MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL AVIATION UNIVERSITY
Faculty of Transport, Management and Logistics
Logistics Department

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BACHELOR THESIS

(EXPLANATORY NOTES)

OF GRADUATE OF ACADEMIC DEGREE

«BACHELOR»

THEME: **«Digitization of processes of sea freight transportation»**

Speciality 073 «Management»

Educational and Professional Program «Logistics»

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Kyiv 2020

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАЦІОНАЛЬНИЙ АВІАЦІЙНИЙ УНІВЕРСИТЕТ
Факультет транспорту, менеджменту і логістики
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ДИПЛОМНА РОБОТА

(ПОЯСНЮВАЛЬНА ЗАПИСКА)

ВИПУСКНИКА ОСВІТНЬОГО СТУПЕНЯ

«БАКАЛАВР»

ТЕМА: «***Цифровізація процесів морських вантажних перевезень»***

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Київ 2020

NATIONAL AVIATION UNIVERSITY
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Academic degree Bachelor

Speciality 073 «Management»

Educational and Professional Program «Logistics»

APPROVED
Head of the Department

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«25» May 2020

TASK

FOR COMPLETION THE BACHELOR THESIS OF STUDENT

Artemii A. Antonov
(surname and name)

1. Theme of the bachelor thesis: «Digitization of processes of sea freight transportation» was approved by the Rector Directive №553/ст. of May 04, 2020.
2. Term performance of thesis: from May 25, 2020 to June 21, 2020.
3. Date of submission work to graduation department: June 05, 2020.
4. Initial data required for writing the thesis: general and statistical information about transport market in Ukraine, information of the company «NAVIS», production and financial indicators of the company «NAVIS», literary sources on logistics and digital technologies, Internet source.
5. Content of the explanatory notes: introduction, the essence of the sea freight transportation; the legal basics of maritime transportation; modern trends in shipping; analysis the transport market in Ukraine and activity of the company «NAVIS»; carrying out of SWOT analysis; development of proposals to digitalize the processes of sea transportation organization; calculation of the economic effect of the proposed measures; conclusions and recommendations.
6. List of obligatory graphic matters: tables, charts, graphs, diagrams illustrating the current state of problems and methods of their solution.

7. Calendar schedule:

№	Assignment	Deadline for completion	Mark on completion
1	2	3	4
1.	Study and analysis of scientific articles, literary sources, normative legal documents, preparation of the first version of the introduction and the theoretical chapter	25.05.20-27.05.20	Done
2.	Collection of statistical data, timing, detection of weaknesses, preparation of the first version of the analytical chapter	28.05.20-29.05.20	Done
3.	Development of project proposals and their organizational and economic substantiation, preparation of the first version of the project chapter and conclusions	30.05.20-01.06.20	Done
4.	Editing the first versions and preparing the final version of the master thesis, checking by standards inspector	02.06.20-03.06.20	Done
5.	Approval for a work with supervisor, getting of the report of the supervisor, getting internal and external reviews, transcript of academic record	04.06.20	Done
6.	Submission work to Logistics Department	05.06.20	Done

Student_____
(signature)

Supervisor of the bachelor thesis _____
(signature)

8. Consultants of difference chapters of work:

Chapter	Consultant (position, surname and name)	Date, signature	
		The task was given	The task was accepted
Chapter 1	Senior Lecturer, Molchanova K.M.	25.05.20	25.05.20
Chapter 2	Senior Lecturer, Molchanova K.M.	28.05.20	28.05.20
Chapter 3	Senior Lecturer, Molchanova K.M.	30.05.20	30.05.20

9. Given date of the task May 25, 2020.

Supervisor of the master thesis: _____ Molchanova K.M.
(signature of supervisor) (surname and name)

Task accepted for completion: _____ Antonov A.A.
(signature of graduate) (surname and name)

ABSTRACT

The explanatory notes to the bachelor thesis « Digitization of processes of sea freight transportation » comprises of 71 pages, 19 figures, 18 tables, 50 references.

KEY WORDS: FREIGHT FORWARDING, MARITIME TRANSPORT, SHIPPING, DIGITAL TECHNOLOGIES, DIGITALIZATION, THE PROCESS OF TRANSPORT ORGANIZATION

The purpose of the research is to study the theoretical foundations and problems of sea transportation organization, the modern digital technologies in sea transport and to develop project recommendations for implementing digital solution in the company activity to achieve the best customer service.

The subject of the investigation is the digitalization of business processes in transportation organization of the freight forward company «Navis».

The object of the research is the business processes in maritime transport organization of the freight forward company «Navis».

Methods of research are scientific inquiry, empirical, analysis and synthesis, modeling, expert assessments, extrapolation of time series.

Materials of the thesis are recommended for use during scientific research, in the educational process and in the practical work of specialists of logistics departments.

CONTENTS

NOTATION

AIS – Automatic Identification System;

BL – Bill of Lading;

DPP – Discounted Payback Period;

CMR – Convention on the Contract for the International Carriage of Goods by Road;

CMS – Code of Merchant Shipping;

FTL – Full Truck Load;

IT – Information technology;

IRR – Internal Rate of Return;

KPI – Key Performance Indicators;

LTL – Less Than Truck Load;

NPV – Net present value;

PCIS – The Port Community Information System;

PP – Payback Period;

VSL – Vessel carrier.

INTRODUCTION

Up to 90% of world's merchandise are carried by sea and the reason is that there are multiple benefits for foreign trade compared with air, rail or road transport.

In an ever-growing globalized economy, the necessity for shipping bigger volumes of cargo in the less time possible is increasing. This has led to the construction of the so-called mega vessels, with the capacity to carry huge amounts of goods into thousands of shipping containers at once. This dynamic benefits the economy of scale and foreign trade, import, and export of all kinds of merchandise and raw materials.

Shipping is present in the development of our daily lives, even if we are sometimes unaware of this fact. There are you four reasons why shipping is the favourite way of transport:

– It´s cheaper: Shipping industry has the most competitive freight costs, as is one of the most cost-effective ways of goods transportation through long distances.

– It´s the ideal way to move big volumes of cargo: Vessels are built to carry huge amounts of goods and raw materials in comparison with the capacity of airplanes or trucks. In addition, shipping allows the movement of liquids, gas and dangerous cargo. For this matter, there are certain regulations to keep the safety of the vessel, the crew, and the cargo.

– It´s safe: The percentages of losses caused by incidents during transport by sea have dropped until it lowest since a decade according to reports from Allianz.

– It's eco-friendly: In comparison with the road transport, the maritime industry is less dangerous for the environment. The shipping industry is responsible for only 12% of the total of pollution generated by human economic activities.

Digital transformation showed platform-operated companies such as UBER, Airbnb or Facebook to be digital disruptors. In many industries, we state that, in the blink of an eye, digital platforms dis-intermediate entire industries. We can see the same platform hype at clients from the transportation industry, where many players

aspire to disrupt a market of a multi-billion industry worldwide. Forwarders as intermediaries were expected to become redundant and a bare platform model was expected to allow for direct interaction between carriers and shippers. Yet, despite numerous efforts, all platform wannabes have failed to generate game-changing effects and the market is as hyperfragmented as ever.

Digital connectors may have the potential to reduce the need for freight forwarders to organize shipments for multiple parties manually. Direct interaction between shippers and carriers is technologically feasible with digital connectors and makes economic sense if a certain platform is able to bring together a critical mass of players in its realm. As a consequence, the intermediary function of freight forwarders is threatened by dis-intermediation and suggests that they are the predecessor of a multi-sided (industry) platform without transport liability.

The purpose of bachelor thesis is justification of digital technology implementation project and project proposals development whose aims are increasing of quality of service and, consequently, competitiveness.

The following scientist and researchers focused their efforts on developing digital technologies on transport: Konstantinos Gkoumas, Mitchell van Balen, Anastasios Tsakalidis, Ferenc Pekar [51], Dmitriev A.V [52], Plastunyak I. A. [53], Markus Fruth and Frank Teuteberg [54], Leonard Heilig, Eduardo Lalla-Ruiz, Stefan Voss [55].

In accordance with purpose of thesis was defined and formed the follow tasks:

1. Consider theoretical basics of international sea transport organization.
2. Breakdown of legal basics of freight forwarder functioning.
3. To study global modern marine technology trends.
4. Study current situation of transport market in Ukraine.
5. Describe general characteristic of freight forward company Navis.
6. Carry out analysis of the Navis business indicators.
7. To carry out of SWOT analysis of Navis company.
8. Explore the possibility of implementation the digital technology in the process of maritime transport organization.

9. Carry out calculation of the economic efficiency of the digital transformation.

The object of research was the processes of sea transport organization, the impacts on this process and the ways to improve customer service.

During the performance of the thesis was used general scientific methods: system analysis, induction and deduction, analyze and synthesis, expertise. During calculation of economic effectiveness of the project was used project performance indicators.

The information sources during thesis research were:

–regulations and legal documents;

–scientific and methodological development whose connect with sea transport organization by freight forwarder;

–statistics and financial report of Navis company, internal documents that describe company's activity;

–Internet sources.

During carrying out calculations and edition of thesis was used Microsoft Office software applications: Word, Excel and Visio.

CHAPTER 1
THEORETICAL BASICS OF LOGISTICS ACTIVITY AND SERVICES IN THE FIELD OF SEA FREIGHT TRANSPORTATION

1.1 Organization of international sea transportation

Maritime transport is considered the most versatile mode of transport that specializes in servicing international trade. Maritime transport is widely used for international and domestic transport. It plays an extremely important role in the formation of all foreign economic relations, especially with foreign countries and is characterized by high efficiency of transportation compared to other modes of transport. According to a study by the International Maritime Organization, sea and river freight account for about 90% of world freight traffic [42]. In Ukraine, on the other hand, sea freight is significantly inferior to rail and land transport in terms of freight turnover.

The main legal institutions and organizational forms of international transportation of goods and passengers were born and developed in the system of maritime merchant shipping. The system of economic and legal relations between the participants in the process of transportation by other modes of transport has developed to one degree or another under the influence of international practice of maritime merchant shipping. It should be noted that in comparison with other modes of transport (motor transport, air transport, railway transport), the main distinguishing feature of maritime transport is its carrying capacity. It is by sea that it is most profitable to transport large consignments of goods in intercontinental communication.

World practice shows that the main features of maritime transport include:

– a variety of ways of transporting goods (transportation of goods in bulk) (grain, ore, coal, etc.), transportation of bulk cargo (oil, petroleum products,

fertilizers, etc.); container transportation; transportation of large and large-scale products; cargo arrived in Ukraine on foreign fleet vessels),

- most seaports have a clear specialization, which determines certain features of the supply of goods,
- a significant part of transit in the total cargo flow (about 25%),
- wide geography of cargo movement.

Process of shipping (considering the activities included from the source provider and target client) can be described by the following scheme (see Fig. 1.1) [35]:

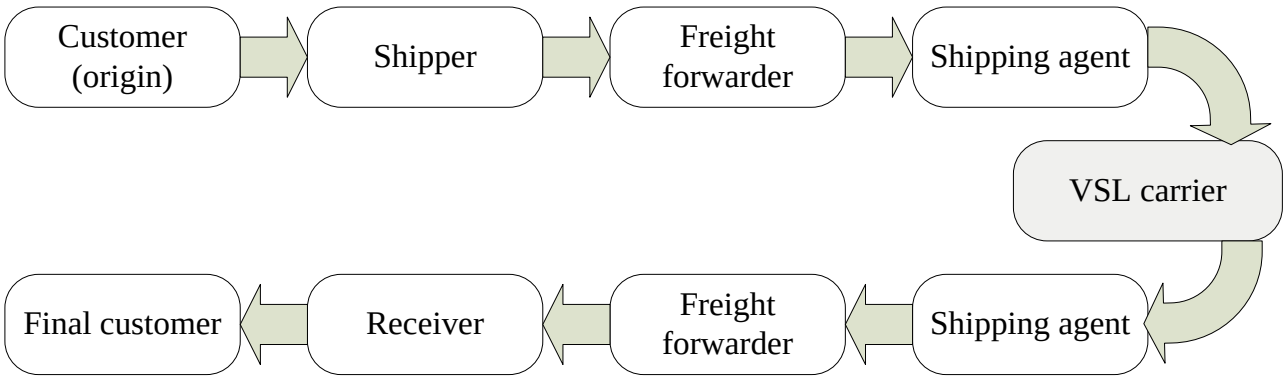


Figure 1.1 – Maritime transportation process]

It is therefore necessary to define the main activities within the above process:

1. Client (origin). Natural or legal person initially owns the goods to be transported to the final customer. Normally, this process will delegate transport actors below.

2. Shipper. Is the natural or legal person that delivers goods to the ship-owner, the master of the vessel or its agent at the port of loading to be transported by sea. In the bill of lading (English Bill of Lading or their initials BL), is defined as “Shipper”. However, in practice it can be said that this function is performed by an agent with legal and professional capacity (Freight), which is acting on behalf of the shipper, deals with the necessary steps to make the goods available to the vessel contracted for transport.

3. Freight forwarder. A professional who plans, coordinates controls and directs all actions necessary to perform the international freight operations, as well as

complementary services, by any kind of transportation; is usually known as “The Architect transport“. Should be remarked that includes the ground transportation required in the process as well as the maritime transportation required. This stage of the process will be discussed later in developing competitive strategies associated

4. Shipping Agent. It is the natural or legal person duly registered in the administrative agencies, serving the needs of ships while in port / s of the country inhabited by the consignee. Owner and represents their interests before the authorities of the country where the ship is. Responsible for provisioning the ship, and or handling all matters of legal representation, and attention to the ship’s crew. In the case of shipping containers, for example, are responsible to provide containers suitable for charging customers, if a shipping no containers can not meet the needs of the customer, those needs are affected for various reasons, but the priority is that there is always equipment available in good condition to meet the demands of an export line.

5. VSL carrier. In this case we refer to the vessel operator (which is not always the owner), which is responsible for transporting the goods from the source port to the destination port. In general, it is the natural or legal person who takes a commitment of transporting goods by sea from one place to another through a contract with the merchant that is embodied in the Bill of Lading.

6. Consignee –receiver. Consignee is the person to whom the carrier (Ship) is supposed to deliver the goods. In most cases the consignee is the Buyer of the goods but not always. Consignee could be the agent nominated by the buyer. Consignee could also be the buyer's bank.

7. Final customer. Natural person or entity receiving or end buyer of the goods transported from the initial customer.

It should be noted that maritime transport is an important sector of Ukraine's economy. Its effective functioning is a necessary factor in the formation of Ukraine as a maritime state, sustainable development of its transport and road complex and the economy as a whole. Ukraine has favorable conditions for the development of maritime transport - in the south its territory is washed by the waters of the Black and

Azov Seas, which practically do not freeze and connect with the Mediterranean Sea through the Bosphorus, the Sea of Marmara and the Dardanelles. The total length of the sea coastline of Ukraine is over 2000 km. Ukraine's maritime transport is concentrated exclusively in the south on the Black and Azov Seas, in the so-called Azov-Black Sea Basin, which is connected to the Mediterranean via the Bosphorus and Dardanelles, and thus to the world ocean.

