depending on the complexity of business processes, diagnostics takes 1-3 months, and its final result is an agreed action plan for the implementation of changes. To implement the preparatory process, external specialists and 79 employees of the company are involved [14].

The implementation process begins with setting the initial parameters of the system, which take into account the specifics of a particular enterprise. There can be about a thousand such parameters, but this setting is one-time and will not be repeated. The initial setup is done together with the development villa specialists and internal employees. Due to such interaction, the examination of the proposed solution and the adaptation of the personnel take place. In the course of implementation, comments and wishes that arise are taken into account. The final part of the implementation is a ready-to-use ERP system.

At the time of putting the system into operation, appropriate training is given to employees, which gives an idea of the technical work of the project and the distribution of roles. Involvement in the use of the ERP system of all divisions is a key condition for further development in the organization and obtaining the expected effect.

After the formation of the finished system, immediate use follows. It usually starts with performing financial tasks and entering the necessary data. That is, all

financial transactions are additionally recorded in the database and can be separately analyzed. Next, use during production - entering data on materials, terms, remaining finished products, loading of warehouses, etc.

The automation tool is used in parallel in different departments. You can follow the first results of the implemented system already in 4–6 places. Work with documentation and reporting is speeding up; it is possible to compare data for different periods and according to selected criteria [18].

ERP systems are widely used in large enterprises because they allow for improved processes and increased productivity. Due to their scale, routine tasks occupy a significant part of resources, and innovative software products are aimed at automating and optimizing typical tasks. In this way, administrative staff can devote more time to project tasks and focus on the development of the organization as a whole [25].

Next, the implementation of the project involves the stage of activity support and the elimination of 80 deficiencies identified in the process of operation. The enterprise, in its turn, will conduct a number of indicators that were previously selected as priority.

When the process of complete connection of the module takes place, that is, the process is fully automated or optimized as much as possible, then you can proceed to the next modules. Implementation of changes in a certain part of the company's activities requires detailed preparation and a carefully organized implementation process.

Not all decisions to implement an ERP system at enterprises are successful, so the role of preparatory stages and analysis of opportunities, risks, threats, and predicted results is important. The use of complex software in activities has a significant part of features that should be taken into account when making decisions about organizational changes.

In the course of using the ERP system, there are changes in the technical instructions of the employees concerning their automated workplaces. It is necessary to add new arrays of data, form new reports, and import information. The

development of an integrated system will stimulate the improvement of the management of the organization.

Automation of systems is associated with the direct interaction of various employees with the IT department. Such activity should be aimed at the transition of business processes into technical interpretation. Logistics processes are closely related to the work of all departments, so they need not only to be technically implemented but also to include existing connections in the system of operation. Practically, to improve the adaptation process, joint meetings of various departments are held, models are formed and the necessary business requirements are created. Therefore, it is logical to start the implementation of changes from the logistics department and then, expanding the interaction, add other structural elements.

The main factor determining the possibility of effective implementation of an integrated system is organizational orderliness at the enterprise. It is determined by readiness for change, the creation of favorable conditions for system transformations, and management automation.

Significant importance in the implementation of ERP is occupied by:

- managers' interest in implementing the proposed solution;
- carrying out the necessary measures for the preparation of documentation;
- active participation of key specialists in the company;
- formation of a strong team to implement changes;
- high professional skills and readiness for teamwork among all project participants;
- formation of defined project implementation indicators;
- availability of necessary material and labor resources [6].

One of the important areas of work related to the implementation of integrated solutions is risk management and their minimization. The company identifies areas of potential risks, further identifies them within the project and develops proposals to avoid or reduce the impact.

Classification of risks will be carried out to systematize the totality of risks on the basis of signs and criteria that allow combining subsets of risks into common concepts.

A risk measurement scale is adopted for risk assessment. The scale for assessing the probability of risk, the scale for assessing the consequences of risk are considered. (see Fig. 3.5)

On the basis of the proposed approaches, concrete measures will be formed during the implementation of the project, which will allow minimizing a significant share of the existing risks.

