MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
KYIV NATIONAL ECONOMIC UNIVERSITY
NAMED AFTER VADYM HETMAN
Faculty of International Economics and Management
Department of International Economics

BACHELOR DEGREE PROGRAM **«INTERNATIONAL ECONOMICS»**

FIELD OF KNOWLEDGE **05 Social and behavioural sciences**

SPECIALTY **051 «Economy»**

Form of education full-time

BACHELOR THESIS

Title "Transport and logistics support for the development of international e-commerce"

By Daria Stepanova _____
(Signature)

Academic Supervisor – professor of the Department of International Economics, Doctor _____ D. Ilnytskyy
(Signature)

Bachelor Thesis has been approved for defense at Attestation Examination Commission (EC)

Head of the Department of International Economics Dr. of science, Professor _____Y. Stoliarchuk
(Signature)

KYIV 2023

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AGREED
Head of the project group (guarantor) of the educational-professional program
_____Y. Stoliarchuk
(Signature)
_____ 2023

APPROVED
Head of the Department
_____Y. Stoliarchuk
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_____ 2023

INDIVIDUAL TASK
higher education applicant_____Daria Stepanova_____
Name, Surname
full-time forms of education

Bachelor Thesis
Title: "Transport and logistics support for the development of international e-commerce"

The title of the Bachelor's thesis has been approved by the Rector's Order «07» 12. 2022 №535

Bachelor Thesis is based on materials: open Ukrainian and foreign sources of scientific knowledge and analytical information, monographs and articles, reports of international organizations and national institutions in the field of international e-commerce.

Deadline for submitting the final version of Bachelor's Thesis to the Academic Supervisor (*20.05.2023)*

Plan of Bachelor Thesis and the terms of it submission to the Academic Supervisor

Chapter 1 THEORETICAL FOUNDATIONS OF DEVELOPMENT OF INTERNATIONAL E-COMMERCE
Chapter 2 RESEARCH OF TRANSPORT AND LOGISTICS IN DEVELOPMENT OF INTERNATIONAL E-COMMERCE

Object of research:	the determinants of the development of competitive interaction of subjects of international economic relations in the context of digital transformation.
Subject of research:	the factors, models, trends, consequences, strategies and prospects for the development of transport and logistics infrastructure as a factor of international e-commerce.
The purpose of the Thesis:	The aim of the research is to substantiate the possibilities of increasing the efficiency of e-commerce by national international business entities based on a generalisation of the theoretical foundations of development of competitive interaction of international economic relations in the context of digital transformation and a comprehensive analysis of factors, models, trends, consequences, strategies and prospects for the development of transport and logistics infrastructure.

Specific tasks applicant has to accomplish to meet the objective:

In Chapter 1: review and analyze the existing theories, concepts and components of international e-commerce in the global postindustrial economy; identify the key factors and models that affect the development of infrastructure of international e-commerce and evaluate their impact; identify relevant indicators and methods of research to investigate the impact of transport and logistics on international e-commerce.

In Chapter 2: identify and analyze the key trends in the development of transport and logistics infrastructure of international e-commerce and their impact on the industry; conduct an analysis of the impact of transport and logistics infrastructure on the development of e-commerce in the European economy; formulate and evaluate strategies for the development of transport and logistics infrastructure aimed at improving the efficiency of delivery of goods from international online stores to customers; analyze the current state and perspectives of development of transport and logistics infrastructure of e-commerce in Ukraine, including challenges and opportunities for improvement.

The task has been set
by the Academic Supervisor _____ Denys Ilnytskyy _____
(Signature) *(Name, Surname)*
09.01.2023

The task has been given to
Applicant  Daria Stepanova _____
(Signature) *(Name, Surname)*
09.01.2023

Abstract

Qualification bachelor's work contains 69 pages, 6 tables, 16 figures, a list of 65 references, applications.

"Transport and logistics support for the development of international e-commerce"

(title of the qualifying bachelor's thesis)

The object of the research work is the determinants of the development of competitive interaction of subjects of international economic relations in the context of digital transformation.

The subject of the research is the factors, models, trends, consequences, strategies and prospects for the development of transport and logistics infrastructure as a factor of international e-commerce.

Purpose of the study is to substantiate the possibilities of increasing the efficiency of e-commerce by national international business entities based on a generalisation of the theoretical foundations of development of competitive interaction of international economic relations in the context of digital transformation and a comprehensive analysis of factors, models, trends, consequences, strategies and prospects for the development of transport and logistics infrastructure.

To achieve this goal it is necessary to solve the following tasks:

– review and analyze the existing theories, concepts and components of international e-commerce in the global postindustrial economy;

– identify the key factors and models that affect the development of infrastructure of international e-commerce and evaluate their impact;

– identify relevant indicators and methods of research to investigate the impact of transport and logistics on international e-commerce;

– identify and analyze the key trends in the development of transport and logistics infrastructure of international e-commerce and their impact on the industry

– conduct an analysis of the impact of transport and logistics infrastructure on the development of e-commerce in the European economy;

– formulate and evaluate strategies for the development of transport and logistics infrastructure aimed at improving the efficiency of delivery of goods from international online stores to customers;

– analyze the current state and perspectives of development of transport and logistics infrastructure of e-commerce in Ukraine, including challenges and opportunities for improvement.

Practical significance. The results of research can be used to improve the transport and logistics infrastructure of international e-commerce, leading to better delivery of goods, reduced costs and customer satisfaction.

Year of completion of the qualifying bachelor's thesis 2023.

The year of the defence of the work is 2023.

Key words: transport, logistics, support, development, international e-commerce.

REVIEW
of the qualification bachelor thesis
of the student of the Faculty of International Economics and Management
educational program "International economics"
Stepanova Daria
title: "**Transport and logistics support for the development of international e-commerce**"

1. **Relevance of the topic:** The topic of the research is of high relevance for several reasons, which outline the necessity of economic actors being in line with global trends through the whole value-added chain. Digitalisation of sales and other communication with stakeholders includes development of e-commerce both for companies interacting with clients and banking and financial sector serving the possibility of settlements, as well as proper regulation of modern forms of international economic relations. Transport and logistics infrastructure are also among determinants of development of the international e-commerce.
2. **Positive features of the qualifying Bachelor's thesis:** the paper is an original, independent, meaningfully diverse study in which the author makes an attempt to systematize information from various sources on a topic that is gaining relevance in times of massive digitalization. The factors, indicators, trends and models of development of infrastructure of international e-commerce are summarized.
3. **The presence of independent developments of the author:** the author on the basis of expert opinions and analysis of primary sources made an attempt to assess the impact of transport and logistics infrastructure on the development of e-commerce in European economy and effectiveness of strategies for development of transport and logistics infrastructure of international e-commerce
4. **The value of theoretical conclusions and practical recommendations:** the drawn conclusions and the proposed recommendations are sufficiently substantiated and can be recommended for use during the implementation of ways of effective perspective development of transport and logistics infrastructure of e-commerce in Ukraine in the context of strengthening competitive positions on European and global markets.
5. **The presence of shortcomings:** the work corresponds to the current level of competencies of the student; contains minor stylistic flaws and is limited by the author's abilities to access and analyse sources of scientific and analytical literature.
6. **General assessment of the bachelor's thesis and its admission to the defence examination board**: the work is performed at an appropriate level and can be recommended for presentation and defence before the examination board. The total score is 46 points.

Academic Supervisor:
Doctor of Economics, professor of
the Department of International Economics _____D. O. Ilnytskyy
(signature) (name, surname)

"_____"_____ 2023

CONTENT

INTRODUCTION

Actuality of the research. In recent years, there has been a steady upward trend in the number of e-commerce services provided. This is undoubtedly due to the development of information and communication technologies, their increasing availability and their much greater competitiveness than traditional methods of trade. According to a report by the Organisation for Economic Co-operation and Development, the volume of global e-commerce continues to grow rapidly. In 2022, the total value of international e-commerce transactions will be around USD 5.7 trillion. In addition, the current conditions of the global pandemic are a catalyst for intensifying the activities of trade enterprises in providing electronic services.