1.2 Legal bases of functioning of transport and forwarding enterprises and sea transportation organization

Relations in the field of freight forwarding are regulated by the Civil Code of Ukraine, the Commercial Code of Ukraine, the laws of Ukraine "On Transport", "On Foreign Economic Activity", "On Transit of Goods", the Law of Ukraine "On Freight Forwarding", other laws, transport codes and statutes, as well as other regulations issued in accordance with them.

Today in Ukraine there is a Law №1955-IV from 01.07.2004 "On transport and forwarding activities", which defines the legal and organizational principles of transport and forwarding activities in Ukraine and aims to create conditions for its development and improvement [1].

This Law defines the concept of freight forwarding activities, which is a business activity for the provision of freight forwarding services for the organization and provision of transportation of export, import, transit or other goods.

Freight forwarding service is work that is directly related to the organization and provision of transportation of export, import, transit or other cargo under the contract of freight forwarding.

A freight forwarder (transport forwarder) is an economic entity that, on behalf of a client and at his expense, performs or organizes the performance of freight forwarding services specified in the freight forwarding agreement.

The customer is a consumer of freight forwarder services (legal or private person), who under the freight forwarding contract independently or through a representative acting on his behalf, instructs the freight forwarder to perform or organize or ensure the performance of services specified in the freight forwarding contract and pays for them, including freight forwarder.

The carrier is a legal or private person who has assumed obligations and responsibilities under the contract of carriage of goods for delivery to the destination of the goods entrusted to him, transportation of goods and their issuance (transfer) to the consignee or other person specified in the document governing relations between freight forwarder and carrier.

Participants in freight forwarding activities are customers, carriers, freight forwarders, transport agents, ports, railway stations, associations and specialized enterprises of rail, air, road, river and sea transport, customs brokers and other persons performing work (providing services) when transporting goods.

This Law applies to relations arising from the freight forwarding of goods by all modes of transport, except pipeline. The provisions of this Law also apply to cases when the freight forwarder's duties are performed by the carrier.

The main task of state regulation of freight forwarding activities is to protect the economic interests of Ukraine, further formation, development and formation of the market of freight forwarding services.

The Cabinet of Ministers of Ukraine organizes and ensures the implementation of state policy and state control in the field of freight forwarding, directs and coordinates the work of executive bodies that carry out state regulation in this area.

Freight forwarders on behalf of customers carry out the following types of freight forwarding activities:

– provide optimal transport services, as well as organize the transportation of goods by various modes of transport through Ukraine and foreign countries in accordance with agreements (contracts), according to which the parties have the right to use known international customs, recommendations, rules of international bodies and organizations. or in an exclusive form by the laws of Ukraine;

– charter national and foreign vessels and attract other vehicles and ensure their supply to ports, railway stations, warehouses, terminals or other facilities for the timely departure of goods;

– carry out work related to the acceptance, accumulation, grinding, finishing, sorting, warehousing, storage, transportation of goods;

– keep records of receipts and departures of goods from ports, railway stations, warehouses, terminals or other facilities;

– organize the protection of goods during their transportation, transshipment and storage;

– organize cargo examination;

– carry out registration of goods and transport documentation and its distribution as appropriate;

– provide in the manner prescribed by law to the participants of transport and forwarding activities applications for shipment of goods and orders for shipment;

– ensure the implementation of a set of measures for the shipment of goods received in poor condition, defective, damaged, fragile, non-standard packaging or one that does not meet the requirements of carriers;

– carry out insurance of cargoes and the responsibility;

– provide training and additional equipment of vehicles and goods in accordance with the requirements of regulations on the activities of the relevant mode of transport;

– provide optimization of the movement of material flows from the shipper to the consignee in order to achieve a minimum level of costs;

– make payments to ports, transport organizations for transportation, transshipment, storage of goods;

– draw up documents and organize work in accordance with customs, quarantine and sanitary requirements;

– provide prepared transport, which has additional equipment in accordance with the requirements provided by law;

– provide other ancillary and transport-related freight forwarding services, which are provided by the contract of freight forwarding and do not contradict the law.

The freight forwarder's fee is the funds paid by the client to the freight forwarder for the proper performance of the freight forwarding agreement. The freight forwarder's fee does not include the freight forwarder's expenses for payment of services (works) of other persons involved in the performance of the freight forwarding contract, for payment of fees (mandatory payments) paid during the performance of the freight forwarding contract. Proof of the freight forwarder's expenses are documents (invoices, bills of lading, etc.) issued by business entities involved in the performance of the freight forwarding agreement or by the authorities.

Transportation of goods is accompanied by goods and transport documents drawn up in the language of international communication, depending on the chosen mode of transport or in the state language, if the goods are transported in Ukraine. Such documents may be: air waybill; international car consignment note (CMR); consignment note SMGS; bill of lading; CIM consignment note; Cargo Manifest; other documents specified by the laws of Ukraine.

The fact of providing the freight forwarder's service during transportation is confirmed by a single transport document or a set of documents (railway, road, air waybills, bills of lading, etc.), which reflect the route of cargo from the point of departure to the point of destination.

Ukraine's modern maritime law is a reflection of the relevant international agreements on maritime transport of goods. Starting with the unofficial London rules of sea freight, the Hague Rules on the Carriage of Goods by Sea (1921), Brussels Convention for the Unification of Certain Rules of Bill of Lading (1924) and Protocol amending the International Convention for the Unification of Certain Rules of Bill of Lading (1968), gradually formed the varieties of the sub-institute of the contract of goods carriage, which were included in the Code of Merchant Shipping (CMS) of most maritime countries and CMS of Ukraine too. [2]

The current CMS of Ukraine allocates the following sea transportation of cargo:

– Cabotage transportations: transportation between the ports of Ukraine is carried out by vessels flying the State flag of Ukraine, as well as vessels flying the foreign flag, subject to obtaining permission from the central executive body, which ensures the formation of state policy in the field of transport.

– International transportations: Transportation between the ports of Ukraine and foreign ports can be carried out both by vessels flying the State flag of Ukraine and on condition of reciprocity by vessels flying the foreign flag.

Under the contract of carriage of goods by sea, the carrier or freighter undertakes to transport the cargo entrusted to him by the consignor from the port of departure to the port of destination and issue it to the person authorized to receive the cargo (consignee), and the consignor or charterer undertakes to pay a fee

The freighter and the charterer are the persons who have concluded the contract of chartering of the vessel (charter).

The contract of carriage of goods by sea must be concluded in writing.

The documents confirming the existence and content of the contract of carriage of goods by sea are:

1) voyage charter - if the contract provides for the condition of providing for the carriage of the entire vessel, its part or individual ship's premises;

2) bill of lading - if the contract does not provide for the conditions specified in paragraph 1 of this article;

3) other written evidence.

1.3 Global modern marine technology trends

The landscape of maritime is shifting with the rising tides of technology [47]. The trends that are emerging are doing so out of necessity. Advances in shipbuilding, propulsion, smart shipping, advanced materials, big data and analytics, robotics, sensors and communications in conjunction with an increasingly skilled workforce

are all having monumental shifts in how the maritime industry are approaching new challenges and opportunities.

The drivers for these technologies are balanced between environmental and commercial necessity. As a catalyst, environmental policies are fast tracking some of the developments to drive sustainability, and as a result have pushed for greater R&D and adoption of tech to reduce GHG emissions, and the benefits are clear. For example, hybrid propulsion has the potential to save 20-30% on vessel operating costs, all whilst reducing GHG emissions.

According to the Global Marine Technology Report 2030 [34], two technology landscapes will shape the future of commercial shipping with a significant impact on ship design and ship operation: the first technology arena originates from within the industry, as intense competition encourages technology sophistication and operational efficiency in order to gain commercial advantages. The second technology area comes from other sectors, as maturing technology is ripe for transfer to ship system design and operation to enhance safety, as well as financial and commercial performance.

Let’s consider modern trends in technologies of maritime transport (Fig.1.2).

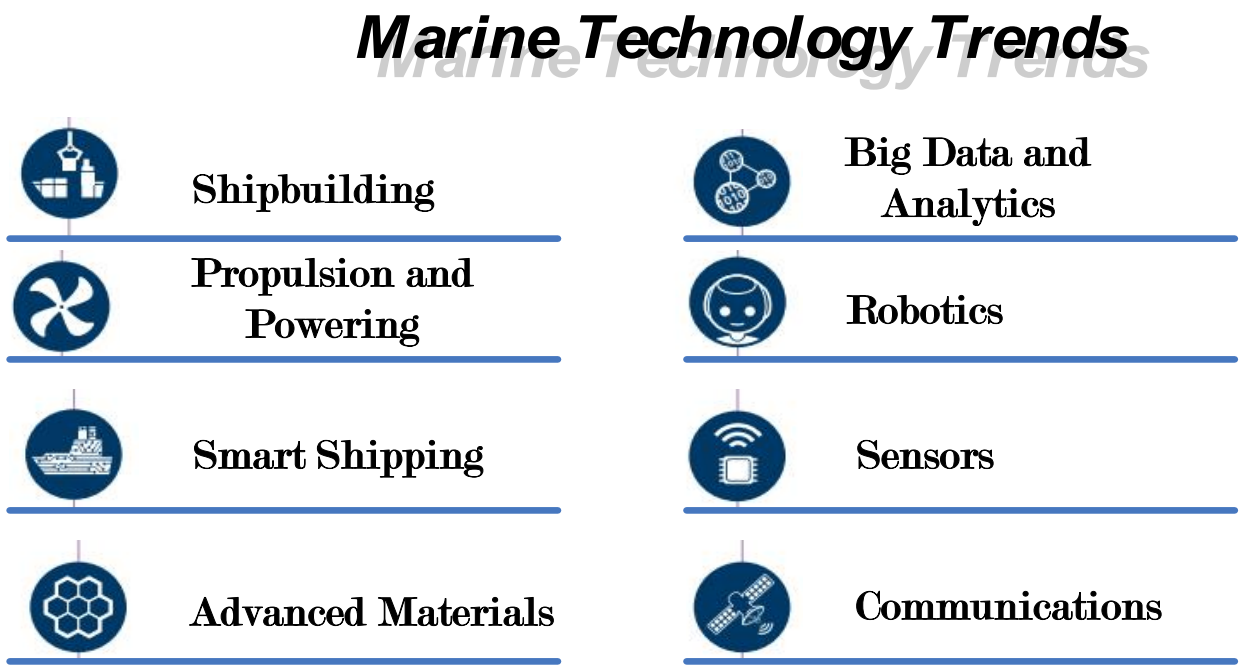


Figure 1.2 – Global trends in maritime transport

Shipbuilding. Design freedom, efficient customisation, waste reduction and managing virtual inventory will drive the development for future shipbuilding technologies. The shipbuilding industry in 2030 will feature higher levels of automation, high-fidelity design software integration, human-computer interfaces, morphing structures, and the introduction of additive manufacturing. Additive manufacturing, sometimes called 3D printing, is an emerging paradigm of manufacturing materials layer-by-layer. The manufacturing process will not need to be changed while altering the geometry of the design. Additive manufacturing will also provide a greater design freedom. It will be possible to manufacture objects with complex geometry; for example, non-linear holes and honeycombs which would have been too costly to produce traditionally.

Adaptable hull forms will be developed to better tackle changing loading conditions and speed profiles. A less ballast or a ballast free design will be further developed, which reduces the transfer of marine invasive species across different waters.

Propulsion and Powering. Ship propulsion and power generation will be a significant area of technological development. It is not only the scope of applicable technology, which includes future engines, alternative fuels, propulsion energy-saving devices, renewable sources of energy, hybrid power generation, and emissions abatement technology. It is also, and perhaps more importantly, the scale of future environmental challenges for commercial shipping which makes propulsion and powering a key technological theme. Notably vessels are claiming 20% reducing in fuel costs with hybrid propulsion whilst significantly reducing emissions.

Smart Shipping. 10% of the new buildings will be smart ships - arguably, smart ships are not a revolution but an evolution. Today’s concept of unmanned machinery spaces may be considered another manifestation of the smart ship, as are data-driven services such as vessel performance monitoring and weather routeing – the modern smart ship will integrate a variety of connected technologies to improve operational efficiency, ship management, regulatory compliance, decision making, environmental

responsibilities and also improve safety and maintenance of vessel and crew through communication networks.

Big Data and Analytics. IT infrastructure will be upgraded to retrieve, store, and process data in real time. Archived data can be stored either on-board a ship or onshore, thanks to the support of communication technologies. Furthermore, cognitive systems will act as data interpreters for humankind. These systems will combine machine learning and natural language processing to offer an intuitive interface between a person and a machine.

Advanced Materials. Developing advanced materials for ship applications will be a critical component of improving future ship performance. New features will be introduced, and multi-functional materials can be created. A new generation of machinery will emerge with enhanced performance. Inherent smart features can be designed for corresponding applications; these may include self-cleaning and self-repairing materials, which would have a myriad of benefits when it comes to safety and maintenance.

Robotics. There are three new types of robots that will be in use by 2030. The first will be a learning robot, the second will be a practical robot (one that can handle an asset), and the third type will be a mini-robot, useful for inspections in harsh, dangerous environments. These robotics will leverage: cognition, versatility, imitation, sense and adaptability. The development of these types of robots is very closely linked to the development of other technologies, like sensors and remote controls. These solutions require system response times (including network delays) of less than a few milliseconds.

Sensors. The utilisation of sensors will represent a powerful opportunity for improvements in the efficiency and safety of vessels and associated equipment's. Sensors and the data they generate will have enormous potential within the commercial shipping sector. Real-time monitoring and analysis strategies will be the key to improving the commercial shipping sector. The capture of vessels' top-quality data by means of robust and reliable sensors will open up new ways of optimising vessels' life cycles. One outcome will be to make possible the ability to extend the

life cycle of a vessel following top-standard operational criteria. This technology will provide data which will need to be properly transferred, stored and analysed.

Communications. Today, ships generate, collect and transmit an ever-increasing volume of data. To achieve efficient data transfer, wireless communications have been widely adopted for many years. Marine very high frequency (VHF) installations, satellites and Wi-Fi are just a few examples. Using a higher frequency band will be capable of transferring multiple signals at a higher data transmission speed. With the integration of 5G, Wi-Fi and new generation satellites, as well as conventional marine radiocommunication networks, we will see transformation everywhere. Stakeholders will be able to monitor live audio and high definition (HD) or 3D video collected on-board. Radio-frequency identification (RFID) tags will support through-life asset management, including the tracking status of cargoes, as well as structural and machinery components.

1.4 Chapter 1 summary

Sea transport is the oldest mode of transport used by humans to transport passengers and goods. Like any other mode of transport has a number of advantages and disadvantages. And its greatest advantage is cargo capacity. About 70% of the global cargo turnover comes from maritime transport.