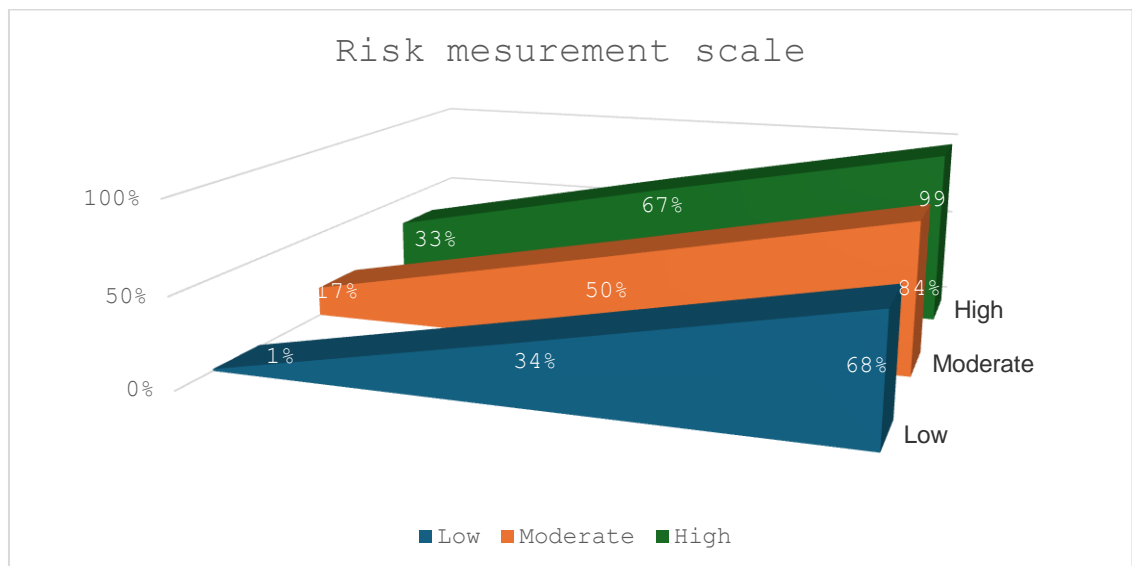


Figure 3.5 – Three-level risk probability distribution

Source: developed by the author

Investment activity is always carried out in conditions of uncertainty arising from the impossibility of fully predicting the conditions of project implementation.

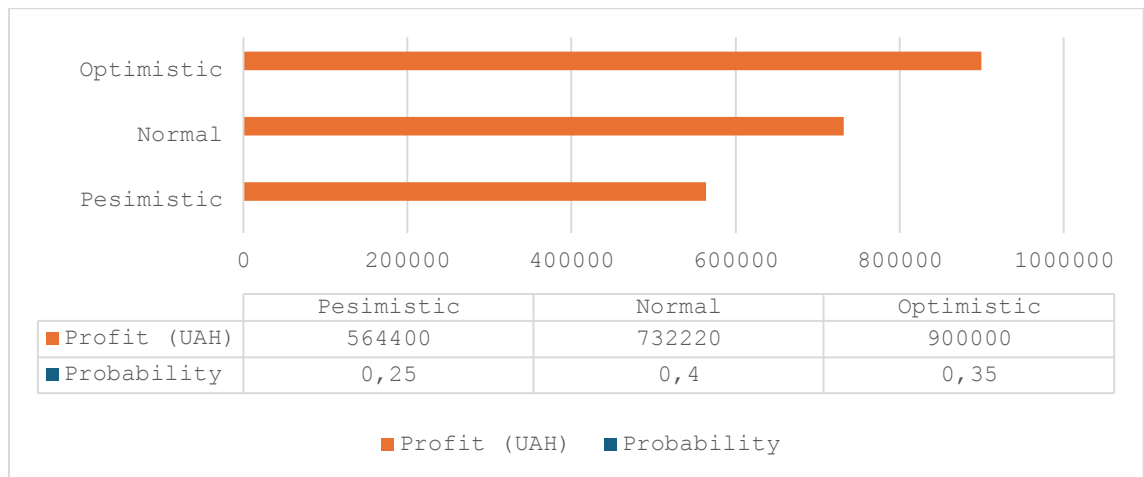


Figure 3.6 – Possible scenarios

Source: developed by the author

$$M(x) = 564400 \cdot 0,25 + 732220 \cdot 0,4 + 900000 \cdot 0,35 = 748988$$

$$D(x) = (748988 - 564400)^2 \cdot 0,25 + (748988 - 732220)^2 \cdot 0,4 + (748988 - 900000)^2 \cdot 0,35 = 16612267216$$

$$\sigma(x) = \sqrt{16612267216} = 128888,6$$

$$\text{var}(x) = \frac{128888,6}{748988} = 0,17$$

The lower the coefficient of variation, the better, which indicates that the schedule of expected benefits is quite positive. It is impossible to unequivocally exclude the risk of project failure, but such a result indicates the predicted benefit, so in the future we will focus on the calculation of the economic efficiency indicators of the implementation of the ERP system for the company.