The Internet, as a technology of global open networks, is the best way to attract a wide range of consumers of logistics services. This technology can be used to provide the following: company advertising; provision of a list of services and price lists; accounting for regular customers and partners; provision of necessary documents to consumers on a paid and free basis; interactive consulting service; counterparty search service; registers of logistics companies and a database of information and logistics resources on the Internet; electronic freight; cargo and vehicle monitoring; virtual agency and forwarding.

Today, the process of accumulating logistics resources on the Internet has reached a level that allows us to talk about the formation of virtual logistics centres. This, in turn, with further development can form a single logistics information space on the Internet.

The study of logistics and transport support in the e-commerce segment is represented by the works of such foreign researchers as P. Drucker, D.J. Bowersox, D.J. Kloss, D. Amor, E. Elias, M. Witzel, D. Koziase, K. Paytel, M. McCartney, D. Siegel, M. Warner. A significant theoretical contribution to the study of e-commerce logistics was made by such Ukrainian scientists as V.I. Skitsko, N.V. Chornopysska, N.T. Hrynev, M.V. Kindiy, M.M. Maga, M.S. Shkoda, M.O. Antonenko, I.P. Mishchuk.

The aim of the research is to substantiate the possibilities of increasing the efficiency of e-commerce by national international business entities based on a generalisation of the theoretical foundations of development of competitive interaction of international economic relations in the context of digital transformation and a comprehensive analysis of factors, models, trends, consequences, strategies and prospects for the development of transport and logistics infrastructure.

To achieve this purpose, the following tasks were set and solved:

– review and analyze the existing theories, concepts and components of international e-commerce in the global postindustrial economy;

– identify the key factors and models that affect the development of infrastructure of international e-commerce and evaluate their impact;

– identify relevant indicators and methods of research to investigate the impact of transport and logistics on international e-commerce;

– identify and analyze the key trends in the development of transport and logistics infrastructure of international e-commerce and their impact on the industry;

– conduct an analysis of the impact of transport and logistics infrastructure on the development of e-commerce in the European economy;

– formulate and evaluate strategies for the development of transport and logistics infrastructure aimed at improving the efficiency of delivery of goods from international online stores to customers;

– analyze the current state and perspectives of development of transport and logistics infrastructure of e-commerce in Ukraine, including challenges and opportunities for improvement.

The object of the research is the determinants of the development of competitive interaction of subjects of international economic relations in the context of digital transformation.

The subject of the research is the factors, models, trends, consequences, strategies and prospects for the development of transport and logistics infrastructure as a factor of international e-commerce.

The main research methods used in writing the paper were the following economic research methods: systematic approach; methods of comparative analysis; method of systematisation, classification and expert evaluation; empirical research; chronological approach and graphical interpretation techniques.

Theoretical, methodological and practical importance of the obtained results. Theoretically, the research contributes to the understanding of transport and logistics support for international e-commerce and contributes to the development of logistics and e-commerce theory. Methodologically, the results provide a basis for developing strategies and recommendations for improving the efficiency of delivery and logistics networks in the context of e-commerce. Practically, these can be used to improve the transport and logistics infrastructure of international e-commerce, leading to better delivery of goods, reduced costs and customer satisfaction.

The information base of the study was based on various sources, such as: monographic studies of domestic and foreign economists on the issues of global economic development and the development of global logistics networks. In addition, materials and analytical reports from organisations such as the World Bank Group, the Organisation for Economic Co-operation and Development (OECD), the International Monetary Fund (IMF), the International Finance Corporation (IFC), the European Bank for Reconstruction and Development (EBRD), the European Logistics Association and the European Transport Research Platform. Statistical data provided by the State Statistics Service of Ukraine and Ministry of Finance of Ukraine.

Structure of the research: The research includes an introduction, two sections, conclusions, a list of references and appendices.

CHAPTER 1. THEORETICAL FOUNDATIONS OF DEVELOPMENT OF INTERNATIONAL E-COMMERCE

1.1 Theory of international e-commerce in global postindustrial economy

The development of the Internet and e-commerce is leading to significant changes in economics and traditional economic theory and practice. Information and communication technology is a major driver of globalisation. Technologies and standards of data transmission via the Internet have become a universal means of exchanging commercial information and have largely determined the principles of doing business in the field of e-commerce. The use of the Internet is transforming the processes of economic interaction between companies and their customers, partners and suppliers. The methods and means of conducting commercial transactions in e-commerce are somewhat different from those in the real economy.

The Second Ministerial Conference of the World Trade Organisation, held in May 1998, approved a Declaration on Global Electronic Commerce. The main document regulating the work in this sphere is the Working Program on Electronic Commerce adopted by the WTO General Assembly in September 1998. According to this programme, e-commerce is "the production, distribution, marketing, sale or supply of goods and services by electronic means"[1].

The term "e-commerce", as one type of commerce in general terms, is established as follows: "E-commerce - 1) economic activity with the use of electronic information technologies; 2) commercial activity with the use of electronic information technologies, where interaction of the parties is carried out electronically instead of physical exchange or direct physical contact [2; 3].

E-commerce is not a new subject of research, although, unfortunately, it has not been sufficiently studied. The relevance of the topic is constantly growing. In developed countries, this can be explained by the fact that e-commerce is considered as one of the

ways to improve the efficiency of small and medium-sized businesses, large corporations and public authorities.

Authors and researchers explore various aspects of e-commerce, including its growth, the impact on consumers and businesses, and the factors that influence the success of online commerce. Below are the main results obtained by the authors in their research, contributing to a better understanding and making strategic decisions in the field of e-commerce (Table 1.1).

Table 1.1 – Definitions of Electronic commerce [52; 53; 54].

Author	Year	Definition
Shahriari S., Shahriari M., Ggheiji S.	2015	Electronic commerce, commonly known as E-commerce, is trading in products or services using computer networks, such as the Internet. Electronic commerce draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems.
Fichter K.	2003	E-commerce is understood as part of the business, which also includes, for example, video conferencing and teleworking. By definitions available so far, the term "e-business" can be defined as follows: business processes, commercial activities, or other economic tasks FORUM Fichter, Environmental Consequences of E-Commerce 27 conducted over the Internet or computer-mediated networks (Intranet, etc.).
Khan A. G.	2016	Electronic commerce, or e-commerce, is the buying and selling of goods and services on the Internet. Other than buying and selling, many people use the Internet as a source of information to compare prices or look at the latest products on offer before making a purchase online or at a traditional store.

E-commerce has produced a new channel for marketing and sales, as Ling Y. underlines in his work [4]. The new sales channel implies a number of advantages for customers shopping online, among them: accessibility of information, customisation possibilities and price comparison.

Moreover, the widespread adoption of e-commerce has revolutionized the way businesses operate by providing opportunities for increased profitability, scalability, and

accessibility to a global customer base. In addition, e-commerce has the following advantages:

- company's global presence in the market allows even the smallest businesses to reach different markets, regardless of their location;
- unlimited opportunities to expand the market for the seller and the choice for the buyer;
- comparatively low time costs of placing an order for the buyer and its fulfilment for the seller. Companies are able to provide necessary product information and respond quickly to customer enquiries. As a result, the elasticity of demand in online markets is higher than in traditional markets;
- lower costs of setting up this type of business, which makes the product offered more competitive by lowering its price;
- the ability to get as much information as possible about customers' needs and to automatically suggest, develop and produce products that meet their requirements;
- working twenty-four hours a day, there are no time constraints;
- additional lines of business can be generated within an existing business;
- business flexibility and rapid response to changes in the external environment [5].

While e-commerce has completely changed the way we purchase and do business, there are some cons as well. Knowing the drawbacks of e-commerce is crucial in the current digital world, where online transactions are becoming more and more common. Understanding these negatives might help people make informed choices and proceed cautiously in the online shopping environment:

- The buyer's awareness determines their susceptibility to being duped and the security of their money. As a result, customers should check the online store's credibility before sending any personal information. When purchasing something online, there is a chance that it won't arrive or that it won't be exactly like the picture.
- Lack of privacy - Some online shops may send you emails about new products and stocks even when you haven't asked for them. This could appear helpful at first, but it's just a means to increase your income.