The organization of international shipping has its own characteristics, associated with the fact that the waters of the oceans are a neutral territory that does not belong to any country. The regime of the sea space and questions on the use of the oceans are regulated by international law of the sea. Currently, most of the norms of international law of the sea are combined in the 1982 UN Convention on the Law of the Sea. All other international agreements (including bilateral and regional agreements) containing regulations relating to this industry mainly supplement or

detail the norms of the Convention. In Ukraine, relations in merchant shipping are regulated by the Code of Merchant Shipping.

Analysis of the latest trends shows that the world is in the midst of a global technology revolution and it touches maritime transport too. For the past 30 years, advances in computer and information technology, biotechnology, nanotechnology and materials technology have been occurring at an accelerating pace, with the potential to bring about radical changes in all dimensions of life. The marine technology of 2030 will integrate developments from multiple scientific disciplines in ways that could transform the quality of design, construction and operation. It can be envisaged that a future marine world will be a connected and digital one, bringing closer integration between people, software and hardware in a way that could transform the way we operate and interact. A new operation paradigm will need to be created to meet these challenges across the shipping, naval and ocean space sectors.

CHAPTER 2
NAVIS COMPANY CHARACTERISTIC AND ANALYSIS OF ACTIVITY

2.1 Analysis of transport in Ukraine

Performance indicators of transport in 2019 showed mostly positive growth. So freight turnover of transport enterprises was 338,9 billion tons or 102,1% of 2018 volumes [20]. Transport companies transported 674,5 million tons of cargo, which is 108,0% of the volume of 2018 (Table 2.1).

Table 2.1 - Volumes of cargo transportation by all modes of transport for 2016-2019, million tons

№	Activity	2016	2017	2018	2019
1	2	3	4	5	6
1	Road transport	166,9	175,6	186,7	244,2
2	in% to the previous year	113,3	105,2	106,3	130,8
3	Railway transport	344,1	339,5	322,3	312,9
4	in% to the previous year	98,3	98,7	94,9	97,1
5	Pipeline transport	106,7	114,8	109,4	112,7
6	in% to the previous year	109,8	107,6	95,3	103,0
7	River transport	3,7	3,6	3,7	4,0
8	in% to the previous year	119,4	97,3	102,8	108,1
9	Sea transport	3,0	2,3	1,9	2,1
10	in% to the previous year	90,9	76,7	82,6	110,5
11	Air transport	0,1	0,1	0,1	0,1
12	in% to the previous year	107,5	111,4	119,7	93,4

End of the Table 2.1

1	2	3	4	5	6
13	Total	**624,5**	**635,9**	**624,1**	**676,0**
14	in% to the previous year	103,9	101,8	98,1	108,3

In 2019 262,6 million tons of cargo were transported by rail in domestic traffic and for export, which is 1,9% less than in 2018. Transportation of timber decreased by 58,3%, ferrous scrap - by 21,9%, building materials - by 19,1%, coke - by 12,1%, coal - by 6,4%, oil and petroleum products - by 5,7%, ferrous metals - by 5,0%, cement - by 4,9%. At the same time, transportation of iron and manganese ore increased by 2,7%, grain and ground products - by 21,0%, chemical and mineral fertilizers - by 31,5%.

In the total volume of cargo transportation by water, foreign countries accounted for 41,0%. Compared to 2018 volumes of foreign cargo transportation increased by 2,3%.

In 2019 compared to 2018 the volumes of cargo pumping by pipeline transport increased. Thus, the pumping of ammonia increased by 13,0%, gas - by 1,1%, oil - by 0,5%. Ammonia transit increased by 16,3% and gas transit by 3,3%. Oil transit decreased by 1,6%.

For almost all modes of transport, freight turnover has increased over the past year (Table 2.2).

Table 2.2 – Freight turnover by all modes of transport for 2016-2019, billion tonne-kilometers

№	Activity	2016	2017	2018	2019
1	2	3	4	5	6
1	Road transport	37,7	41,2	42,6	48,9
2	in% to the previous year	109,6	109,3	103,4	114,8
3	Railway transport	187,2	191,9	186,3	181,8

End of the Table 2.2

1	2	3	4	5	6
4	in% to the previous year	96,3	102,5	97,1	97,6
5	Pipeline transport	94,4	105,4	99,2	104,5
6	in% to the previous year	116,7	111,7	94,1	105,3
7	River transport	1,5	1,4	1,6	1,6
8	in% to the previous year	93,8	93,3	114,3	100,2
9	Sea transport	2,5	2,9	1,8	1,8
10	in% to the previous year	64,1	116,0	62,1	100,5
11	Air transport	0,2	0,3	0,4	0,3
12	in% to the previous year	107,1	120,7	124,6	87,0
13	Total	323,5	343,1	331,8	338,9
14	in% to the previous year	102,6	106,0	96,7	102,1

Visualization of the dynamics of changes in volumes of transported goods and cargo turnover is presented in the Fig. 2.1 and 2.2.

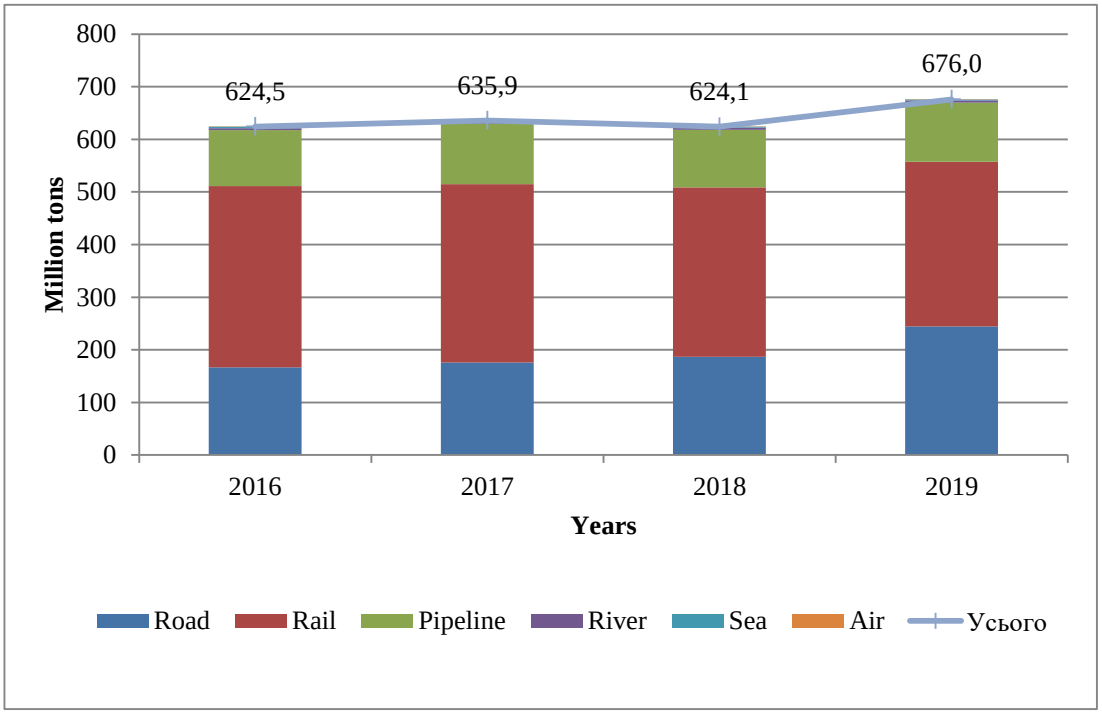


Figure 2.1 – Dynamic of volumes of cargo transportation

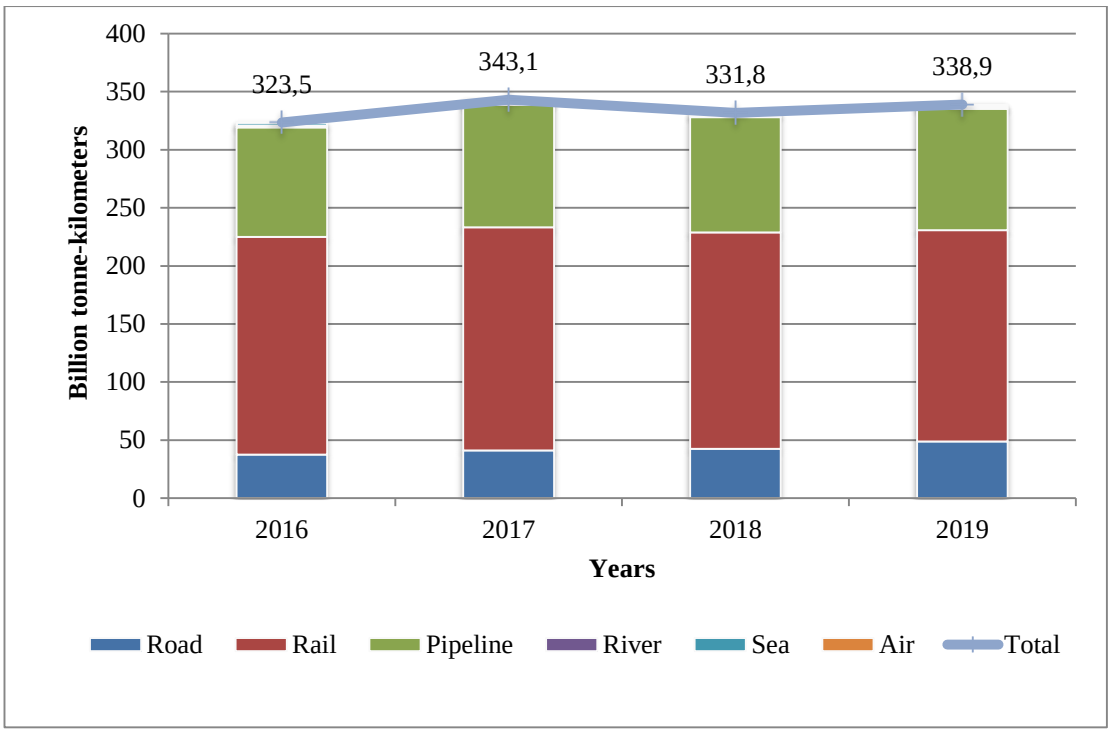


Figure 2.2 – Dynamic of freight turnover

Traditionally, in the structure of cargo transportation, the first place belongs to railway transport (46,3%), second place – road transport (36,1%) and third place – pipeline (16,7%) (see Fig. 2.3).

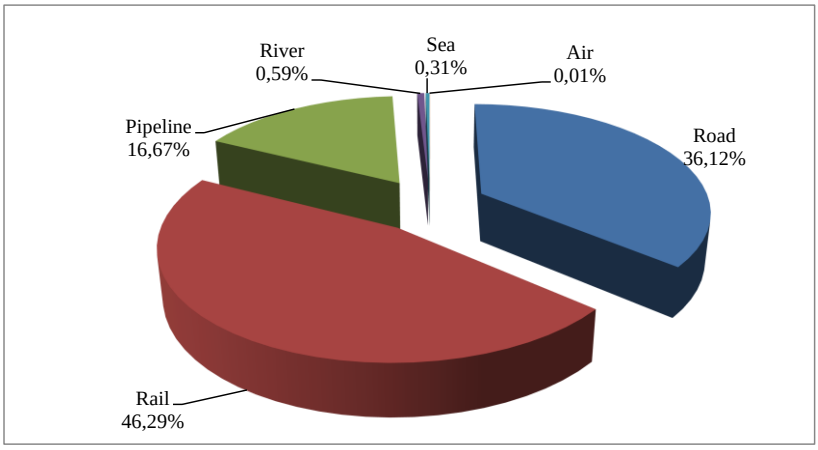


Figure 2.3 - The structure of cargo transportation by all transport modes in 2019

The maritime transport complex is a multifunctional structure that meets the needs of the national economy in transport [10]. Seaports are an integral part of the transport and production infrastructure of the state due to their location in the

directions of international transport corridors. The competitiveness of the domestic transport complex on the world market depends on the efficiency of seaports, the level of their technological and technical equipment, compliance of the management system and infrastructure development with modern international requirements. The main advantages of the seaport industry of Ukraine are:

– high export potential of cargoes of ferrous metals, coal, iron ore concentrate and grain;

– availability of cargo handling facilities;

– favorable location of seaports to ensure transit cargo flows;

– availability of legal framework on the possibility of attracting private investment for the development of the port industry;

– availability of highly qualified specialists in the port industry.

Today, the port system of Ukraine has 18 seaports, 13 of which are located on the continental territory of Ukraine, and 5 ports - in the temporarily occupied territory of the Autonomous Republic of Crimea (see Table 2.3).

Table 2.3 – Sea ports in Ukraine [23]

№	Port name	Port location
1	2	3
1	Belgorod - Dniester seaport	The port is located on the shores of the Dniester estuary northwest of the Dniester-Constantinople estuary (southern bucket of the Dniester estuary)
2	Berdyansk seaport	Sea of Azov, Berdyansk Bay, Tonka Strait
3	Izmail seaport	Port in the Odessa region, located at the mouth of the Kili River Danube.
4	Chernomorsk seaport	Black Sea
5	Mariupol seaport	North-western part of the Taganrog Bay of the Sea of Azov
6	Mykolaiv seaport	The Mykolaiv seaport is located in the city of Mykolaiv near the left bank of a bend of the river the Southern Bug for 19 miles to the north from its mouth. The port also includes the port of Ochakiv and a raid near the city of Ochakiv near the banks of Trutayev
7	Odessa seaport	Black Sea, Odessa Bay
8	Specialized seaport Olbia	The left bank of the Bug-Dnieper estuary

End of the Table 2.3

1	2	3
9	Reni seaport	Coastline on the left bank of the Danube
10	Skadovsk seaport	Black Sea. Dzharilgatskaya Bay.
11	Ust-Dunaisk seaport	Odessa region, Kiliya district, Vilkove city
12	Kherson seaport	right and left banks of the Dnieper River in the city of Kherson
13	Southern seaport	Black sea, Adzhalik estuary

According to the results of 2019, the seaports of Ukraine increased the volume of cargo handling by 18.4% and reached record levels in the history of its existence (except for ports located in the Crimea). The annual volume of cargo handling of 13 operating ports for the first time exceeded 160 million tons. The Administration of Seaports of Ukraine reports about it [26].

The maximum indicators of transshipment of grain cargoes and ore are fixed. Container traffic has overcome a 10-year maximum of 1 million TEU. At once four ports - Southern, Mykolaiv, Chernomorsk and Olbia - reached the maximum volume of transshipment since its foundation.

The largest contribution to the record transshipment is projected to have been made by the Ukrainian agricultural sector. Grain cargo and oil accounted for more than a third (37,7%) of the total cargo flow in Ukrainian ports. Compared to 2018, grain transshipment increased by 32% to 54,6 million tons. Ore transshipment became the second largest – 37,3 million tons per year - more than 9 million tons (+ 33%) than in 2018. The three leaders among cargoes in 2019 are closed by containers - more than 1 million TEU.