3.3 Economic justification of project recommendations

With the introduced changes, Windrose Airlines expects to improve the management of logistics processes, improve business processes as a whole, and receive financial benefits. We consider the proposed changes as project work for the company because a significant part of the work falls on the initial stage -

implementation, and further system maintenance will be considered operating expenses. For evaluation, we use the calculation of project efficiency. To implement changes, it is important to create a cross-functional team, the necessary human resources were considered above. Finances that will be used for the implementation of improvement measures should be considered investments, which in the future will lead to increased profitability and additional benefits for the enterprise.

The project requires material and non-material resources for successful implementation and will not show immediate results. It is advisable to consider such changes within the framework of strategic planning and obtaining a comprehensive result, which will lead to a deep transformation of business processes. To calculate the main performance indicators of the project, it is advisable to make a table (see table 3.3).

Table 3.3 – Initial data on the calculation of the main performance indicators of the project

| Indexes | Value |
|--|--------------|
| 1. Project cost (project costs), incl. | |
| Free Cash Flow | 355 120 |
| EBITDA (= income variable costs-fixed costs) | 268 325 |
| EBITDA profitability,% | 75.6 |
| 2. Term of operation, years | 5 |
| 3. Profit (excluding tax) from the implementation of the project at the end of the service period, hryvnias. | |
| 4 Cash flows by year, hryvnias: | 1 531 708 |
| in 1 year | 289 350 |
| in the 2nd year | 295 600 |
| in the 3rd year | 302 520 |
| in the 4th year | 318 500 |
| in the 5th year | 325 680 |
| 5. Discount rate, % | 30 |
| 6. Permissible investment payback period for the company:years. | 1 |

Source: developed by the author

To implement the planned project, the management of the enterprise needs to find financial resources. According to the decision of the financial director of the company, the best option was to take a loan from the bank. The calculation of the

payback period of the investment project will take place under the condition that the enterprise takes a loan from the bank in the amount of UAH 200,000 for 5 years, the discount rate is 30%. The implementation of the proposed project will contribute to the further development of the company, which, first of all, will significantly reduce labor costs, material costs and other operating costs. The net present value (NPV) is calculated according to formula (3.1).

$$NPV = \sum_{k=1}^n \frac{B_t - C_t}{(1+i)^n} - IC \quad (3.1)$$

where B_t are project benefits in year t

C_t - project costs in year t

t - discount rate (30%)

n - is the duration of the project

The results of the calculations are listed in the table 3.4

Table 3.4 – Actual cash flows to determine NPV

| Period of time (t), year | Investment | Incomes (B _t) | Costs (C _t) | B _t -C _t | K _{disc} | Net discounted income |
|--------------------------|------------|---------------------------|-------------------------|--------------------------------|-------------------|-----------------------|
| | | | | | $(1/(1+i)^t)$ | |
| 0 | 200 000 | - | - | - | 1 | - |
| 1 | | 289 350 | 55 900 | 233 450 | 0.769 | 179 523.1 |
| 2 | | 295 600 | 61 320 | 234 280 | 0.592 | 138 693.8 |
| 3 | | 302 520 | 65 090 | 237 430 | 0.455 | 108 030.7 |
| 4 | | 318 500 | 68 800 | 249 700 | 0.35 | 87 395.0 |
| 5 | | 325 680 | 70 700 | 254 980 | 0.269 | 68 589.6 |

Source: developed by the author

$$NPV = 582232.1 - 200000 = 382232.1 \text{ грн}$$

The proposed project has a positive net present value in the amount of UAH 382,232.1.

In figure 3.7 we can see financial results for 5 years: total income – 1 531 650 UAH, costs – 321 810UAH and profit – 1 209 840UAH.