- Online purchases can take a long time to arrive, and shipping costs might occasionally be higher than the item's cost, especially if the purchase is made from another country. Online purchases could be more challenging to return than traditional shop purchases.

- Often, shipping costs are not reimbursed, and occasionally, the cost of returning the merchandise itself must be paid. Additionally, it's crucial to check the website's credibility and the security of your credit card and online banking information before making an online purchase. Finally, when purchasing online, you won't be able to physically see the products (like clothing).

E-commerce is characterized by public accessibility, information richness, interactivity, personalization and application of social technologies [6]. The increasing popularity of e-commerce is associated with its following factors that have a positive impact on business [7, p.70-89]:

- predominant use of computer networks as a communication channel, which allows real-time communication and access to virtually any required information and exchange of resources;

- the replacement of paper-based workflow by electronic workflow, which allows business processes to be accelerated, their quality to be increased, costs to be reduced and the safety and security of documents to be ensured;

- the use of electronic digital signatures, which do not require the physical presence of the participants in one place at the conclusion of the transaction, reduces the risk of forgery of documents, and allows tracking their status at any time;

- the use of various Internet advertisements (banner advertising, search engine marketing) instead of more expensive street and media advertisements;

- the use of cash and traditional non-cash bank transfers is complemented by the use of Client-Bank systems, Internet-Bank, e-money, e-bills;

- possibility to automate trade and technological processes such as order processing, receipt of payment and others;

- expansion of the trading space, as the service area of the enterprise on the Internet does not depend on the type of the enterprise, its specialization or location;

the cost of setting up a traditional trading enterprise, which may include the purchase or rental of office and production premises and their maintenance, is much higher than the cost of making a website.

In the theory of e-commerce, there are several generally accepted forms that divide e-commerce into segments of commercial interconnection between its participants (figure 1.1). These forms include business-to-consumer (B2C), business-to-business (B2B), consumer-to-consumer (C2C), business-to-government (B2G), and government-to-consumer (G2C).

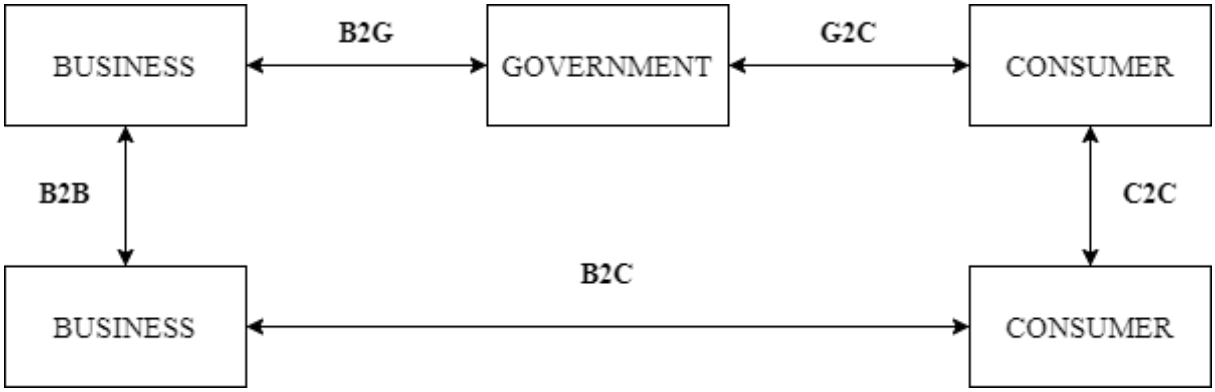

Figure 1.1 – Scheme of e-commerce forms [8].

- Business-to-business (B2B) - is the interconnection of companies in the electronic environment; through virtual B2B platforms, businesses and companies are able to exchange information, find new partners, suppliers and conduct trade transactions. In Western countries, the concept of B2B is defined as the provision of manufacturing enterprises with various support services, equipment, etc [9].

B2B commerce is more than just a simple mechanism for accepting orders online. It forms a network of independent organisations related to commerce or to industries such as chemicals, automotive or construction [9]. It is a new way of viewing goods, products and prices, providing specialised services and delivering specialised goods to business partners, and it is a new way of accounting for inventory. All of this means extending the supply chain to improve the efficiency of commercial enterprises.

The B2B form of commerce has created new opportunities for establishing contacts between firms of different profiles. For example, traditional methods of establishing contacts (by phone, fax, mail or in person) are being replaced by Web-based

models such as auctions and exchanges. In markets which are spread across different geographical regions, buyers cannot find suppliers and end up overpaying or buying lower quality goods. In B2B e-commerce, however, the participants in the supply chain are directly connected to each other.

- Business-to-consumer (B2C) - refers to the relationship between companies and end users on the Internet, i.e., the retail sale of goods and services to individuals via the Internet. This is the most promising area of e-commerce. B2C systems include: web showcases designed using web design tools; online stores that contain, in addition to the showcase, all the necessary business infrastructure to manage the process of trading via the Internet (back-office); TIS (trading Internet system) - online stores whose back-office is fully integrated with the business processes of a physical (offline) company.

- Consumer-to-consumer (C2C) - establishes interaction between users of Internet services. Such interaction takes place through online auctions, which act as intermediaries between buyers and sellers [11].

- Business-to-Government (B2G) - is the relationship between companies and government administrative bodies; this category includes business relationships between commercial entities and government agencies, local and international organisations. Although the B2G system is not as widely developed as the above, new trends have recently emerged [10].

This includes online procurement of goods and services by governments and international organisations. Commercial entities, in turn, have the opportunity to submit their proposals and thus engage in a dialogue with the authorities. In other words, this form includes all types of agreements between a company and government organisations. Another example is public procurement, which can be published on the Internet. All firms that are interested in supplying the requested products can also submit their offers electronically. In addition to procurement announcements, administrative authorities may also offer the possibility of electronic exchange for transactions such as value added tax refunds. This model of organising an e-commerce system is still in its infancy.

- Consumer-to-Government (C2G) establishes the relationship between users and the administration. This area is the least developed but has great potential and is used to

organise interaction between the government and the consumer (especially in the social and tax areas). For example, in the United States, one third of taxpayers file their income tax returns through tax authorities' websites. The Tax Code of Ukraine provides that one of the ways to file tax returns is to submit them electronically, subject to the condition that the electronic signature of the reporting persons is registered in accordance with the procedure established by law [8].

Considering the impact of e-commerce and the development of the national economy, it is necessary to specify the specifics of this impact and its individual, main types. Usually, economic relations in the field of e-commerce and the national economy as a whole are in a complicated relationship. However, for the convenience of describing the specific features of the interaction between the presented systems, it is advisable to describe such interaction. Fig. 1.2 shows a model of electronic interaction between trade and the national economy.

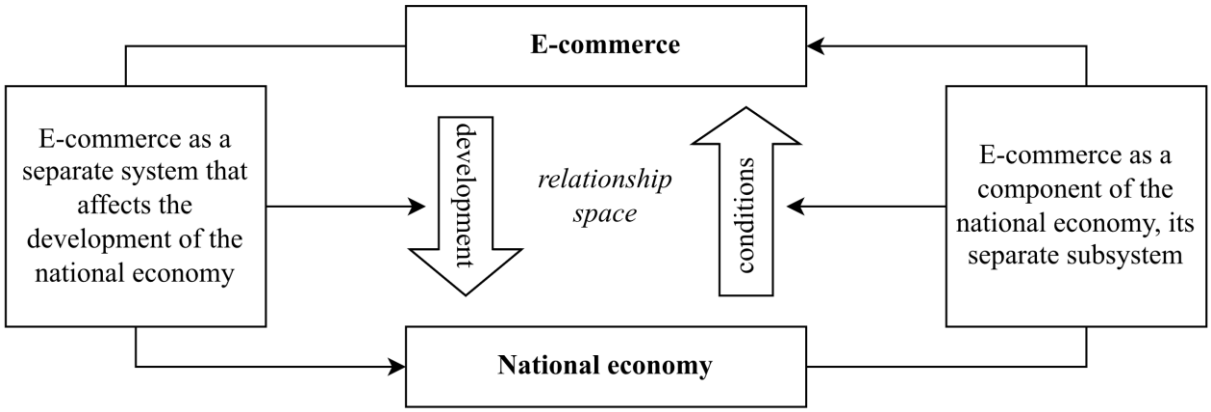

Figure 1.2. – The importance of e-commerce in the development of the national economy [8].