The growth of transshipment in 2019 was observed in all areas: exports, imports, transit, domestic transportation. But the most significant - by 22,2%, to almost 121 million tons was the growth of exports of Ukrainian producers. Imports increased by 8,7% to 25,8 million tons. Transit cargo handling increased by almost 8% compared to last year to 11 million tons.

The leaders in transshipment in 2019 are traditionally four ports: Southern – 53,9 million tons (+ 26,1%), Mykolaiv – 33,4 million tons (+ 14,5%), Chernomorsk – 26,2 million tons (+ 21,4%), Odessa – 25,3 million tons (+ 16,8%).

In 2019, the seaports of Ukraine handled 11850 vessels, which is 196 vessels or 1,7% more than last year.

In 2019, the number of goods transported by the Dnieper River increased by 19% to almost 11,8 million tons. In particular, transportation of metal products increased by almost 33% and grain transportation by more than 54%. During the year, 1,7 million tons and 4,9 million tons, respectively, were transported. The growth of cargo transportation on the Dnieper is taking place against the background of a decrease in the number of passages by 27%. This indicates an increase in the level of vessel congestion and improved navigation conditions. This is partly due to dredging in the reservoirs of the Dnieper, which the branch of AMPU "Dredging Fleet" carried out for the first time in 6 years.

2.2 Navis company characteristic and its activity on the freight forwarding market

The freight forward company Navis was founded in 2013. Today, number of offices is 4: Kyiv (UA), Odessa (UA), Tallinn (EST), Georgia (GE). The head office is located in Kyiv. Number of employees is 48. [30]

The company offers its services in the field of sea, land and railway transport, customs brokerage service and stevedoring work in the ports (see Fig. 2.4).

The key figures in comparison 2018-2019 were followed:

−numbers of container shipment :+ 35 %,

−numbers of Customs declarations :+ 40 %,

−numbers of FTL shipments :+ 20 %,

−numbers of Rail shipments :+ 15 %.

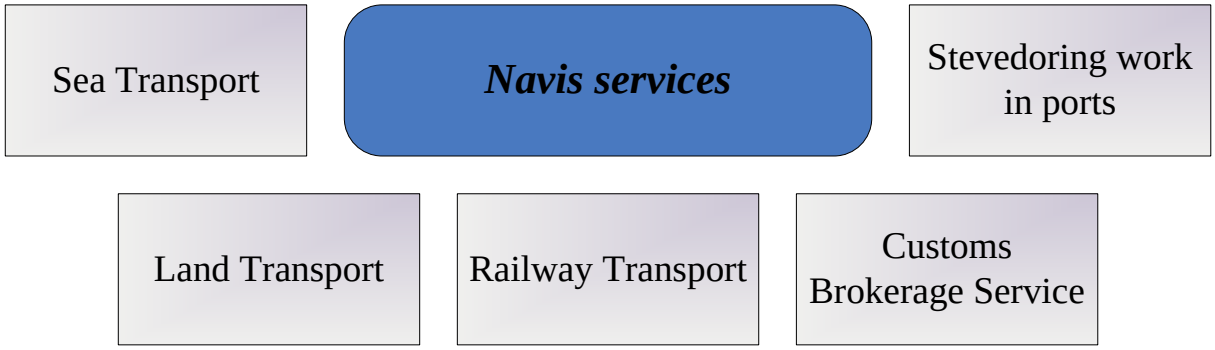


Figure 2.4 – Services of Navis company

In the field of sea freight was created NAVIS Container Team, which specializes only on Ocean Freight service [44]. Company proposed service of Inland transportation of containers. Transportation can be provided by road and railway transport and also provides reloading of cargo in the ports from and in the container to the railway or vehicles. Navis carries out container tracking 7 day a week and 24 hours per day.

The main lines the company cooperates: MAERSK, CMA, MSC. Navis proposes best export logistic solution from UA to the markets of UAE, Middle East, North Africa.

Navis company cooperates with the truckers from Poland, Ukraine and Slovakia. Number of available trucks exceeds 4800 units. [41] Fleet characteristic is shown on the Fig. 2.5.

Company's clients could choose FTL (Full Truck Load) or LTL (Less Than Truck Load) services. Full truckload, commonly referred to as FTL, is a type of shipping mode whereby a truck carries one dedicated shipment. In other words, the journey is reserved for one shipment only. The advantages of FTL are followed:

−for shipments that are large enough to fill or nearly fill an entire shipping container, full truckloads work out cheaper;

−FTL are much less encumbered by size and weight restrictions;

−FTL shipments get to the destination sooner, as the truck is making no other pickups or drop-offs along the way;

−FTL transport means less handling (there is no transferring between trucks mid-transit), the shipment is likely to get lost or damaged.

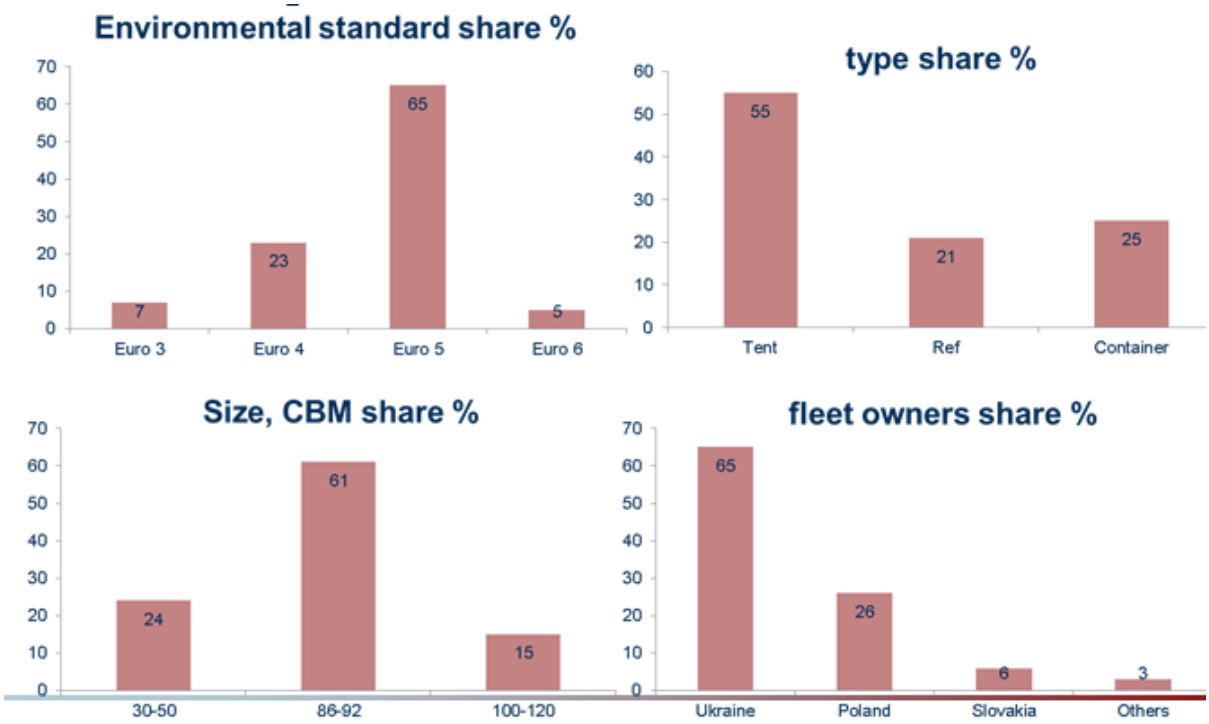


Figure 2.5 – Navis fleet characteristic

Less-than-truckload, also known as or less-than-load (LTL), is a shipping service for relatively small loads or quantities of freight. Less-than-truckload services are offered by many large, national parcel services as well as by specialized logistics providers. These services can accommodate the shipping needs of countless businesses that need to move smaller batches of goods frequently. Less-than-truckload shippers offer economies of scale so that freight costs of individual shipments are minimized. The big advantage of LTL is that it saves money and is more efficient for smaller shippers.

Navis consolidation warehouses is located in Poland, and has wide transportation network of partners in Europe. Was developed innovate solution in groupage service. Clients firstly can calculate transportation cost with help of On-line Calculator. The form of request is presented on the Fig. 2.6.

The company has a well-established scheme of working with customers:

1) calculation of the transportation cost,

2) coordination and signing of an application for transportation,

3) shipment of goods from the consignor’s warehouse,

4) registration of transport documentation,

5) delivery of goods to the address of the consignee.

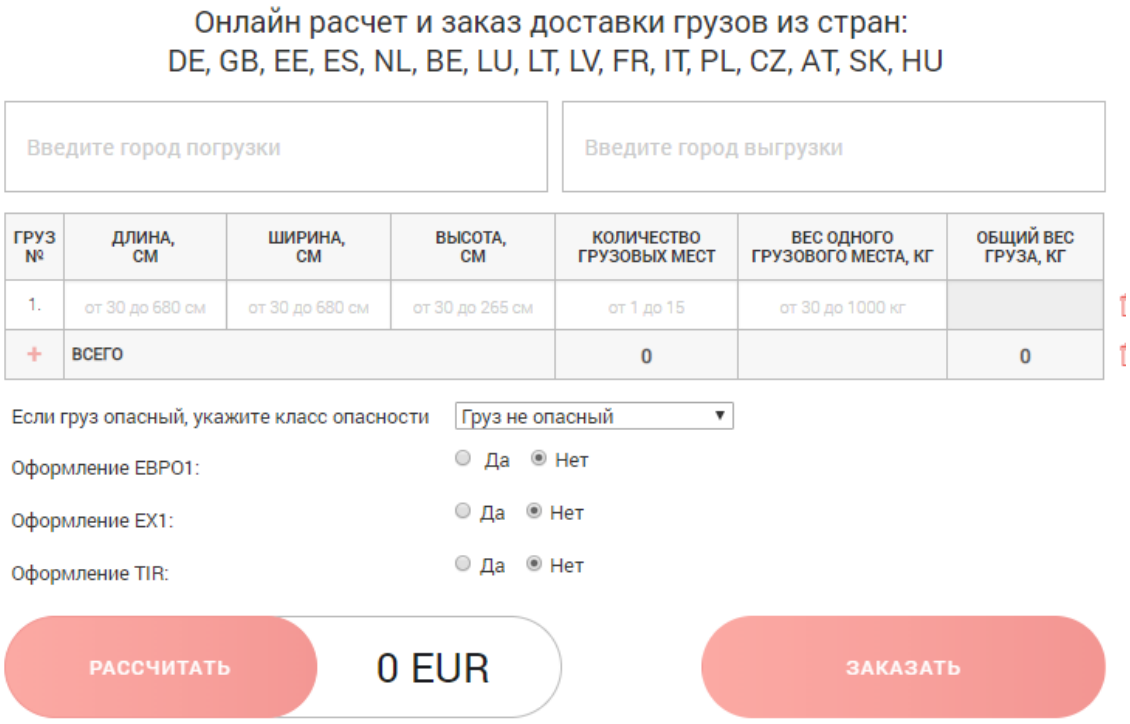


Figure 2.6 – The form of On-line calculator of transportation cost [8]

For railway transportation Navis proposes different type of wagons, border reloading and railstation support [40]. Navis Rail service is designed specifically for customers who prefer outsourcing logistic service. Navis provides a full range of services:

–Transit;

–Imports;

–Export;

–Cross-Docking;

–Customs clearance;

–Wagons traffic control;

–Transit Time control;

–Wagons supply management.

Customs clearance service is Value Added Service. In this field company has more then 10 years experience [31]. Service network in Ukraine:

−Yahodin (UA \ Poland border);

−Lvov\Krakovets (UA \ Poland border);

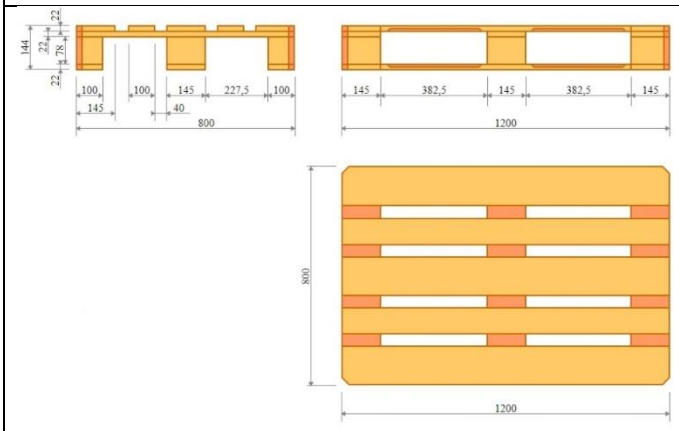
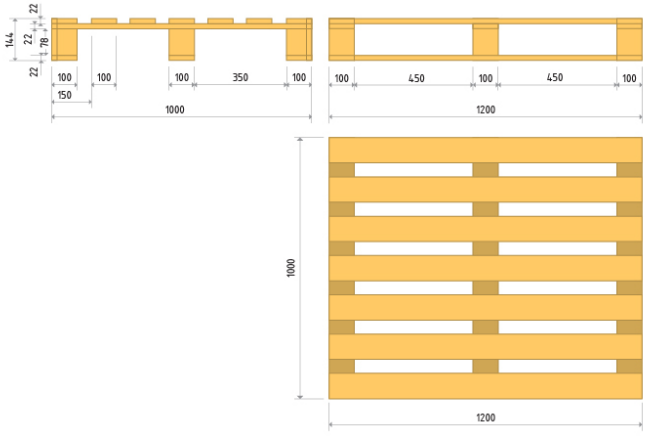
−Chop\Uzhgorod (UA \ Hungary & Slovakia border);

−Kiev;

−Odessa\Chernomorsk (Sea Ports - Sea Gate of Ukraine).

Another area of company activity is pallets sales [37]. Navis Group LLC produces and sells pallets made of wood of various standards and sizes, in accordance with needs and requirements. The characteristic of pallets is shown in Table 2.4.

Table 2.4 – Pallets production by Navis

Type	Dim, mm	Price, EUR
	1200x800	3,7-5,6 EUR (price depends on demands to the pallet)
	1200x1000	3,7-5,6 EUR (price depends on demands to the pallet)

Organization structure of Navis is presented on the Fig. 2.7. Company has several departments in accordance with activity field, Financial Department, IT specialists, office managers and HR and lawyers.