Figure 3.7 – Financial results for 5 years (in UAH)

Source: developed by the author

Next, will be calculated the return on investment index according to formula (3.2):

$$PI = \sum_{k=1}^n \frac{B_t - C_t}{(1+i)^n} : IC = \frac{572232.1}{200000} = 2.9 \quad (3.2)$$

Since the ROI is greater than 1 (2.9), the project is effective and appropriate for the company. Also, will be calculated the discounted investment payback period according to formula (3.3):

$$DPP = t + \frac{|KPV_t|}{PV_{t+1}} = 0 + \frac{179523.1}{138693.8} = 0 + 1.3 = 1.3 \quad (3.3)$$

where t is the year of the last negative value of the cumulative value;

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

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

According to the calculations, the payback period of the project is more than 1 year. Will be calculated the benefit-cost ratio, it shows how much we get from 1 invested hryvnia (formula 3.4)

$$BCR = \frac{\sum_{k=1}^n \frac{B_t}{(1+i)^t}}{\sum_{k=1}^n \frac{C_t}{(1+i)^t}} \quad (3.4)$$

where B_t are project benefits in year t

C_t - project costs in year t

t - discount rate (30%)

n is the duration of the project

BCR

$$= \frac{(289350 * 0.769 + 295600 * 0.592 + 302520 * 0.455 + 318500 * 0.35 + 32680 * 0.269)}{(55900 * 0.769 + 61320 * 0.592 + 65090 * 0.455 + 68800 * 0.3570700 * 0.269)}$$

$$= 4.8$$

The project is effective, as 1 UAH invested generates 4.8 UAH of profit. To evaluate the proposed project and for the purpose of making a decision on the feasibility of financing, the calculated values of the project performance criteria will be entered in the table (Table 3.5)

Table 3.5 – Project evaluation indicators

| Indexes | Indicator | Decision |
|--|---------------|--------------------------------|
| Net Present Value (NPV) | 382 232.1 UAH | The project should be accepted |
| Profitability index (RI) | 2.9 | The project is profitable |
| Discounted Rate of Return on Investment (DROI) | 1.9 | The project is accepted |
| Discounted investment payback period (DPP) | 1.3 | The project is accepted |
| Benefit/Cost Ratio (BCR) | 4.8 | The project is accepted |

Source: developed by the author

The financial resources required for the implementation of the ERP system implementation project can be divided into two parts: investments in the development of the system itself and costs for its operation. About 30% of project manager costs and IT infrastructure maintenance costs. In general, monthly financial needs do not exceed 13,320,000 UAH. So, after analyzing the performance evaluation indicators of the proposed project, conclusions can be drawn about the feasibility of adopting the project, its profitability and achieving the goal of the research.

Chapter 3 summary

The successful development of the economy in modern conditions depends not only on the introduction and use of new production technologies, but also on the application of new methods and approaches to the rapid implementation of all logistics management processes.

The modern concept of the resource management system - Enterprise Resource Planning (ERP) combined planning of material support, financial accounting, management of logistics channels. ERP is an organizational strategy for the integration of production and operations, labor resource management, financial management and asset management, focused on continuous balancing and optimization of enterprise resources with the help of a specialized integrated application software package that provides a common model of data and processes for all areas of activity.

Having considered the possibilities of implementing the ERP system at Windrose Airlines, the stages of software integration into operations were determined. The effectiveness of the information system and its impact on the supply chain were analyzed. Supply chain performance is forecast to improve.

From airlines, hotels, and trucking to rail, ocean shipping, and third-party logistics, Oracle Cloud helps travel and transportation companies deliver exceptional service and enhance resilience. Streamline back-office operations, personalize marketing and service, and redefine the customer and employee experience with Oracle.

The conducted assessment of the project's effectiveness showed a net present value (NPV) in the amount of UAH 382 232.1. Other indicators, such as the profitability index, discounted rate of return on investment, discounted investment payback period, and benefit/cost ratio, make it possible to expect the project to be profitable.

Based on the analysis of the results, it was determined that in the considered conditions, the implementation of the ERP system is economically feasible, since the return on costs can be obtained in a little more than a year of its use by the company. At the same time, the effectiveness of the airline's logistics management processes increases, according to such indicators as: increasing the level of supply reliability, reducing logistics costs, increasing labor productivity, and improving the supply chain.

Based on results the Gantt Chart (Appendix F) has been created where was built ERP implementation plan for Windrose Airlines. All possible delays which can be faced during this implementation were taking into account. The chart can be modified depending on the Windrose workforce as well as on the areas being implemented.