Moreover, evaluating the influence of e-commerce on market competition and consumer behaviour is essential for comprehending its overall effects on the economy. Thus, when analysing Fig. A.1, it can be stated that the role of e-commerce in the development of the national economy should be considered in two aspects [8, p. 59].

1. Treat e-commerce as a part of the national economy. The emphasis should be placed on the impact of the institution ensuring the development of the country's economy and the development of e-commerce. It is important to consider the functioning

of those areas that facilitate the development of economic relations in the field of e-commerce and analyse the general conditions for investment activity in the country.

2. Consider e-commerce as a separate component of the national economy, which has a positive impact on the development of other components of the economy. At the same time, this type of trade should be viewed somewhat in isolation from the overall economic system. The emphasis is placed on understanding the peculiarities of e-commerce, analysing the areas of its positive impact on the intensification of economic relations in the country, analysing the development of those areas that depend on e-commerce or are largely dependent on it, and their functioning.

Over the past few decades, e-commerce has experienced remarkable growth and transformation, shaping the way we buy and sell goods and services globally. Considering the evolution of e-commerce development in the world, the scientific literature distinguishes the following periods of its formation (Table B.1).

Thus, throughout history, we can see that trade has been a driving force for progress and a tool for spreading innovation and discovery. Moreover, modern international trade is tied to the economies of countries willing to participate in global trade. The welfare of some countries depends to a large extent on the trade activities that states carry out. In addition, the growth of the Internet is particularly important for the growth of e-commerce. It has been able to involve all people in the process, thereby extending its reach far beyond large companies.

Electronic commerce must be viewed in the perspective of markets within our economic system. Markets serve as exchange platforms. Supply and demand collide in this area. A market is thought to be made up of all organisations that are pursuing a particular objective and producing a certain good or service, as well as all organisations that are doing the same and acquiring the good or service. The trade of products and services happens within this market. When a market is competitive, it has many buyers and sellers, homogeneous products, easy entry and exit from the market, low switching costs for customers who want to select from a range of suitable products from competing firms, and the availability of perfect information. Each market requires information to work properly, and it is routinely shared between buyers and sellers during price

negotiations, for example. Perfect information means that customers will have all the knowledge they require to make informed, logical decisions about which products or services to buy in the market (for example, through advertising and news media).

1.2 Factors and models of development of infrastructure of international e-commerce

With the advent of the Internet, people realised that they had limitless possibilities for communicating and doing business around the world. By carving a niche for itself in the marketplace, e-commerce has not just made it easier and cheaper for producers, sellers and buyers to do business, it has radically changed the relationship between the consumer and the companies that offer them their goods and services.

The biggest and most important advantage of e-business is that it allows an interested company or individual to reach the global marketplace. It serves both national and international market needs. Your business is no longer restricted by geographical boundaries. With e-business, even small businesses can access the global marketplace to sell and buy goods and services. There are also no time constraints in doing business this way, as e-commerce allows you to transact 24 hours a day and even on public holidays and weekends, which in turn significantly increases sales and profits.

Today, online business has become so popular that more and more people are swapping their cramped offices and factory premises for a desk in front of their home computer. This type of business offers a huge advantage, as it allows you to work as long as your desire and patience allow. Internet commerce gives the individual the right to choose what time their workday begins and how long it lasts. In addition, it is possible to do business on the Internet from home and office, sitting in an armchair or resting somewhere by the sea. However, it's not all rosy, as online commerce is not a source of instant cash, but a job that requires a huge amount of dedication. Given the fact that information technology continues to evolve and encompass more and more industries, it can be assumed that there will be a periodic need for fresh ideas and insights into existing businesses [13].

The main areas of e-business distribution may include: trade, marketing, pre-sales, financial, insurance and banking, product development, maintenance and support, transport, shipping and supply, accounting, taxes, customs, etc. E-commerce in customer relations implements the principle of maximum customer satisfaction. It is based on three "pillars": a constantly updated database of offers of goods and services, organisation of mutual payments for goods and services and, finally, management of delivery channels.

Over the past decades, the Internet and e-commerce-related technologies have accelerated global economic development, providing new opportunities for businesses and consumers. However, the development of international e-commerce infrastructure faces numerous challenges and tasks that require the attention of economists and governments around the world.

One of the main factors affecting the development of international e-commerce infrastructure is the level of availability and quality of Internet connections. In countries with high availability and speed of Internet connections, e-commerce can develop faster and more efficiently. For example, in the European Union and North America, where Internet speeds and availability are high, e-commerce has a significant share of the retail market.

However, many countries with low availability and speed of Internet connections, such as those in Africa and Southeast Asia, face challenges in developing e-commerce. These countries require significant investments in the development of Internet connectivity infrastructure, including the construction and modernisation of telecommunications networks and other infrastructure.

Another important factor affecting the development of international e-commerce is the availability of a strong and reliable logistics infrastructure. This means that consumers and businesses must be able to deliver goods and services internationally quickly and efficiently. This includes the development of port and aviation infrastructure, the construction and expansion of trunk roads and rail networks, and the establishment of warehouses and distribution centres.

An important condition for the existence of e-commerce is the payment environment. In a networked economy, the competitiveness of its entities is determined

by the level of development and mutual integration of trade and payment instruments. The rapid pace of development of international e-commerce requires the introduction of modern payment solutions.

Another factor affecting the development of international e-commerce is the legal and regulatory infrastructure. Governments need to create favourable legislation for the development of e-commerce and ensure the protection of consumer rights and intellectual property. In addition, regulatory authorities should set security standards for e-commerce and enforce these standards.

Another important factor for the development of international e-commerce is cultural differences and language barriers. International e-commerce must consider cultural differences and language barriers in order to be successful in the international market [16]. For example, businesses should ensure that goods and services can be ordered in different languages and that customers can receive support in their native language.

In general, models for developing international e-commerce infrastructure should consider various factors, including technological development, logistics infrastructure, payment systems, legal and regulatory infrastructure, and cultural and linguistic differences. In addition, the models should ensure the integration of national and international infrastructure, including the creation of common standards for secure and efficient international trade.

International e-commerce has become an integral part of the modern economy. The growth in the use of the Internet and mobile devices has contributed to the rapid development of this industry. In this context, infrastructure is essential for the development of international e-commerce. In the international e-commerce industry, several models of infrastructure development exist:

- Model 1: Development of e-commerce infrastructure at the national level.

The development of e-commerce infrastructure at the national level includes the creation of a legal framework for e-commerce, the development of the Internet and the creation of electronic payment systems. An important component of the development of e-commerce infrastructure is the protection of intellectual property, which is key to ensuring the

security of electronic transactions. The development of e-commerce infrastructure at the state level requires cooperation between the government and the private sector.

- Model 2: Development of international logistics infrastructure [50]. The development of international logistics infrastructure covers all stages of the logistics chain, including picking, transporting, warehousing and delivering goods. An efficient logistics infrastructure ensures fast and reliable delivery of goods. [17] An important component of the development of international logistics infrastructure is the development of international transport networks, such as ports, airports, railways and roads. The development of these networks can provide convenient access to markets and ensure reliable and fast delivery of goods.
- Model 3: Developing information infrastructure. The development of information infrastructure includes the creation of information systems that process and transmit data, as well as the creation of electronic platforms for the sale of goods and services. The development of information infrastructure can provide convenient and quick access to information about goods and services and help to increase the number and variety of products and services available for e-commerce.
- Model 4: Developing social infrastructure. The development of social infrastructure consists of establishing social safety nets for consumers and sellers engaged in e-commerce, as well as creating platforms to enable communication between sellers and buyers. The development of social infrastructure can ensure security and trust in e-commerce, as well as ensure the efficient operation of the electronic exchange of goods and services.
- Model 5: "E-commerce 1.0" and "E-commerce 2.0". These models represent earlier phases of e-commerce development, focusing on the emergence of company websites for online sales (E-commerce 1.0) and the heavy use of social media and user sharing (E-commerce 2.0). The first model, E-commerce 1.0, encompassed the emergence of company websites for online sales. Beginning in 1995, the volume of global e-commerce gradually increased. However, during the first phase, the volume of e-commerce was only a fraction of global GDP. E-commerce 2.0 represented a period of

heavy use of social media and sharing among users. By the end of 2010, more than 30% of the world's population was registered on social media, and most users looked to feedback and recommendations from other users when making purchasing decisions.