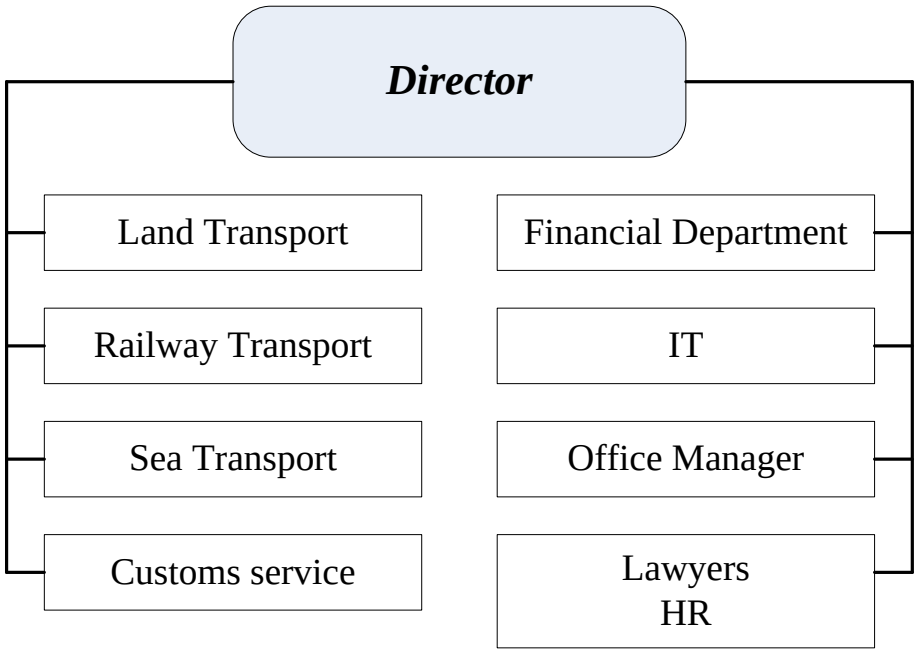


Figure 2.7 – Organization structure of Navis

Since in the future the company plans to expand its activities, several departments will be added to the organizational structure. One of the plans for expansion is air transportation. The direction of contract logistics will also be open (warehouse).

2.3 Analysis of financial and production indicators

The most important indicator of a company's success is its financial condition. The Navis company's financial flows during 2019 were quite smooth (Table 2.5). The average growth of gross profit over the year was 7,8%. The month in which the maximum gross profit was recorded in the total result was November.

Table 2.5 – Gross profit of Navis company in 2019, UAH

Month	Road	Sea	Customs	Rail	Total
January	256 123	194 991	423 797	50 381	925 291
February	242 364	353 758	709 297	24 413	1 329 832
March	250 265	731 605	602 580	128 418	1 712 867
April	311 432	628 770	639 872	183 814	1 763 888
May	257 498	602 443	711 497	192 688	1 764 126
June	314 813	467 844	823 596	205 651	1 811 904
July	307 304	551 964	860 704	138 641	1 858 613
August	230 262	848 489	894 294	92 736	2 065 780
September	247 332	836 853	885 177	32 980	2 002 343
October	192 453	698 121	989 962	186 443	2 066 979
November	128 896	769 661	1 050 726	175 923	2 125 206
December	143 537	806 897	942 556	49 584	1 942 574
2019	2 882 279	7 491 396	9 534 058	1 461 670	21 369 403

Graphically, the dynamics of profit by month and by mode of transport is presented on the Fig. 2.8.

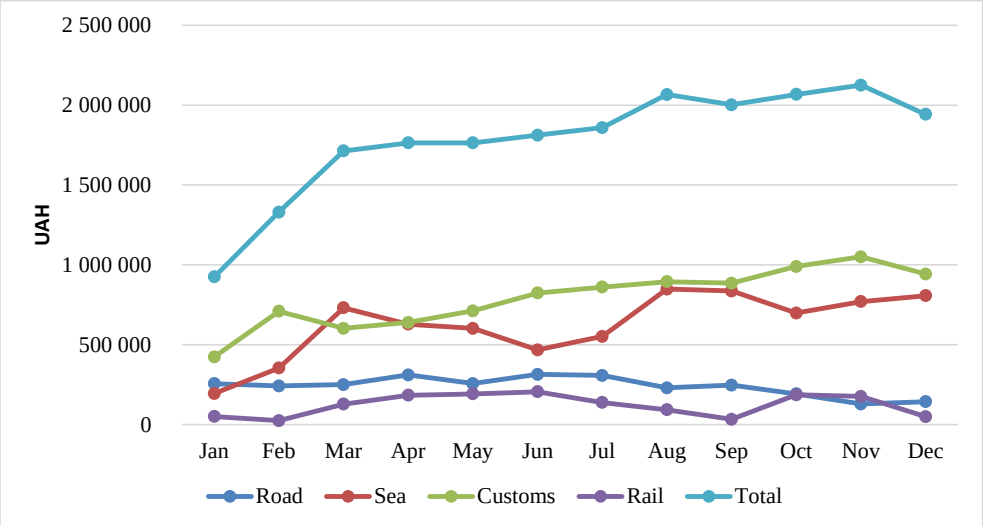


Figure 2.8 – Gross profit dynamic in 2019

The most significant activity of the Navis company is customs brokerage service – 45% in total profit in 2019 (see Fig. 2.9). Another one is sea transport – 35% in total profit.

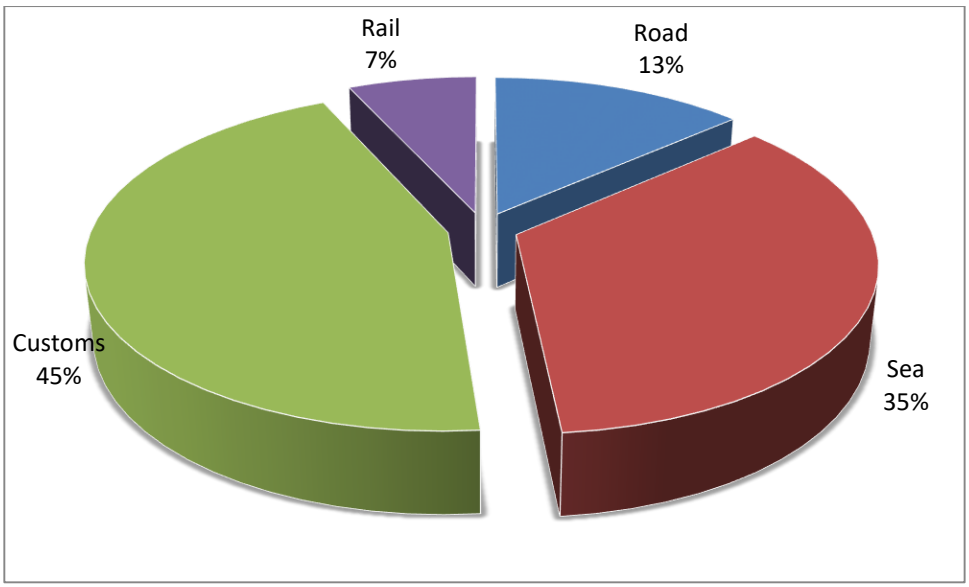


Figure 2.9 - Share of activities in total profit in 2019

Let's analyze the financial stable of Navis company during several years (Table 2.6).

Table 2.6 – Gross profit of Navis in 2016-2019, UAH

Activity	2016	2017	2018	2019
Road	2161709,1	2594051	2392291,4	2882278,8
Sea	5243977,2	6068030,8	6742256,4	7491396
Customs	7055202,8	7722586,9	7150543,4	9534057,9
Rail	1490903,7	1169336,3	1169336,3	1461670,3
Total	15951793	17554005	17454428	21369403

Analysis of financial flows over several years allows us to conclude that the Navis company operates in the market stably, without jumps (see Fig. 2.10). This allows the company to build a positive image and maintain customer confidence. This is mainly achieved by maintaining high quality services.

Due to profit growth, the company develops strategic plans to expand its activities: increased car transportation services, sea transportation and customs brokerage service.

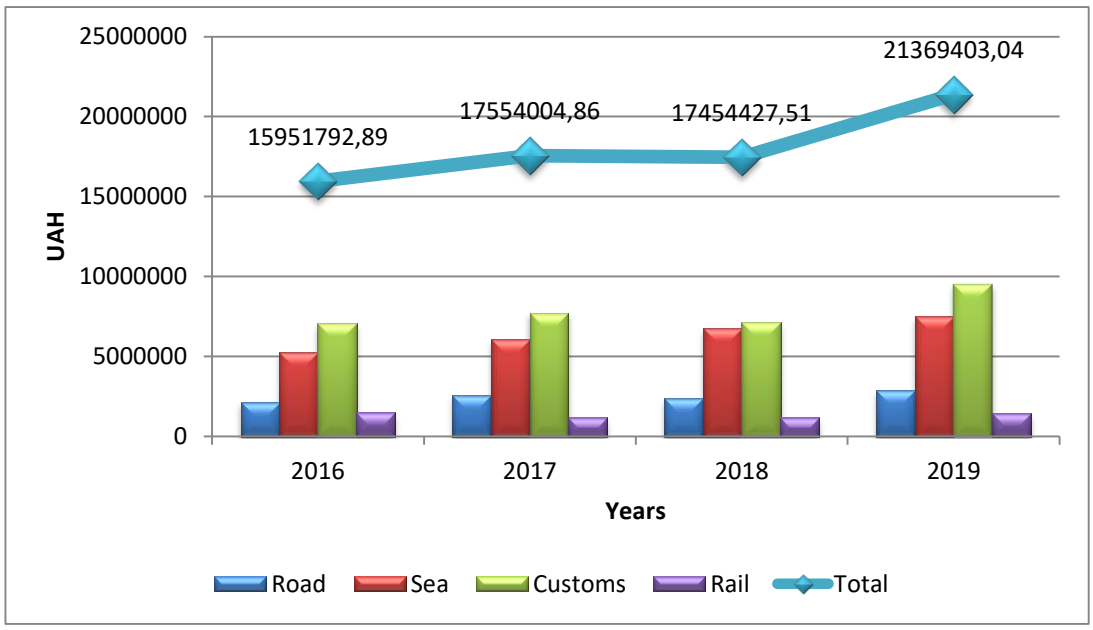


Figure 2.10 – Dynamic of profit in 2016-2019

Now we will analyze the company's production indicators for 2019. In the Table 2.7 are presented the number of orders made for different services of the company in 2019.

Table 2.7 - The number of orders made for different services of the company

Month	Road, trucks	Sea, containers	Customs, declarations	Rail, wagons	Total
January	85	107	959	20	1 171
February	103	360	1476	5	1 944
March	133	498	1357	7	1 995
April	122	126	1113	6	1 367
May	108	191	1305	8	1 612
June	118	138	1255	5	1 516
July	169	275	1698	3	2 145
August	96	533	1612	2	2 243
September	77	263	1479	1	1 820
October	55	354	1528	15	1 952
November	45	208	1316	32	1 601
December	63	181	1128	43	1 415
2019	1174	3234	16 226	147	20 781

Analysis of orders for various services of the company suggests that for road transport the most productive period is March – August (see Fig. 2.11). In contrast to road transport, the most productive period of the year for rail transportation is October – January, when weather conditions can be difficult for road transport.

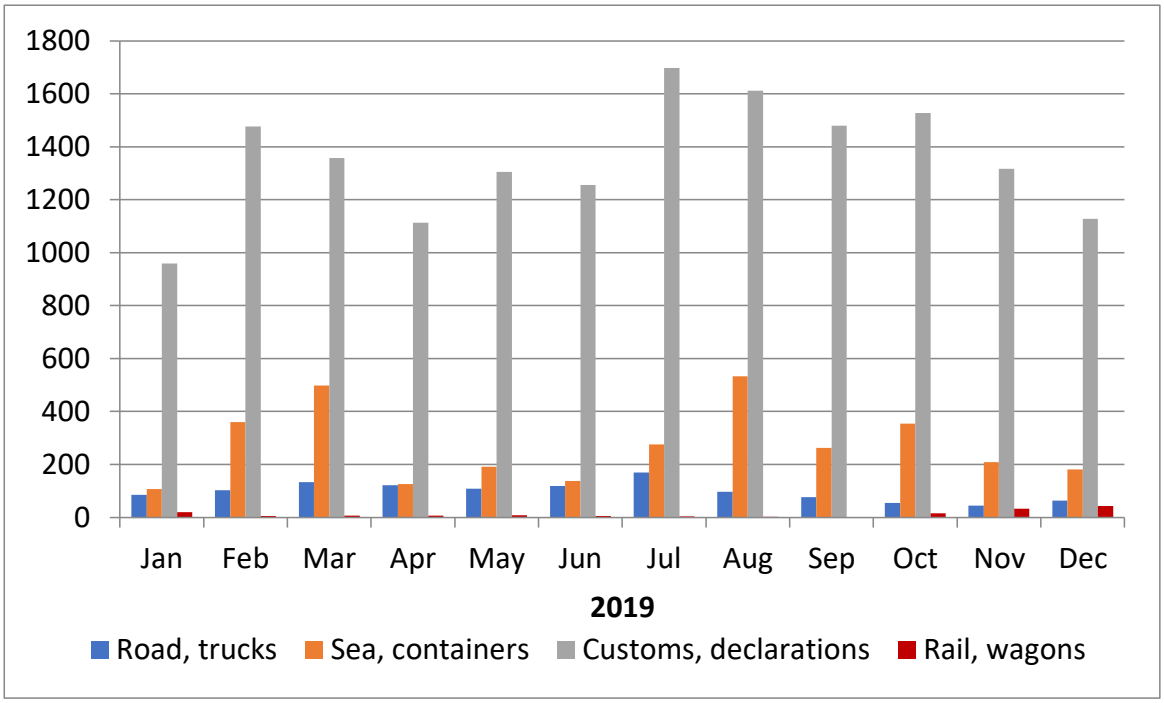


Figure 2.11 – The number of orders for company's services

The next step in the analysis of the company is to analyze the amount of cargo transported by different modes of transport (Table 2.8).

Table 2.8 – The amount of cargo transported by different modes of transport, tons

Month	Road	Sea	Rail	Total
1	2	3	4	5
January	1700	2140	1100	4 940
February	2060	7200	275	9 535
March	2660	9960	385	13 005
April	2440	2520	330	5 290
May	2160	3820	440	6 420
June	2360	2760	275	5 395

End of the Table 2.8

1	2	3	4	5
July	3380	5500	165	9 045
August	1920	10660	110	12 690
September	1540	5260	55	6 855
October	1100	7080	825	9 005
November	900	4160	1760	6 820
December	1260	3620	2365	7 245
2019	23480	64680	8085	96 245

The most difficult month for commercial activity is January. This month there were fewer orders and, as a result, less cargo transported.