CONCLUSIONS AND RECOMMENDATIONS

The logistics management process in airlines is the process of managing the logistics system, namely the performance of basic management functions (using computer technologies) to achieve the company's logistical goals.

When analyzing the production activity of aviation enterprises, it should be understood that this will have a strictly objective assessment of the sphere and environment in which this enterprise operates and the place that the enterprise occupies in it. The improvement of the performance indicators of airlines is achieved due to the growth of the ranking of airlines and the recognition of their leading position among air carriers.

Features of effective management of logistics systems of enterprises make it possible to establish external factors of influence on the functioning of the logistics system and to evaluate their influence using modern scientific methods; identify internal factors influencing the logistics system and establish limitations of its functioning; systematically assess the possible consequences of the implementation of the chosen development option; carry out timely organizational changes in the logistics system due to changes in the external and internal environment; to obtain the maximum effect when optimizing the functioning of the logistics system in order to increase the competitiveness of the business entity.

Thus, the use of the principle of the system logistics approach can provide a modern enterprise with the opportunity to form strategic and tactical goals for the operation of the logistics system, identify all possible alternative ways of achieving the set goals in the short term and in the future, as well as choose the most effective of them, distinguish the elements of the logistics system, and establish relationships between them.

Before the start of the full-scale war, Ukraine had great potential for the development of its air transport industry due to Ukrainian geographical location, the presence of several international airports and active European integration. However,

post-pandemic conditions of COVID-19 and war have created certain challenges and limitations for the development of air transport in the country.

As a result of European integration, Ukraine must comply with EU standards in the field of aviation, which requires large investments in the modernization of airports and aviation enterprises. This can be a challenging task in the face of financial constraints and economic instability.

The war in the country not only had a negative impact on the air transport industry of Ukraine, but also essentially made it impossible to function. After the victory and the opening of the sky, the country will need a quick restoration of aviation

The successful development of the economy in modern conditions depends not only on the introduction and use of new production technologies, but also on the application of new methods and approaches to the rapid implementation of all logistics management processes.

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Having considered the possibilities of implementing the ERP system at Windrose Airlines, the stages of software integration into operations were determined. The effectiveness of the information system and its impact on the supply chain were analyzed. Supply chain performance is forecast to improve.

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Based on the analysis of the results, it was determined that in the considered conditions, the implementation of the ERP system is economically feasible, since the return on costs can be obtained in a little more than a year of its use by the company. At the same time, the effectiveness of the airline's logistics management processes increases, according to such indicators as: increasing the level of supply reliability, reducing logistics costs, increasing labor productivity, and improving the supply chain.

Therefore, it is advisable for Windrose Airlines to implement an ERP system for managing logistics processes.

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APPENDIXES

APPENDIX A


1. Warehousing or Warehouse Management. A warehouse is a physical place where goods are stored when they come out of production. But warehouse management can be strategically used by companies to excel in the market. For example, the location of a warehouse can play a significant role by allowing companies to deliver their products faster than their competitors. Warehousing automation can also help companies cut labor costs.




2. Order Processing & Fulfillment. Order processing and fulfillment is the process of receiving an order, ensuring payment terms have been met, checking the production capacity and availability of stock and preparing the order for transportation. Another important aspect of order processing & fulfillment is to document transactions and make sure the warehouse inventory is updated whenever an order is fulfilled.




3. Material Handling. Materials handling refers to the movement of goods in a warehouse. Companies need to plan their warehouse layouts carefully to help their employees clearly understand where to find the products that are ordered by customers. Some warehouses for big companies can be very large, so it's important to plan carefully to avoid any logistic inefficiencies.



4. Packaging. In logistics management, the packaging doesn't focus on the aesthetics of the product packaging for the final customers, but instead on how well the product is packaged for transportation in terms of storage space efficiency, breakage prevention, packing cost and ease of handling. If packaging meets these requirements, it can help companies save money and facilitate its logistics management process.



5. Transportation Management. Transportation is the process of delivering products or materials from their warehouse to the final customer. This is the most expensive logistics activity and therefore, is a step that should be planned carefully to minimize manufacturing costs. Logistic managers need to find the most efficient transportation schedule and method of transportation such as rail, truck water and air.



6. Inventory Management. Keeping an inventory of products at the warehouse is costly for businesses and may affect their profitability. For this reason, the goal of inventory control is to gauge customer demand to maintain an inventory level that satisfies it, but without causing overcosts. Some manufacturing methods such as lean manufacturing or just-in-time manufacturing allow businesses to manage their inventory costs.