- Model 6: "E-commerce 3.0", "E-commerce 4.0","E-commerce 5.0", "E-commerce 6.0". These models represent more recent phases of e-commerce development, characterized by the utilization of modern technologies and resources. E-commerce 3.0 emphasizes user-centricity, convenience, and access to a wide range of products and services. E-commerce 4.0 involves the use of artificial intelligence to enhance the customer experience and optimize business processes. In 2020, more than half of companies were using AI to improve the customer experience, and machine learning was enabling them to provide personalised recommendations and optimise business processes. E-commerce 5.0 focuses on the Internet of Things (IoT) technologies and data collection for personalized products and services. E-commerce 6.0 integrates virtual and augmented reality technologies to provide a realistic and immersive online shopping experience. E-commerce 6.0, linked to virtual and augmented reality technologies, offers consumers a more realistic and engaging online shopping experience. Forecasts suggest significant growth in this segment, with the VR/AR market expected to be worth $160 billion by 2023.These models reflect the continuous evolution of e-commerce towards more advanced and innovative approaches.
- Model 7: Integrated model. An integrated model of international e-commerce is a model that envisages the creation of an integrated system that combines various aspects of international e-commerce, such as logistics, customs procedures, payment systems, and others. The aim of this model is to ensure greater efficiency and lower costs for international e-commerce transactions.

The integrated model of international e-commerce involves different stages of interaction between buyers and sellers. At the first stage, the buyer orders goods through an online store or other electronic communication channel. At the second stage, the seller confirms the order and sends the goods to the buyer. At the third stage, the buyer receives the goods and can make payment through various payment systems.

As part of an integrated international e-commerce model, it is important to ensure international logistics, which includes the delivery of goods from one country to another. This may include the use of sea, air and land transport, as well as customs procedures. It is also important to ensure the safety of goods in transit, which may include protection against fire, theft and other dangers. In order to implement an integrated model of international e-commerce, it is important to ensure international cooperation between different countries and regions, in particular in the development of e-commerce infrastructure.

In general, infrastructure development helps to reduce barriers and constraints that reduce the efficiency of e-commerce and provide wider access to markets. The four models of infrastructure development discussed above are just some of the approaches to international e-commerce infrastructure development, but they can be useful for economists, researchers and practitioners in this field [51].

In addition, it is important to consider national and international legal and regulatory requirements that define the rules of e-commerce. For example, ensuring the protection of personal data and privacy, consumer protection, taxation and other legal issues. These aspects should also be considered when planning and developing international e-commerce infrastructure.

Thus, infrastructure development is key to the efficiency and development of international e-commerce. The development of logistics, technological, information and social infrastructure can provide convenient and secure access to markets and increase the number and variety of products and services available for e-commerce.

The development of electronic commerce is also having a significant impact on the international economy. Thanks to the widespread use of the Internet and the constant growth of technological development, e-commerce has become an important factor in increasing trade and accelerating globalisation. Here is a closer look at some of the key factors that influence the development of e-commerce on the international economy:

1. Expanding global access: E-commerce provides the ability to trade and conduct business transactions without geographical restrictions. The Internet allows businesses

and consumers from different countries to easily enter the global market, which contributes to an increase in international trade and accelerates globalisation processes.

2. Growth of international exports: E-commerce enables businesses to efficiently export their goods and services to the international market. This reduces the costs of traditional distribution, marketing and advertising, increases international sales and enhances the competitiveness of enterprises.

3. Changing business models: E-commerce is revolutionising business models, in particular by enabling the development of e-wholesale, e-marketplaces and online platforms. This reduces the cost of international trade, increases the efficiency and speed of transactions, and simplifies the search for partners and customers.

4. Creation of new jobs: The development of e-commerce requires specialists in technology, logistics, marketing, and other areas. This creates new jobs, contributes to the development of human capital and increases employment.

5. Changing consumer habits: E-commerce is changing the way people shop. Virtual stores and online platforms provide consumers with more choice, convenience and affordable prices. This contributes to an increase in international consumption and trade.

6. Increased competition: E-commerce creates a global competitive environment for businesses. Companies from all over the world can compete with each other in the global market, which stimulates the improvement of the quality of goods and services, innovation and price reduction.

7. Impact on logistics and supply: E-commerce is changing approaches to logistics and supply chain. Efficient delivery systems and logistics solutions are becoming critical to the success of e-businesses. This contributes to the development of logistics infrastructure, attracting new investments, and developing cross-border supply.

8. Security and regulatory challenges: E-commerce poses challenges in terms of cybersecurity, data protection and regulation. International security standards and norms of behaviour need to be developed to ensure that consumers and businesses have confidence in e-commerce.

All these factors make the development of e-commerce a significant influence on the international economy. It helps to increase international trade, create new jobs, change consumer habits and create new opportunities for businesses. However, it also poses security, regulatory and consumer protection challenges for governments and the business community.

1.3 Indicators and methods of research of impact of transport and logistics on international e-commerce

The international economy is a complex and dynamic system in which the interconnection of indicators and methods of transport and logistics research plays an equally important role. These factors have a major impact on the international economy and determine the efficiency and competitiveness of countries on a global scale.

One of the key aspects of the international economy related to transport and logistics is international trade. Transport infrastructure and logistics services are essential for the movement of goods across borders, which contributes to the growth of international trade. Studies conducted by economists show that improvements in transport infrastructure contribute to international trade and economic growth [62].

International e-commerce is the activity of buying and selling goods and services over the Internet between companies and consumers located in different countries. Such rapid growth of international e-commerce in recent decades would not have been possible without the use of transport and logistics, which play a key role in ensuring the fast and efficient delivery of goods.

The development of e-commerce is also having a significant impact on the international economy. More and more companies and consumers are conducting their transactions online, which has a significant impact on transport and logistics. E-commerce requires fast and reliable delivery of goods, efficient warehousing, and a reverse logistics chain. Researchers have noted that the development of e-commerce has a significant impact on logistics systems, which stimulates changes in transport and logistics processes [63].

One of the key indicators of the impact of transport and logistics on international e-commerce is speed of delivery. The quicker a company processes an order, the quicker the goods are ready for shipment, which increases customer satisfaction and reduces the likelihood of cancellations. Logistics companies must provide an efficient order-processing process that optimises delivery times and reduces logistics costs.