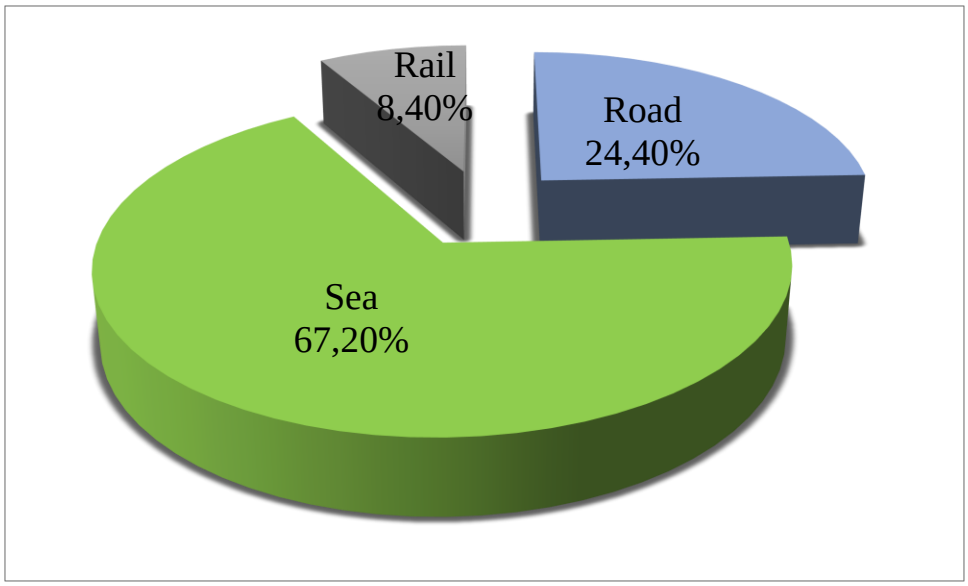


Figure 2.12 - The share of modes of transport in the amount of cargo transported in 2019

The main volume of the cargo in 2019 was transported by sea. All performance indicators of the company show that sea transport is the most significant type of activity in this period of time. Accordingly, the development project will be implemented in sea department. For this, possible development paths are developed and a decision is made in favor of the most optimal.

2.4 Chapter 2 summary

In the second chapter of bachelor thesis was analysed the transport market in Ukraine and activity of Navis company on this market. In recent years, transport market indicators have shown market growth. So freight turnover of transport enterprises was 338,9 billion tons or 102,1% of 2018 volumes. Railway transport leads in the structure of transported cargo. But it should be noted that official state statistics only show data from Ukrainian companies. Thus, official statistics show that 6,1 million tons were transported by water in Ukraine in 2019. But according to statistic of Administration of Seaports of Ukraine the annual volume of cargo handling of 13 operating ports reached to 160 million tons. And these statistics take into account the cargo transported under other flags. This suggests that maritime transport in Ukraine is developing, along with port infrastructure.

The object of study was the freight forwarding company Navis. This company was founded in 2013. Nowadays company 4 offices in different counties (Estonia, Georgia) and head office is located in Kyiv. The company offers its services in the field of sea, land and railway transport, customs brokerage service and stevedoring work in the ports. Analysis of company financial state shows that the Navis company's financial flows during 2019 were quite smooth. Analysis of financial flows over several years allows us to conclude that the Navis company operates in the market stably, without jumps. The most significant activity of the Navis company is customs brokerage service – 45% in total profit in 2019. Another one is sea transport – 35% in total profit. The main volume of the cargo in 2019 was transported by sea. And the company pays much attention to the development of this field of activity.

CHAPTER 3
DEVELOPMENT OF A PROJECT TO DIGITALIZE COMPANY ACTIVITIES

3.1 Navis company SWOT analysis

SWOT analysis (or SWOT matrix) is a strategic planning technique used to help a person or organization identify strengths, weaknesses, opportunities, and threats related to business competition or project planning [46]. It is designed for use in the preliminary stages of decision-making processes and can be used as a tool for evaluation of the strategic position of a city or organization. It is intended to specify the objectives of the business venture or project and identify the internal and external factors that are favorable and unfavorable to achieving those objectives. Users of a SWOT analysis often ask and answer questions to generate meaningful information for each category to make the tool useful and identify their competitive advantage.

Strengths and weakness are frequently internally-related, while opportunities and threats commonly focus on the external environment. The name is an acronym for the four parameters the technique examines:

– Strengths: characteristics of the business or project that give it an advantage over others.

– Weaknesses: characteristics of the business that place the business or project at a disadvantage relative to others.

– Opportunities: elements in the environment that the business or project could exploit to its advantage.

– Threats: elements in the environment that could cause trouble for the business or project.

The degree to which the internal environment of the firm matches with the external environment is expressed by the concept of strategic fit. Identification of

SWOTs is important because they can inform later steps in planning to achieve the objective. First, decision-makers should consider whether the objective is attainable, given the SWOTs. If the objective is not attainable, they must select a different objective and repeat the process.

Conducting a swot analysis of the company's activities will provide an opportunity to develop a long-term development plan. Firstly we analyse road transport activity (Table 3.1).

Table 3.1 – SWOT-analysis of road transport activity

Strength	Weaknesses
FTL service, LTL service, Strong team, Work schedule 24/7, Office existence, Positive experience, stress resistance, Geography: Georgia, Latvia, Poland.	Geography, Sales, Carriers, Accounts receivable control, Truck search speed, 1 employee in LTL sector.
Opportunities	Threats
Geography, Truck search speed in 30 minutes, Implementation of CRM, Sales, Communication, Experience exchange.	Loss of key customers

Accordingly to analysis the action plan was developed;

1) To create a base of exporters from Ukraine to Georgia, Armenia, Azerbaijan;

2) To create a base of exporters of clients from Ukraine to Poland (south, west, southwest);

3) Revise the amount of team bonus, in the direction of reduction;

4) Create a strong FTL service vehicle search system;

5) Create KPI on received and executed applications in 1C;

6) Car maker should work in one accounting system 1C;

7) Create a strong trucking team;

8) boost sales;

9) Development of business share in current customers;

10) strengthen receivables control.

The SWOT-analyses of customs brokerage services have been done in the Table 3.2.

Table 3.2 – SWOT-analysis of customs brokerage activity

Strength	Weaknesses
Geography: Kyiv, Odessa, Chop, Yagodin, Boryspil, Work schedule 24/7, All modes of transport, Deferred payment of services, Certification.	Team, Sales, Weak control, Lack of coherence.
Opportunities	Threats
Team reinforcement, Strengthening personal contacts in Odessa, Set target sale.	Loss of P&G.

In accordance with analysis of customs brokerage service the follow step could be recommended for implementation:

1) Broker team strengthening;

2) Strengthening the sales team of customs brokerage services;

3) Top 20 customers of customs Yagodin.

The SWOT-analyses of sea transport have been done in the Table 3.3.

Table 3.3 – SWOT-analysis of sea transport activity

Strength	Weaknesses
Team (interchangeability), Professionalism, Deferred payment of services, Work in all ports, Wide range of services, Flexibility in payments, Operativeness and customer focus.	Sea freight, Sales, No representation in the port.
Opportunities	Threats
Agent network, Office in Chornomorsk/Odessa/Yuzhnyii, Strengthen the purchase of sea freight, Sales.	

The follow action plan in the field of sea transport could be considered:

1) Hiring a top development manager;

2) Opening an office in Odessa;

3) Expansion of the agent network in order to attract orders;

4) Customer mailing: distribution of import tariffs, distribution of export tariffs.

3.2 Development of a proposal to digitalize the process of organizing shipping

These days, digital transformation is happening in all fields of the economy. Freight transportation are not exception. In the field of maritime transport there is the concept of a single window.

The Ukrainian National Maritime Single Window is a hardware and software complex created to simplify and harmonize administrative procedures by streamlining the formalities for providing information and electronic transmission of information during transportation using maritime transport facilities [3]. This complex is created to fulfill the obligations of the state of Ukraine to simplify trade procedures in the framework of the implementation of EU directives 2010-65 and 2002-59, as well as the agreement with the World Trade Organization on trade facilitation of December 7, 2013. Our system is based on technical solutions compatible with SafeSeaNet.

SafeSeaNet is a vessel traffic monitoring and information system, established in order to enhance [49]:

- Maritime safety;
- Port and maritime security;
- Marine environment protection;
- Efficiency of maritime traffic and maritime transport.

The main information elements that are contained in the system and made available to users are as follows:

- Automatic Identification System (AIS) based near-real-time ship positions (i.e. one every 6 minutes);
- Archived historical ship positions (over several years);
- Additional information from AIS-based ship reports (e.g. identification name/numbers, flag, dimensions, course, speed, dimensions, destination and ship type);
- Estimated/actual times of arrival/departure;
- Details of hazardous goods carried on board;
- Information on safety-related incidents affecting ships;
- Information on pollution-related incidents affecting ships;
- Details of waste carried on board/to be offloaded (from June 2015);
- Ship security-related information (from June 2015);
- Information on the location of remaining single hulled tankers;

– Information on the location of ships that have been banned from EU ports;

– Digital map layers (containing information on depths, navigation aids, traffic separation schemes, anchorages, AIS station locations, etc.).

Since 2012, the port community information system (PCIS) has been operating in Ukrainian ports, the developer of which is “PPL 33-35” LLC.

The port community information system was created on the initiative of the Odessa Commercial Sea Port Administration in order to optimize the operation of seaports, namely, the transition of paper documents to electronic documents when making ship calls and subsequent cargo handling.

The company "Plasque" undertook to implement the concept, creating the organization "PPL 33-35", which became the developer of the system.

PCIS successfully passed test operation in the Odessa port, at the transshipment of containerized cargo. The system was put into commercial operation in January 2014. Currently, 980 forwarding companies use it in Ukrainian seaports [19].

If we talk about the interaction of information systems at the national level, then a single sea window should be part of the National single window (see Fig. 3.1).

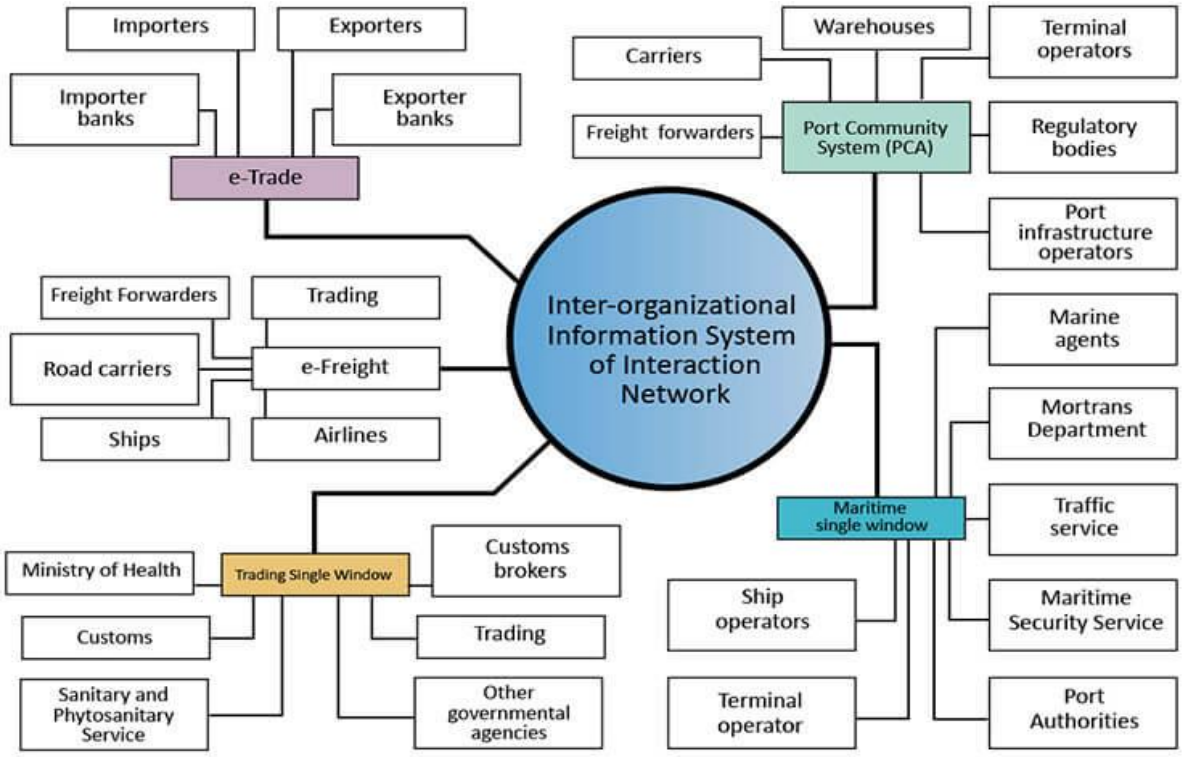


Figure 3.1 - Scheme of interaction of interorganizational information systems

There may be many “windows” in a scheme. But in order to unite them and allow them to fully interact, a state body must be created that implements this idea [16].

The presence of such information systems greatly optimizes the interaction of participants in the supply chain. Now we need to analyze what digital solutions can contribute to improving the company's earnings.

Containers have become a driving force in multimodal transport, making it easy to transport between different modes of transport. Transshipment of cargo in containers is the most economical and dynamically developing method of delivery of goods due to the high speed of cargo handling. The volume of transshipment of cargo in containers has increased over the past two decades, as evidenced by growth indicators in container traffic (in developed countries, up to 98% of the total turnover is part of the cargo transported in containers). It should be borne in mind that the volume of transshipment of cargo in containers varies under the influence of various internal and external factors.

The global container trade market in 2018 developed against the backdrop of some uncertainties, which include: the introduction of IMO environmental restrictions on the sulfur content in the fuel bunker in 2020; existing frictions in international trade between countries (for example, China - USA); current trends in the economy of China (for example, the cost of imports from China); weakness in consumer markets and adverse conditions for the development of the global economy and others. These factors adversely affect the development of container trade, and as a result, slower growth rates can be observed, compared, for example, to 2017. Nevertheless, 2018 as a whole for the global container market turned out to be successful, showing growth of 6% and exceeding the figure 2.6% growth in global container trade, reaching 152 million TEU [43].

In 2019, the global container market continued to be affected by the trends discussed above, as well as [42]: the continued increase in oil prices; review by terminal and linear operators (Maersk, DP World, Cosco, Contship Italia) of the development strategy (expanding its presence at domestic terminals, warehouses,

customs and logistics complexes, etc.); association of carriers in enlarged alliances; the use of digitalization (as a means of increasing efficiency and creating greater value for global supply chains) and others.

It should be noted that the container market is subject to rapid response to changing economic conditions. In this regard, the actors of the container transportation system need to take measures to increase container traffic. There are various obstacles (for example, infrastructure, customs clearance of goods, inconsistency of the legal framework, etc.), the solution of which requires a certain amount of time. However, the existing trend in the development of the transition to digitalization can have a positive impact on the further development of container cargo flows, and the introduction of digital solutions in the activities of the subjects of the container transportation system will open up a number of opportunities.

Digitalization of the container transportation system is the process of improving the container transportation system with the help of an integrated digitalization system, including automation, computerization, informatization, with the aim of developing both container transportation in general and, in particular, increasing the competitiveness of entities operating in the container market by increasing the speed of interchange , availability and security of information.

The use of digitalization in the container transportation system will allow: to simplify internal business processes; increase the efficiency of container transportation; track the location and condition of the cargo; manage the schedule of calls; reduce the time of work with the load; optimize staff work; reduce business risks through online payments; expand opportunities for online marketing; increase the throughput of container terminals; quickly respond to force majeure circumstances and others.

Carriers have many opportunities to apply digital technology—not only to maintain their direct customer relationships with acceptable costs but also to improve their operations and grow their businesses. Seven digital trends have emerged as especially valuable in the shipping industry (see Fig. 3.2).