Figure 1.2 –The logistics management process: logistics activities

Source: developed by author based on [47]

| СЕРТИФІКАТ ЕКСПЛУАТАНТА <i>AIR OPERATOR CERTIFICATE</i> | | | |
|--|--|--|--|
| Типи експлуатації <i>Types of operation</i> | Комерційна експлуатація повітряного транспорту (CAT) <i>Commercial air transport</i> | <input checked="" type="checkbox"/> Пасажирів <i>Passengers</i> | <input checked="" type="checkbox"/> Вантаж <i>Cargo</i> |
| <input type="checkbox"/> Інше <i>Other</i> | | | |
|  УКРАЇНА UKRAINE ДЕРЖАВНА АВІАЦІЙНА СЛУЖБА УКРАЇНИ <i>STATE AVIATION ADMINISTRATION OF UKRAINE</i> | | | |
| CE №: UA 004 AOC №: UA 004 | ТОВАРИСТВО З ОБМЕЖЕНОЮ ВІДПОВІДАЛЬНІСТЮ "АВІАЦІЙНА КОМПАНІЯ "РОЗА ВІТРІВ" "WIND ROSE" AVIATION COMPANY | | Операційні точки зв'язку <i>Operational points of contact</i> |
| | Комерційне найменування: - <i>DBA: -</i> Адреса експлуатанта: вул. Волоська 50/38, офіс 134, м. Київ, Україна, 04071 <i>Operator address: office 134, 50/38 Voloska str., Kyiv, 04071, Ukraine</i> Телефон: +38 (044) 492-97-87 <i>Telephone:</i> Факс: +38 (044) 492-97-89 <i>Fax:</i> E-mail: CHARTER@WINDROSE.AERO | | Контактна інформація, що дає змогу негайно зв'язатися з оперативним керівництвом, наведена в Керівництві з експлуатації частина А, розділ 11. <i>Contact details, at which operational management can be contacted without undue delay, are listed in Operations Manual Part A, chapter 11.</i> |
| Цей сертифікат засвідчує, що ТОВАРИСТВУ З ОБМЕЖЕНОЮ ВІДПОВІДАЛЬНІСТЮ "АВІАЦІЙНА КОМПАНІЯ "РОЗА ВІТРІВ" надано право здійснювати комерційну повітряну експлуатацію, як це визначено в експлуатаційних специфікаціях, що додаються, відповідно до керівництва з експлуатації та Авіаційних правил України «Технічні вимоги та адміністративні процедури щодо льотної експлуатації в цивільній авіації», затверджених наказом Державної авіаційної служби України від 05 липня 2018 року № 682, зареєстрованим в Міністерстві юстиції України 27 вересня 2018 року за № 1109/32561. <i>This certificate certifies that "WIND ROSE" AVIATION COMPANY is authorized to perform commercial air operations, as defined in the attached operations specifications, in accordance with the Operations Manual and the Aviation Rules of Ukraine "Technical requirements and administrative procedures related to air operations in civil aviation" approved by the order of the State Aviation Administration of Ukraine dated 05th of July 2018 No 682, registered in the Ministry of Justice of Ukraine dated 27th of September 2018 No 1109/32561.</i> | | | |
| Дата видачі: 08.12.2020 <i>Date of issue: 08.12.2020</i> | Прізвище та підпис: <i>Name and signature:</i> | | Олександр БІЛЬЧУК <i>Oleksandr BILCHUK</i> |
| | Посада: Голова <i>Title: Chairman</i> | | |

Figure 2.3 – Air operator certificate Windrose Airlines

Source: developed by author based on [49]

NM-1290



Certificate of Registration

IATA is proud to recognize that

WIND ROSE AVIATION COMPANY

has been successfully registered as an IOSA Operator under the IATA Operational Safety Audit program (IOSA), in accordance with the provisions of the IOSA Program Manual.