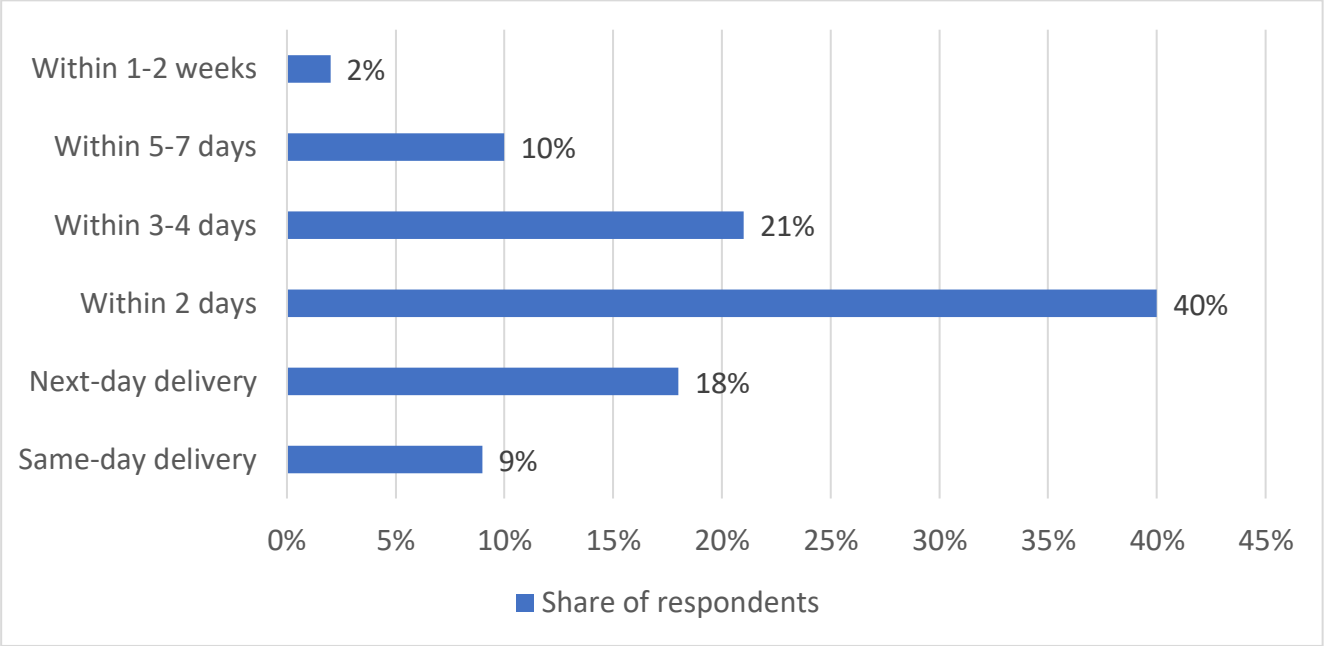

Figure 1.3 – Timeframe willing to wait for fast shipping according to U.S. consumers as of September 2019 [19].

According to the data presented on Fig. 1.3, 40 per cent of US holiday shoppers surveyed said they were willing to wait two days for orders delivered via speedy delivery. A total of 18 per cent were willing to wait the next day to receive an item when paying for the fast delivery option.

Today, many countries use the logistics audit methodology developed by the American company Logistics Field Audit, Inc. In its classical form, the LFA audit involves research in seven sections [20]:

A. Business scheme, mission and strategy.

B. Analysis of the product range.

C. Analysis of the inventory management system.

When assessing the maximum depth of stocks, a wholesale trade company takes into account not only stocks in its own warehouses and in transit. Also can see the dynamics of sales and the volume of stocks at retailers.

D. Analysis of the planning system

- planning structure;
- depth of inventory planning;
- analysis of seasonal fluctuations and marketing assessment of non-seasonal fluctuations.

E. Analysis of logistics costs

- Identify areas of hidden costs → reduce operating costs.

The main areas of hidden costs are: warehouse, inventory transport costs. A company does not always consider many of the determining parameters that lead to hidden costs. For example, the costs associated with processing reverse flows, which, according to experts of the international LFA network, account for up to 15% of the logistics budget for wholesale trade enterprises.

F. Analysis of IT support

Having analysed the company's IT support in the course of a logistics audit using LFA technology, it is impossible not to take into account that the task of an information system from the logistics point of view is not only inventory accounting, but also the management of goods flows. Since warehouse logistics plays the role of the main link in the management of stocks and goods flow at a wholesale trade enterprise, the issue of choosing an automated warehouse management system (WMS) has now become relevant. A common misconception of some managers is that the accounting functions of an accounting programme or similar programmes that record the movement of goods in a warehouse are sufficient to automate warehouse management. The WMS helps to make decisions (generate orders) in the process of warehouse operation when the complexity and speed of operations exceeds the capabilities of the human mind.

G. Analysis of the logistics service.

All sections have their own research structure, the purpose of which is to identify problem areas, define problem areas, determine the possibility of improvement, develop

ideas for improvement, develop the implementation of new ideas and technologies. The structure of the study is based on the basic principles of LFA [20].

- LFA principal No. 1: Clarity of alignment of the logistics management strategy with the global strategy of the enterprise.
- LFA principal No. 2: Localisation of logistics costs.
- LFA principal No. 3: Determination and constant accounting of logistics indicators.

Accounting and evaluation of logistics performance are becoming the main factors of continuous improvement on the way to becoming a leader in this area. Managers of wholesale trade companies often do not pay much attention to operational logistics. For example, many companies do not separate the logistics service for sales and the logistics service for supply. Warehouses (both in-house and outsourced) do not have a clearly defined concept and purpose - distribution, buffer, cross-docking, etc. At the same time, the load on operational logistics (both warehouses and transport) is constantly increasing and is not always planned and adequate.

By analysing factors such as inventory turnover, transportation costs, and warehouse efficiency, businesses can gain valuable insights into the impact on the cost of goods movement within their warehouses. To evaluate the performance of operational units, it is necessary to understand how the cost of goods movement through the warehouse is affected by:

- warehouse technology (how the warehouse operations chain is structured and how the resources of equipment, machinery and personnel are allocated)
- quality of warehouse management;
- internal losses: shortages and re-sorting;
- efficiency of inventory management;
- efficiency of the logistics service (timely transportation of goods in a given direction);
- the ability to plan warehouse loads (both within the daily schedule and taking into account annual fluctuations).

Logistics audit using LFA technology reveals the sources of excess logistics costs and develops a plan for optimising the logistics function by improving the functional efficiency of managing the company's logistics system, integration and close interaction of all links in the supply chain.

A comprehensive overview of the ratings for different countries is presented in Table B.1, serving as a valuable resource for assessing their readiness and potential as international e-commerce hubs. The Logistics Performance Index (LPI) enables countries to assess their domestic supply chain performance and identify areas for improvement, fostering efficient trade logistics activities. It allows for comparisons across 160 countries, providing valuable insights into the strengths and weaknesses of different regions. Similarly, the Ease of Doing Business Index (EDBI) provides an essential benchmark for countries to gauge their regulatory environment's conduciveness to local business operations. With rankings based on ten key areas, it offers valuable insights into the ease of starting and operating businesses, enabling policymakers to implement targeted reforms and enhance their country's competitiveness.

Indicators for e-government, internet accessibility, and postal development also emphasize the importance of digital infrastructure for promoting economic growth. The ability of a nation to use information and communication technology to provide public services is gauged by the E-Government Development Index (EGDI). Policymakers can pinpoint opportunities for e-governance improvement by analyzing website development patterns, telecommunications connectivity, online service delivery, and human capacity. The Inclusive Internet Index evaluates internet access's accessibility, affordability, relevance, and readiness, acknowledging its critical role in promoting social and economic inclusion. Similar to this, the Integrated Postal Development Index provides performance scores for factors like dependability, coverage, relevance, and sustainability, highlighting the significance of postal services in the era of e-commerce and assisting stakeholders and policymakers in enhancing infrastructure and efficiency.

The indicators and methods for investigating the impact of transport and logistics on international e-commerce are highly dependent on the efficiency of transport logistics in general. Transport is one of the most important components of logistics and its

efficiency can have a significant impact on the delivery of goods and services as well as on customer satisfaction. Various indicators can be used to measure the impact of transport on international e-commerce, such as delivery time, quality of packaging and delivery, cost of transport, etc. It is important to bear in mind that these indicators are directly related to the efficiency of transport logistics as a whole, including the choice of means of transport, route optimisation and logistics operations management.

Effective management of the supply chain relies on the efficient integration of various functions, and transport logistics plays a pivotal role by addressing key tasks related to market service areas, transport process organization, and inventory management within the overall logistics system. Transport logistics, as an integral part of the overall logistics system, helps to solve three main tasks of this system, namely the tasks related to:

1) formation of market service areas, forecasting of material flow, processing of material flow in the serviced system (supplier's warehouse, consumer's warehouse, wholesale trade enterprises) and other works on operational management and regulation of material flow;

2) development of a transport process organisation system (transportation plan, activity distribution plan, cargo flow formation plan, vehicle schedule, etc;)

3) inventory management and their maintenance by means of transport and information systems.