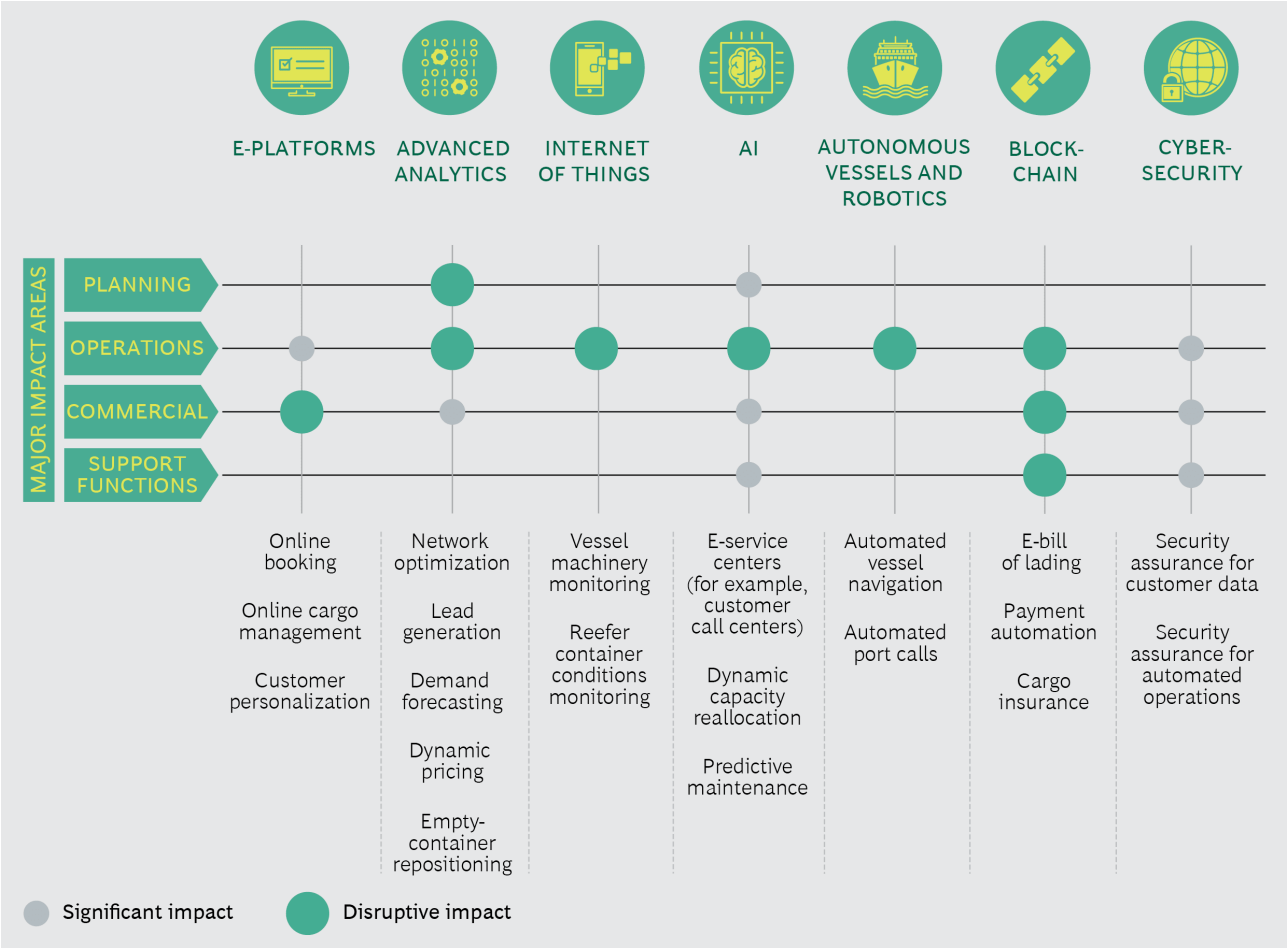


Figure 3.2 – Seven Digital Trends will transform container shipping [48]

One of the digital solution that can be recommended for implementation in the Navis activity is digital freight forwarder organization. Digital forwarders incentivize shippers to entrust them with their goods by presenting a selling proposition of liability, guaranteed capacity, price stability, and invoice consolidation. They can offer customized solutions to large clients and complex traffic flows with key activities managed by humans, while activities such as capacity brokerage, routing, and pricing will become digitalized. This will allow small clients with sporadic, simple shipments and without complex customs management to be serviced easily. [32]

As such, the digital freight forwarders will be able to coordinate even better the different parties they already synchronize manually: customs, shippers, carriers, drivers, ground-handling agents, assurance, etc.

Traditional freight forwarders have already started to “grow” their own digital talents and apparently continue to do so with their dedicated digital units, intensified R&D cooperation, and new hiring profiles.

To develop a digital forwarder software product, it was decided to turn to an IT company. To select a software developer it is advisable to use the expert assessment method. The algorithm of this method assumes the following:

- compiling a list of criteria according to which developer will be evaluated;
- assessment of each criterion by a group of experts on the significance of this criterion for the company from 1 to 10;
- calculation of the weight of the criterion;
- evaluation of each developer according to the selected criteria;
- multiplying the assessment by the weight of the criterion and derivation of a comprehensive assessment by summing the values for all criteria.

The weight of the criterion is calculated as follows:

$$P = \frac{x_{av}}{\sum x_{av}} * 100\%, \quad (3.1)$$

where x_{av} is the average value of the assessment of the criterion significance.

The developer's assessment taking into account the weight of the criterion is calculated as follows:

$$V = P * E, \quad (3.2)$$

where E is assessment provided to the developer by an expert from 1 to 10.

Thus, the director of the company, the head of the shipping department, the leading logisticians and the head of the IT department compiled a list of criteria that are most important when choosing suppliers and assessed their significance. The results of the calculations are summarized in table. 3.4.

Table 3.4 – List of criteria for selecting developers and assessing their significance

№	Criterion	Experts					Average value	Weight of criterion, P, %
		1	2	3	4	5		
1	2	3	4	5	6	7	8	9
1	Software price	10	9	9	10	10	9,6	15,74
2	Observance of the terms established by the contract	9	8	10	9	7	8,6	14,10
3	Compliance of the software functionality with the technical task	10	10	10	9	10	9,8	16,07
4	Reputation in the software developers market	8	9	9	8	7	8,2	13,44
5	Cost of software support	10	9	9	10	9	9,4	15,41
6	Qualification and competence of programmers	8	7	7	9	8	7,8	12,79
7	Experience in developing similar software products	8	7	9	6	8	7,6	12,46
8	Total						61	

The next step is to evaluate the developers according to each of the criteria. Information for evaluation is taken from the Internet based on the feedback of existing customers. Among the software developers, the following were selected for further selection: EPAM, SoftServe, Infopulse, N-iX and Miratech.

The results of the evaluation are summarized in table. 3.5.

Table 3.5 – Evaluation of potential developers by criteria

№	Criterion	Developers				
		EPAM	SoftServe	Infopulse	N-iX	Miratech
1	2	3	4	5	6	7
1	Software price	7	9	10	9	9
2	Observance of the terms established by the contract	10	9	7	8	7
3	Compliance of the software functionality with the technical task	10	9	9	8	7
4	Reputation in the software developers market	10	9	10	7	7
5	Cost of software support	6	8	8	9	9
6	Qualification and competence of programmers	10	9	9	8	8
7	Experience in developing similar software products	8	8	9	7	6

The next step is to calculate the developer's estimate based on the weight of the criterion. These calculations are given in table. 3.6.

Table 3.6 – Evaluation of developers taking into account the weight of the criterion

№	Criterion	Developers				
		EPAM	SoftServe	Infopulse	N-iX	Miratech
1	2	3	4	5	6	7
1	Software price	1,10	1,42	1,57	1,42	1,42
2	Observance of the terms established by the contract	1,41	1,27	0,99	1,13	0,99
3	Compliance of the software functionality with the technical task	1,61	1,45	1,45	1,29	1,12
4	Reputation in the software developers market	1,34	1,21	1,34	0,94	0,94
5	Cost of software support	0,92	1,23	1,23	1,39	1,39
6	Qualification and competence of programmers	1,28	1,15	1,15	1,02	1,02
7	Experience in developing similar software products	1,00	1,00	1,12	0,87	0,75
8	Comprehensive assessment	8,66	8,72	8,86	8,05	7,63
9	Relative weight in total	20,66	20,81	21,13	19,21	18,19

Therefore, analysing the evaluation results to decide on the choice of software developer, we can recommend first of all the company Infopulse and as a backup SoftServe. Their comprehensive scores are the highest, 8,86 and 8,72 respectively.

3.3 Calculation of project performance indicators

The introduction of new solutions at the enterprise must be accompanied by an economic justification for this decision. Criteria for the effectiveness of investment projects can be used for such justification. The choice of a specific criterion for the conclusion on the effectiveness of the project depends on certain factors - the available market outlook, the existence of constraints on resources for project financing, fluctuations in cash flows and the possibility of making a profit.

Net Present Value (NPV) [4]. This is the most famous and most used criterion. It can also be called discounted net benefits.

NPV is equal to the difference between the future value of the expected benefit stream and the current value of the present and subsequent costs of the project throughout its cycle. NPV is the discounted value of the project (current value of income or benefits from investments).

In order to calculate the NPV of the project, it is necessary to determine the discount rate, use it to discount the flow of costs and benefits and summarize the discounted benefits and costs (costs with a minus sign). When conducting a financial analysis, the discount rate is usually the cost of capital for the firm. In economic analysis, the discount rate is the underlying cost of capital, i.e. the profit that could be obtained by investing the most profitable alternative projects.

If the NPV is positive, then the project can be recommended for funding. If the NPV is zero, then the proceeds from the project will be enough only to restore the invested capital. If the NPV is less than zero - the project is not accepted. The calculation of NPV is done according to the following formula:

$$NPV = \sum_{t=1}^{n} \frac{I_t - O_t}{(1+r)^t} \quad (3.3)$$

where I_t, - income flows of the project in year t;

O_t, - outcome flows of the project in year t;

r - discount rate;

n - duration (life) of the project.

To calculate this indicator, you must first determine the amount of investment in this project. Possible investments in the purchase of software, necessary equipment, staff training and support of consultants in the implementation and operation of the product were assessed (Table 3.7).

Table 3.7 - Possible costs for the introduction of a digital freight forwarder at the enterprise, USD

№	Cost item	1 year	2 year	3 year	4 year	5 year	Total
1	2	3	4	5	6	7	8
1	Consulting on the development of the technical task	10000	-	-	-	-	10000
2	Software development directly	32000	-	-	-	-	32000
3	Software integration into company activities	15000	-	-	-	-	15000
4	Cost of server hardware and databases	6000	-	-	-	-	6000
5	Additional network laying	1500	-	-	-	-	1500
6	Software technical support services	3000	3000	3000	3000	3000	15000
7	Training of system users	500	-	-	-	-	500
8	System administrator training	500	-	-	-	-	500

End of the Table 3.7

1	2	3	4	5	6	7	8
9	Upgrading of the system according to user reviews of the software product	-	7500	-	-	-	7500
10	Total	68500	10500	3000	3000	3000	88000

Calculations of the net present value of the project, benefits and costs will be presented in the form of Table. 3.8.

Table 3.8 - Calculations of project implementation efficiency, USD

№	Years	Incomes	Outcomes	Cash Flow	Discount coefficient r=15%	Discounted Cash Flow	Discount coefficient r=20%	Discounted Cash Flow
1	1	2	3	4	5	6	7	8
2	t	I_t	O_t	CF_t	$1/(1+r)^t$		$1/(1+r)^t$	
3	1	19000	68500	-49500	0,870	-43043	0,833	-41250
4	2	22300	10500	11800	0,756	8922,5	0,694	8194,44
5	3	26000	3000	23000	0,658	15122,9	0,579	13310,2
6	4	28000	3000	25000	0,572	14293,8	0,482	12056,3
7	5	32000	3000	29000	0,497	14418,1	0,402	11654,4
8					NPV	9713,85	NPV	3965,41

Therefore, the difference between the present value of the future benefit stream and the present value of the future costs of project implementation is 9713,85 USD at a discount rate of 15% and 3965,41 USD at a discount rate 20%. Since the amount of discounted net worth is positive - the net present value is positive, the project will have a positive impact on the company and can be recommended for financing.

Another criterion for evaluating the effectiveness of the project is Internal Rate of Return (IRR).

The IRR of the project is equal to the discount rate at which the total discount benefits are equal to the total discounted costs, i.e. the IRR is the discount rate at which the NPV of the project is zero. The IRR is equal to the maximum interest on loans that can be paid for the use of the necessary resources, while remaining at a break-even level.

The calculation of IRR is performed by the method of successive approximations of the value of NPV to zero at different discount rates. Calculations are made according to the formula:

$$IRR = A + \frac{a(B - A)}{(a - b)} \tag{3.4}$$

where *A* is the value of the discount rate at which the NPV is positive;

B is the value of the discount rate at which the NPV is negative;

a is the value of the positive NPV, under discount rate A;

b is the value of the negative NPV, under discount rate B.

At a discount rate of 25%, the NPV is negative. Substitute these values into the formula and determine the value of IRR.

$$IRR = 15\% + \left(\frac{9713{,}85*(25-15)}{9713{,}85-(-529{,}28)}\right)\% = 24{,}48\%.$$

Also, the Internal Rate of Return can be found graphically. To do this, NPV values are calculated for discount rates in the selected range, for example from 5 to 30%. Based on these values, a graph of the NPV value depends on the discount rates. (Fig. 3.3)

You can see in the chart that before the 25% discount rate, the NPV values become positive and only after the 25% mark do they become negative. That is, at an interest rate of 25, the present value of all cash flows of the project is 0. This means that at such an interest rate, the investor will be able to recoup its initial investment.