Valid until: 24 May 2022

Nick Careen
Senior Vice President
Operations, Safety and
Security

Please note: this is a ceremonial certificate only and is not proof of IOSA Registration. Official IOSA Registration is only shown on the IOSA Registry (www.iata.org/registry) and IATA is the official custodian of all IOSA Audit Reports



SARF16
07-JUN-21

Certificate of Registration Windrose Airlines (IATA)
Source: [49]

Table 2.1 – The fleet of Windrose for all the years of its existence

| Aircraft | Current fleet | | Stored/Scrapped | History | Total |
|---|---------------|--------|-----------------|---------|-------|
| | Active | Parked | | | |
| <u>Airbus A320</u> | | | 5 | 4 | 9 |
| Airbus A320-200 | | | 5 | 4 | |
| <u>Airbus A321</u> | | | 6 | 7 | 13 |
| Airbus A321-200 | | | 6 | 7 | |
| <u>Airbus A330</u> | | | 1 | 2 | 3 |
| Airbus A330-200 | | | 1 | 2 | |
| <u>ATR 42/72</u> | | | 5 | 1 | 6 |
| ATR 72 | | | 5 | 1 | |
| <u>Boeing 737 NG/Max</u> | 2 | | | 2 | 4 |
| Boeing 737-800 | 1 | | | 1 | |
| Boeing 737-900 | 1 | | | 1 | |
| <u>Embraer 135/145</u> | | | 7 | | 7 |
| Embraer 145 | | | 7 | | |
| <u>Embraer 190/195</u> | 1 | | | 2 | 3 |
| Embraer 190 | 1 | | | 2 | |
| <u>McDonnell MD-80/90</u> | | | | 5 | 5 |
| McDonnell MD-82 | | | | 4 | |
| McDonnell MD-83 | | | | 1 | |
| TOTAL | 3 | | | | |
| <p>The 'Parked' status corresponds to planes which have not flown for 20 days but of which we have no information that they have left the operator's fleet.</p> <p>The status 'Stored / Scrapped' status corresponds to planes which no longer fly for the operator (e.g. returned to the lessor / destroyed / stored).</p> | | | | | |

Source: developed by author based on [50]

Table 2.6 – Evaluation of the effectiveness of the logistics activity of the enterprise

| Parameters | Raw score | Score in points | Weighted score |
|--|-----------|-----------------|----------------|
| 1 | 2 | 3 | 4 |
| 1. Information logistics | | | |
| 1.1. The level of information support | 0.31 | 2 | 0.62 |
| 1.2. Document processing speed | 0.38 | 3 | 1.14 |
| 1.3. Availability of innovative technologies | 0.31 | 2 | 0.62 |
| <i>Performance indicator of information logistics</i> | 1 | | 2.38 |
| 2. Supply logistics | | | |
| 2.1. Order processing time; | 0.3 | 3 | 0.9 |
| 2.2. Received and processed applications | 0.39 | 2 | 0.78 |
| 2.3. Delayed orders | 0.31 | 1 | 0.31 |
| <i>Performance indicator of supply logistics</i> | 1 | | 1.99 |
| 3. Warehouse logistics | | | |
| 3.1. Cargo processing time | 0.2 | 3 | 0.6 |
| 3.2. Cargo storage time | 0.21 | 2 | 0.42 |
| 3.3 Specific load of the warehouse | 0.19 | 3 | 0.57 |
| 3.4. Cargo volume of the warehouse | 0.2 | 2 | 0.4 |
| 3.5. Productivity of the warehouse. | 0.2 | 3 | 0.6 |
| <i>Performance indicator of warehouse logistics</i> | 1 | | 2.59 |
| 4. Transport logistics | | | |
| 4.1. Expenses for the delivery of goods from the customer to the recipient based on 1 t/km | 0.25 | 2 | 0.5 |
| 4.2. Capital return, capital capacity of vehicles | 0.29 | 2 | 0.58 |
| 4.3. Coefficient of suitability of vehicles | 0.2 | 3 | 0.6 |
| 4.4. Profitability of vehicles | 0.26 | 2 | 0.52 |
| <i>Performance indicator of transport logistics</i> | 1 | | 2.2 |
| 5. Production logistics | | | |
| 5.1. Freight turnover per unit of vehicles | 0.35 | 2 | 0.7 |
| 5.2. Productivity | 0.3 | 2 | 0.6 |
| 5.3. Production growth rate | 0.35 | 2 | 0.7 |
| <i>Performance indicator of production logistics</i> | 1 | | 2.1 |
| 6. Marketing logistics | | | |
| 6.1. The level of the sales channel; | 0.49 | 2 | 0.98 |
| 6.2. Profitability of sales | 0.51 | 2 | 1.02 |
| <i>Performance indicator of marketing logistics</i> | 1 | | 2.00 |
| <i>The average indicator of the effectiveness of logistics activity</i> | | | 2.21 |