Based on the tasks of transport logistics, it is also possible to determine the main criteria for the efficiency of transport logistics (Table C.1.). These indicators can be used to get important insights into the effectiveness and success of a company's transport logistics operations. Businesses can monitor the Utilisation of Transport Capacities indicator to determine how efficiently their vehicles are being used, which results in better resource allocation and increased operational efficiency. Additionally, businesses can assess the financial success of their transportation logistics using the Profitability of Sales Channels indicator, which aids in strategic resource allocation and decision-making. A vital indicator of the calibre of a transport company's work, the reliability of delivery indicator promotes client happiness and trust. Companies can monitor the Total Public

Expenditure indicator to make sure that financial resources are allocated effectively and to spot opportunities for cost-cutting and investment optimisation. Finally, the Vehicle Performance indicator provides information on how effectively vehicles are used, helping businesses to increase productivity, cut expenses, and boost overall operational performance.

Costs and delivery time play a key role in choosing a mode of transport. Since costs are an evaluation criterion for determining the optimal technological scheme of transportation, it is impossible not to consider the fact that costs depend on the delivery time of the cargo. As the delivery time increases or decreases, transport costs also change. In addition, delivery time is one of the main indicators, as it defines the latest logistics concepts where time plays a key role.

On the other hand, the transit time is a good indication of the reliability of the chosen transportation scheme. In addition, reducing the delivery time usually gives a company a significant competitive advantage in the finished goods market. Therefore, it is worth setting the delivery time as a generalised parameter. Also, among the set of criteria used in solving the problems of organising transportation, the most interesting are

- delivery of cargo "just in time";
- duration of cargo delivery;
- costs for the carriage of goods;
- vehicle productivity;
- productivity of loading and unloading mechanisms;
- energy intensity of transport and technological operations;
- energy intensity of transportations;
- specific labour intensity of the complex of transport and technological operations;
- cost of transportation;
- profit from transportation.

Just-in-time cargo delivery is characterised by the satisfaction of customers' requirements for cargo transportation within the planned time. This is achieved through

the rational coordination of the operation of transport and systems that service and consume transport products, i.e. the service. The criterion is the actual time of delivery of goods, which should be less than the time specified in the contract for the carriage of goods. The actual delivery time affects the length of the material resources turnover period. Reducing it allows you to free up some of the material resources for further production use.

Nevertheless, the optimisation criterion chosen for the specific conditions of the task (determining the rational option for organising delivery) should reflect the results of production activities. For the carrier, the cost of delivery is of primary importance. One of the most important criteria from the point of view of the consumer of transport services is the total cost of delivering products from the supplier's warehouse to the consumer's warehouse, i.e. the reduced costs along the entire logistics chain. Consequently, the cost of transportation is more often chosen as an optimisation criterion. The cost of transportation is a general indicator of transport performance and represents the cost of performing a unit of transport products.

Some authors argue that the criterion of efficiency should be profit maximisation. However, such an approach may be focused on changing tariff policy and increasing the volume of services sold without implementing rational technological measures.

In conclusion, transport and logistics play an important role in international e-commerce by affecting the speed, reliability, accuracy and flexibility of goods delivery. Logistics performance indicators can be used to assess the impact of transport and logistics on international e-commerce. Research methods such as data analysis, surveys, expert assessments and competitive environment analysis can help in understanding customer needs and improving the quality of services of transport companies and logistics operators.

With the rapid development of technologies such as drones, autonomous cars and blockchain, we can expect significant changes in the transport and logistics industry in the future. Therefore, it is important to constantly analyse industry trends and changes in order to adapt your business processes and remain competitive in the international e-commerce market.

CHAPTER 2. RESEARCH OF TRANSPORT AND LOGISTICS IN DEVELOPMENT OF INTERNATIONAL E-COMMERCE

2.1 Key trends in development of transport and logistics infrastructure of international e-commerce

The international economy is significantly impacted by trends in the creation of logistics and transportation systems in e-commerce. Logistics and transport have been slower to embrace digital transformation than other industries. However, due to the global pandemic, the growth of e-commerce and the decline of offline retail, the traditional supply chain and logistics activities had to change. Companies are facing rising costs, struggling to scale their processes, unable to predict demand, and relying heavily on manual labour. And now is the time for innovation and trends.

Nowadays, e-commerce is used by most countries in the world, which was not possible before. It has helped global markets grow significantly and has given developing countries a new opportunity to interact with each other (Figure 2.1).

According to eMarketer's 2021 Global E-Commerce Report, Latin America showed the leading growth (36.7%), up from 23.2% in 2019. The lowest growth is observed in the Middle East and Africa - 19.8%, but this is still a growth rate.

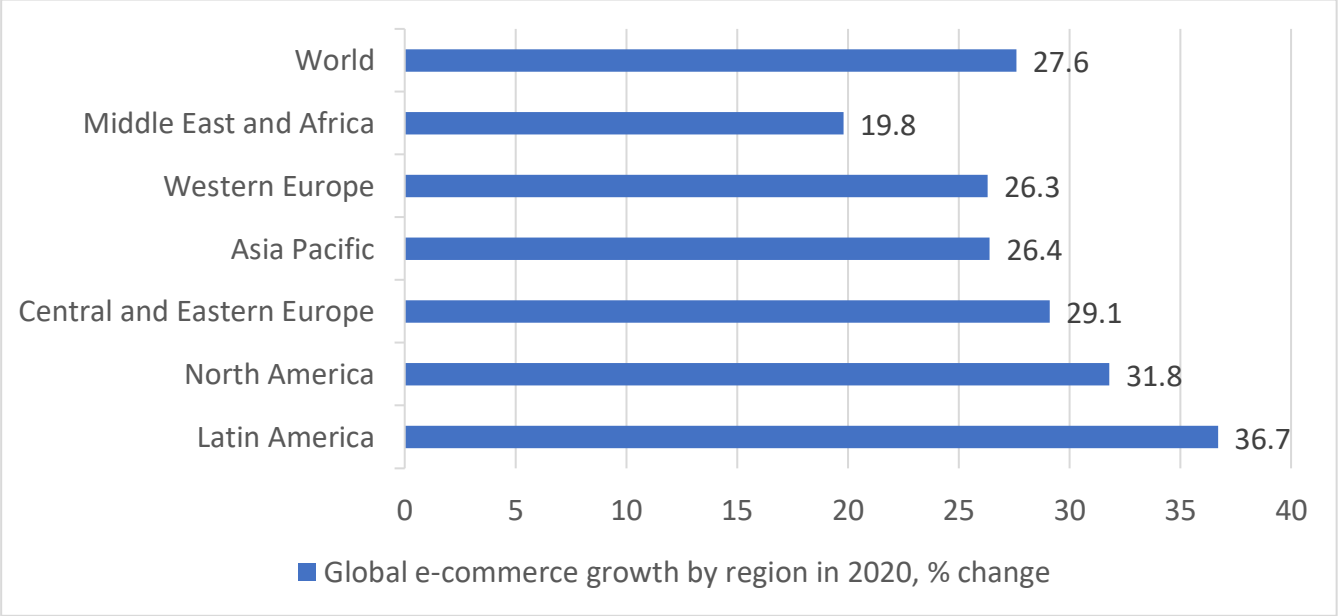

Figure 2.1. – Global e-commerce growth by region in 2020, % change [14].

The Logistics Trend Radar shows that innovations in logistics will correlate with social and business trends, as well as technological advances. Logistics companies are planning to automate as much as possible, make their processes more flexible and increase the resilience of their operations [22].

The way customers conduct business has changed dramatically in the past few decades, especially when it comes to digital transactions. The world of e-commerce payments saw a dramatic change in 2019 as a result of the dominance of digital and mobile wallets. These modern payment options outpaced conventional credit cards, which held a market share of 24.2% (Figure 2.2) during the same time period, accounting for 41.8% of all global e-commerce transactions.

The simplicity of usage, convenience, and security of digital wallets have contributed to their popularity. Customers may make secure online payments with just a few clicks on a smartphone or other internet-capable devices, doing away with the need for physical cards or cash. The online payment business has changed due to this seismic upheaval in consumer behaviour, which has also ushered in a new era of digital trade.