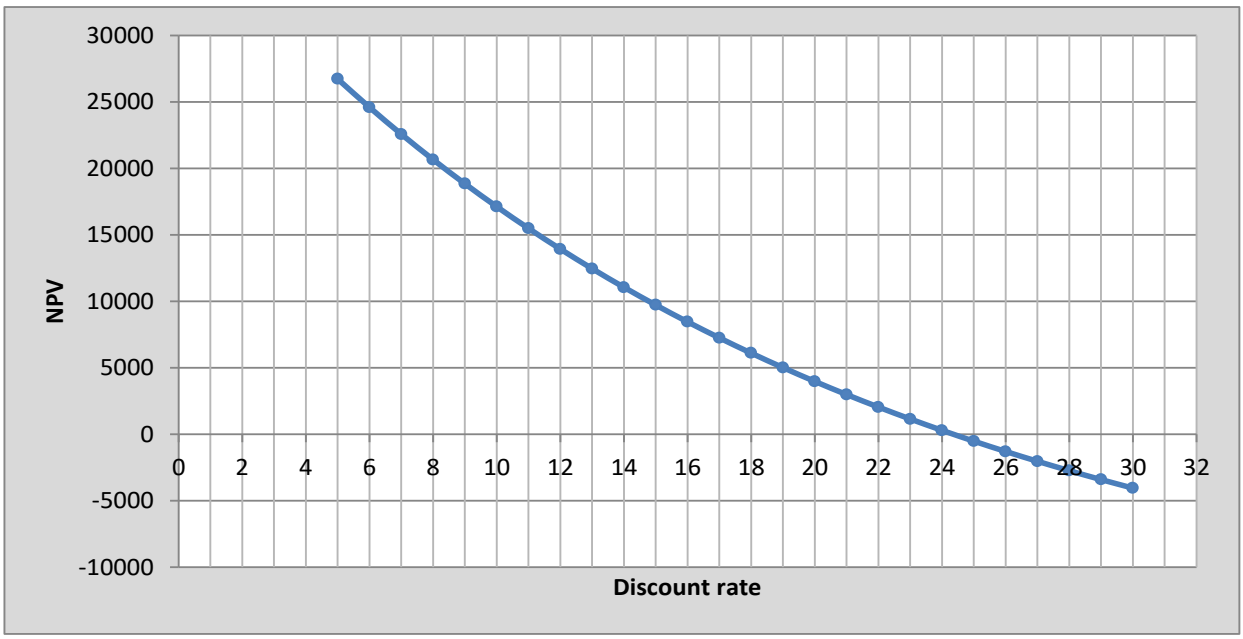


Figure 3.3 - Dependence of the NPV value on the discount rate

Another efficiency criterion is Payback Period (PP). The payback period refers to the amount of time it takes to recover the cost of an investment. Simply put, the payback period is the length of time an investment reaches a break-even point [38].

The time value of money is not taken into account. Payback Period intuitively measures how long something takes to "pay for itself." All else being equal, shorter payback periods are preferable to longer payback periods. Payback period is popular due to its ease of use. [39]

The payback period is indicated by the formula:

$$PP = \min\ n \quad \text{under which} \sum_{i=1}^{n} CF_i > IC \tag{3.5}$$

where *IC* (Invest Capital) - the initial investment costs in the project,

CFi (Cash Flow) - cash flow of the project in the *i* period of time, less current costs,

n is the number of time periods.

Calculate the payback period of investment in the project (Table 3.9).

Table 3.9 – Calculation of the project Payback Period

№	Time period (year), T	Initial investment costs, IC	Cash Flow, CF	Cash flow cumulative total
1	2	3	4	5
2	1	65500	16000	16000
3	2	65500	11800	27800
4	3	65500	23000	50800
5	4	65500	25000	75800
6	5	65500	29000	104800

Cash flow over time was defined as the difference between the expected benefits and current expenses, which expected 3000 USD in 1st year, 10500 USD in 2nd year, and 3000 USD in 3rd year, 4th year and in 5th year. Capital investments at the beginning of the project amounted to 65500 USD. Based on the calculations, we construct graphs to more conveniently reflect the moment of the beginning of the prevalence of cash flows over capital investments (Fig. 3.4).

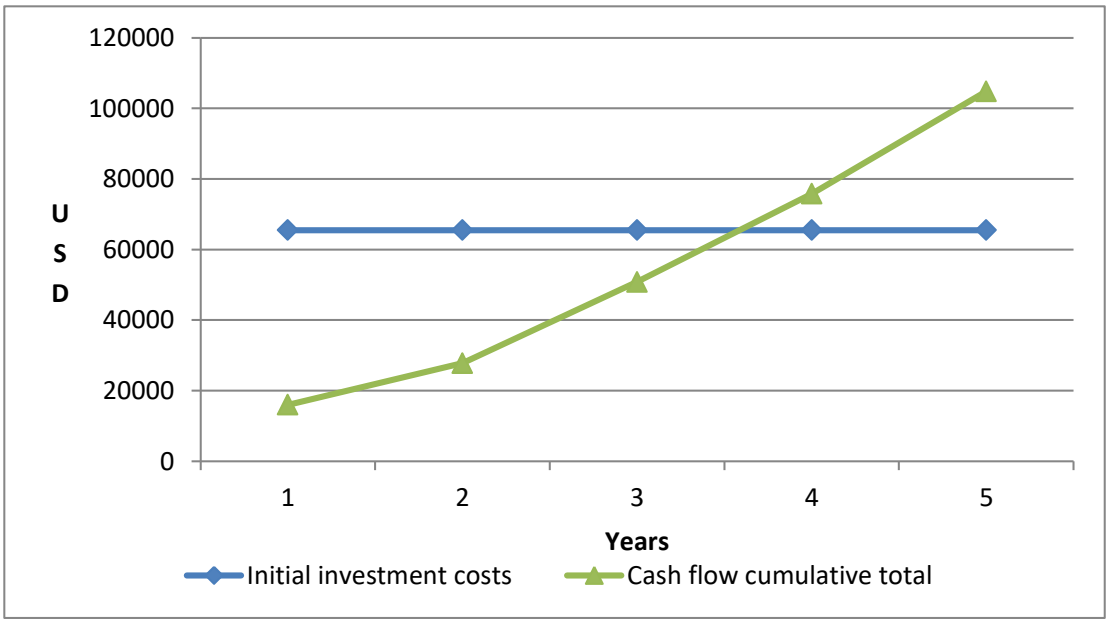


Figure 3.4 - Graphical display of the project PP

According to the calculations we can see that the Payback Period of the project comes after 3,5 years.

The discounted payback period (DPP) is the amount of time that it takes (in years) for the initial cost of a project to equal to discounted value of expected cash flows, or the time it takes to break even from an investment. It is the period in which the cumulative net present value of a project equals zero. [33] Discounted payback period helps businesses reject or accept projects by helping determine their profitability while taking into account the time-value of money

Calculated by the formula:

$$DPP = \min\ n \quad \text{under which} \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} > IC \tag{3.6}$$

where r is the discount rate.

Next step will be carry out of necessary calculations of discounted payback period and after calculations we bring results to the table (Table 3.10).

Table 3.10 - Calculation of the project DPP

№	Time period (year), T	Initial investment costs, IC	Cash Flow, CF	Discounted CF, r=15%	Cash flow cumulative total	Discounted CF, r=20%	Cash flow cumulative total
1	2	3	4	5	6	7	8
1	1	97800	13850	12589,65	12589,7	11541,7	11541,7
2	2	97800	12000	9912	22501,7	8333,3	19875,0
3	3	97800	28750	21591,25	44092,9	16637,7	36512,7
4	4	97800	33650	22982,95	67075,9	16227,8	52740,5
5	5	97800	40250	24995,25	92071,1	16175,6	68916,1

Graphic interpretation of the discounted payback period calculation is given in the chart (Fig. 3.5).

The graph shows that discounted payback period under 15% discount rate comes after 4th year and after 5th year under 20% discount rate.

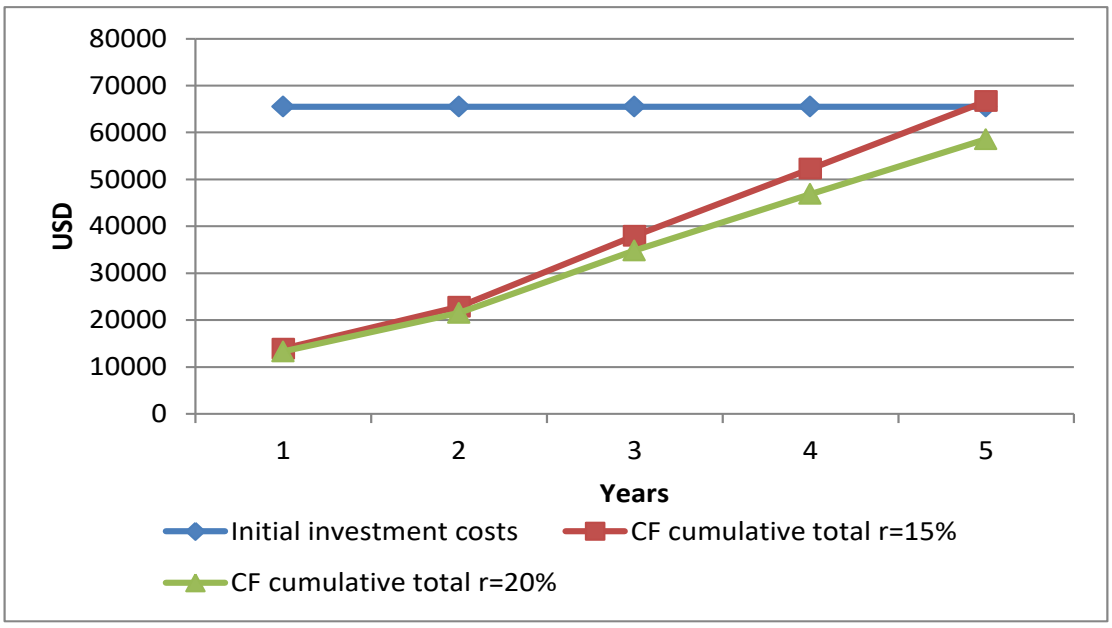


Figure 3.5 – DPP calculations

Therefore, the general conclusion after evaluating the effectiveness of the introduction of a digital freight forwarder is that the implementation of the software will have a positive effect on the activities of the whole company. The project performance indicators are positive, which characterizes the project as one that is recommended for implementation.

3.4 Chapter 3 summary

In the third chapter of bachelor thesis was carried out SWOT analysis of Navis company, analysed modern solution in the field of maritime transportation, proposals for digitalization of the company's activities were worked out and the effectiveness of the proposed project was evaluated.

SWOT analysis allows you to diagnose weaknesses and strengths in the company and develop an action plan. One of the activities in the field of shipping is to increase sales. it was decided to focus on the service LCL. And to increase sales it is advisable to use modern digital solutions. In general, today digitalization is a

universal trend in all areas of human life. At the state level, the digitalization directions in economic fields are prescribed. Thus, in the field of maritime transport, the concept of a maritime single window is being developed. This is a hardware and software complex created to simplify and harmonize administrative procedures by streamlining the formalities for providing information and electronic transmission of information during transportation using maritime transport facilities.

Digitalization of the container transportation system is the process of improving the container transportation system with the help of an integrated digitalization system, including automation, computerization, informatization, with the aim of developing both container transportation in general and, in particular, increasing the competitiveness of entities operating in the container market by increasing the speed of interchange , availability and security of information.

One of the modern IT solution is digital freight forwarder. Usage of digital technologies could decrease unit costs, increase customer stickiness and satisfaction and get greater profitability. A proposals project was developed for the implementation of a software product that combines a marketplace and an online forwarder. Marketplaces - platforms for market participants to place their offers, and online forwarders - companies that provide logistics services on their own behalf and use their own IT platform.

To assess the effectiveness of the proposed project, various indicators were used: Net Present Value, Internal Rate of Return, Payback Period and Discounted Payback Period. All indicators were positive, which suggests that the project can be recommended for implementation.

CONCLUSIONS AND RECOMMENDATIONS

Sea transport is the oldest mode of transport used by humans to transport passengers and goods. Like any other mode of transport has a number of advantages and disadvantages. And its greatest advantage is cargo capacity. About 70% of the global cargo turnover comes from maritime transport.

The organization of international shipping has its own characteristics, associated with the fact that the waters of the oceans are a neutral territory that does not belong to any country. The regime of the sea space and questions on the use of the oceans are regulated by international law of the sea. Currently, most of the norms of international law of the sea are combined in the 1982 UN Convention on the Law of the Sea. All other international agreements (including bilateral and regional agreements) containing regulations relating to this industry mainly supplement or detail the norms of the Convention. In Ukraine, relations in merchant shipping are regulated by the Code of Merchant Shipping.

Analysis of the latest trends shows that the world is in the midst of a global technology revolution and it touches maritime transport too. For the past 30 years, advances in computer and information technology, biotechnology, nanotechnology and materials technology have been occurring at an accelerating pace, with the potential to bring about radical changes in all dimensions of life. The marine technology of 2030 will integrate developments from multiple scientific disciplines in ways that could transform the quality of design, construction and operation. It can be envisaged that a future marine world will be a connected and digital one, bringing closer integration between people, software and hardware in a way that could transform the way we operate and interact. A new operation paradigm will need to be created to meet these challenges across the shipping, naval and ocean space sectors.

In the analitical chapter of bachelor thesis was analysed the transport market in Ukraine and activity of Navis company on this market. In recent years, transport market indicators have shown market growth. So freight turnover of transport

enterprises was 338,9 billion tons or 102,1% of 2018 volumes. Railway transport leads in the structure of transported cargo. But it should be noted that official state statistics only show data from Ukrainian companies. Thus, official statistics show that 6,1 million tons were transported by water in Ukraine in 2019. But according to statistic of Administration of Seaports of Ukraine the annual volume of cargo handling of 13 operating ports reached to 160 million tons. And these statistics take into account the cargo transported under other flags. This suggests that maritime transport in Ukraine is developing, along with port infrastructure.

The object of study was the freight forwarding company Navis. This company was founded in 2013. Nowadays company 4 offices in different counties (Estonia, Georgia) and head office is located in Kyiv. The company offers its services in the field of sea, land and railway transport, customs brokerage service and stevedoring work in the ports. Analysis of company financial state shows that the Navis company's financial flows during 2019 were quite smooth. Analysis of financial flows over several years allows us to conclude that the Navis company operates in the market stably, without jumps. The most significant activity of the Navis company is customs brokerage service – 45% in total profit in 2019. Another one is sea transport – 35% in total profit. The main volume of the cargo in 2019 was transported by sea. And the company pays much attention to the development of this field of activity.

In the third chapter of bachelor thesis was carried out SWOT analysis of Navis company, analysed modern solution in the field of maritime transportation, proposals for digitalization of the company’s activities were worked out and the effectiveness of the proposed project was evaluated.

SWOT analysis allows you to diagnose weaknesses and strengths in the company and develop an action plan. One of the activities in the field of shipping is to increase sales. it was decided to focus on the service LCL. And to increase sales it is advisable to use modern digital solutions. In general, today digitalization is a universal trend in all areas of human life. At the state level, the digitalization directions in economic fields are prescribed. Thus, in the field of maritime transport, the concept of a maritime single window is being developed. This is a hardware and

software complex created to simplify and harmonize administrative procedures by streamlining the formalities for providing information and electronic transmission of information during transportation using maritime transport facilities.

Digitalization of the container transportation system is the process of improving the container transportation system with the help of an integrated digitalization system, including automation, computerization, informatization, with the aim of developing both container transportation in general and, in particular, increasing the competitiveness of entities operating in the container market by increasing the speed of interchange , availability and security of information.

One of the modern IT solution is digital freight forwarder. Usage of digital technologies could decrease unit costs, increase customer stickiness and satisfaction and get greater profitability. A proposals project was developed for the implementation of a software product that combines a marketplace and an online forwarder. Marketplaces - platforms for market participants to place their offers, and online forwarders - companies that provide logistics services on their own behalf and use their own IT platform.

To assess the effectiveness of the proposed project, various indicators were used: Net Present Value, Internal Rate of Return, Payback Period and Discounted Payback Period. All indicators were positive, which suggests that the project can be recommended for implementation.

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