Source: developed by author



Figure 3.2 – The Top Airline ERP Platforms

Source:[37]

APPENDIX G

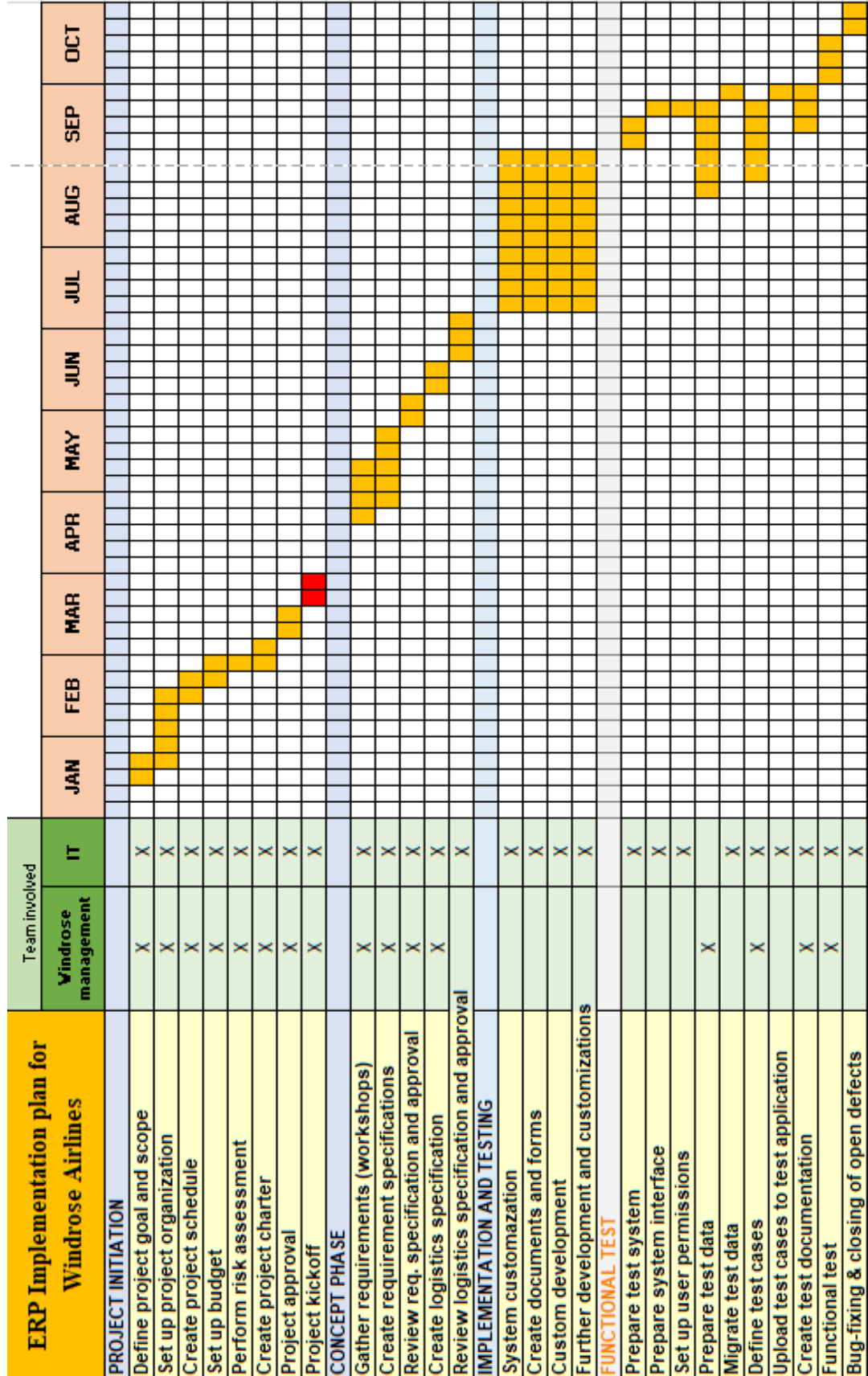


Figure 3.8 – Gantt Chart of ERP implementation plan for Windrose Airlines
 Source: developed by author