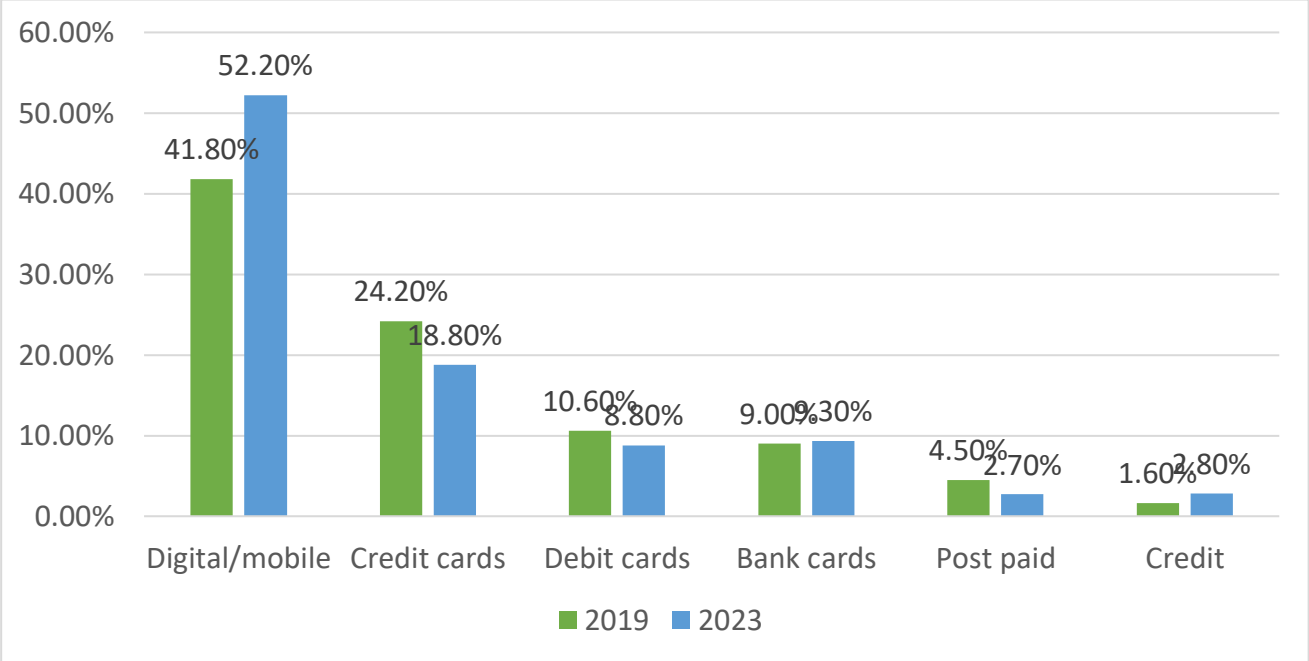

Figure 2.2. – E-commerce payment methods in 2019 and 2023 by share of transaction volume [15].

According to predictions, the use of digital wallets will grow much more in the years to come. Digital wallets are predicted to account for a larger portion of the

worldwide e-commerce payment business by 2023, growing to 52.2% (Figure 2.2). By surpassing credit cards and other traditional payment methods, this would firmly establish their place as the most popular online payment method globally.

However, when talking about the subject of payment systems, it is crucial to take the bigger picture into account. Even though e-commerce and digital wallets have grown significantly over the world, several nations still struggle to build strong payment infrastructure and networks. The growth of domestic and international e-commerce is severely constrained by the lack or underdevelopment of these platforms.

In recent years, several significant global trends have emerged, shaping the landscape of this industry. Understanding these trends is vital for businesses, policymakers, and stakeholders involved in international e-commerce.

The first and major trend of our time is digital transformation in logistics. The evolution of logistics is closely linked to the use of digital technologies. The development of communication tools and server systems has led to the possibility of regular exchange of all major types of documents in electronic form between participants in the transport process. The introduction of electronic document interchange (EDI) allows for the automatic storage and exchange of shipping documents. The advantages of using EDI include a simplified document flow scheme, preliminary paperwork, reduced paperwork costs, fast document transfer, and the ability to track cargo to its destination.

E-declaration is an important area of digitalisation, with the transition to the use of cloud technologies expected to dramatically increase the speed of transport logistics through the unified storage of customs declarations in the cloud. The use of cloud technologies by customs offices allows them to improve logistics efficiency, such as streamlining customs declarations and speeding up customs clearance. DAAS (Data as a Service) - is already a reality today. Data exchange between carriers is a new service [23].

Barcoding and electronic (RFID - Radio Frequency Identification) coding of goods, their packages and containers are of great importance for improving the efficiency of logistics, making it possible to locate and identify goods at any time. Such systems allow for unambiguous identification of cargo units (pallets, containers, etc.) throughout the supply chain; prompt and reliable input and receipt of information about goods, cargo

units, packaging, etc.; automated accounting for the availability, movement and consumption of goods; monitoring and control over product promotion; automated electronic document processing; cost reduction, simplification and acceleration of the procedure for collecting, processing and fulfilling customer orders and inventory management procedures.

One of the successful concepts in digital logistics is digital logistics centres (DLCs), which are the basic elements in servicing international transport corridors. The key areas in which DLCs can help logistics companies succeed are [24]:

- electronic exchange of data (documentation) and other various transport information, etc., will speed up the delivery of goods;
- supply chain planning will ultimately reduce logistics costs. Flexibility is becoming an important criterion for manufacturers to succeed - they are trying to reduce inventory, store less in warehouses and produce directly to order;
- inventory management will help to reduce the volume of stocks;
- planning of multimodal transport (special computer programs will help to choose the optimal route and modes of transport, calculate the cost of delivery). Due to the widespread use of smartphones, to increase its competitiveness, a logistics company can create mobile applications that can be used to calculate the time and cost of delivery or storage of cargo;
- prompt response to road conditions and queues at borders using computer systems will help increase throughput. Due to the increase in the number of vehicles, traffic congestion and long queues at the borders are a problem today. To reduce this negative effect, various mobile applications have been developed that show the situation on roads and borders in real time.

The rapid development of the digital economy has led to a reduction in inventory at all stages of production and consumption, which will change production systems around the world. Consumers are seeking individualisation of the goods and services they consume. The system characteristic of the traditional approach to production, in which a manufacturer first produces products according to a plan and later sells them - "production

for the warehouse" - is being replaced by a system characteristic of the logistics approach to production, in which a manufacturer starts production only after receiving a specific order - "production to order". Implementation of the latter requires significant changes and improvements to the company's existing logistics, digitalisation of processes and the establishment of closer partnerships with suppliers and consumers. Following the concept of just-in-time production, most international businesses seek to build long-term relationships with suppliers and reduce their number. As a result of such close partnerships, the company receives material resources and products of the required quality, increases the flexibility and reliability of supplies, and creates a single digital space that can be used to switch to a Vendor Managed Inventory (VMI) system.

Organising mass production to order is not always possible for various reasons, so the method of "delayed production" or "deferred product differentiation" is widespread in global practice, when the distribution system receives either almost finished products or products in basic configuration, which, after receiving a specific order, are modified to be ready to meet all requirements. The use of this method significantly reduces the volume of product inventory.

The organisation of e-commerce logistics is another important trend. Online shopping and the expectation of fast and free delivery of goods puts new pressure on logistics: Internet trade or e-commerce is growing at a rate of 20% per year. E-commerce is driving demand for modern transport and logistics services and a new generation of warehousing facilities In the US and the UK, online sales account for around 10% of total retail turnover, while in China, France and Germany they account for around 5%.

The average receipt represents the amount of money spent by consumers in a particular country on various services accessed through online platforms, including but not limited to entertainment, travel, education, and professional services (Figure 2.3). The Czech Republic tops the list with a $32.40 average receipt, with Italy coming in second by a $2 difference. By examining their success factors and identifying the underlying trends, we can gain a comprehensive understanding of the evolving e-commerce landscape in Europe and its impact on economic growth and consumer behaviour.

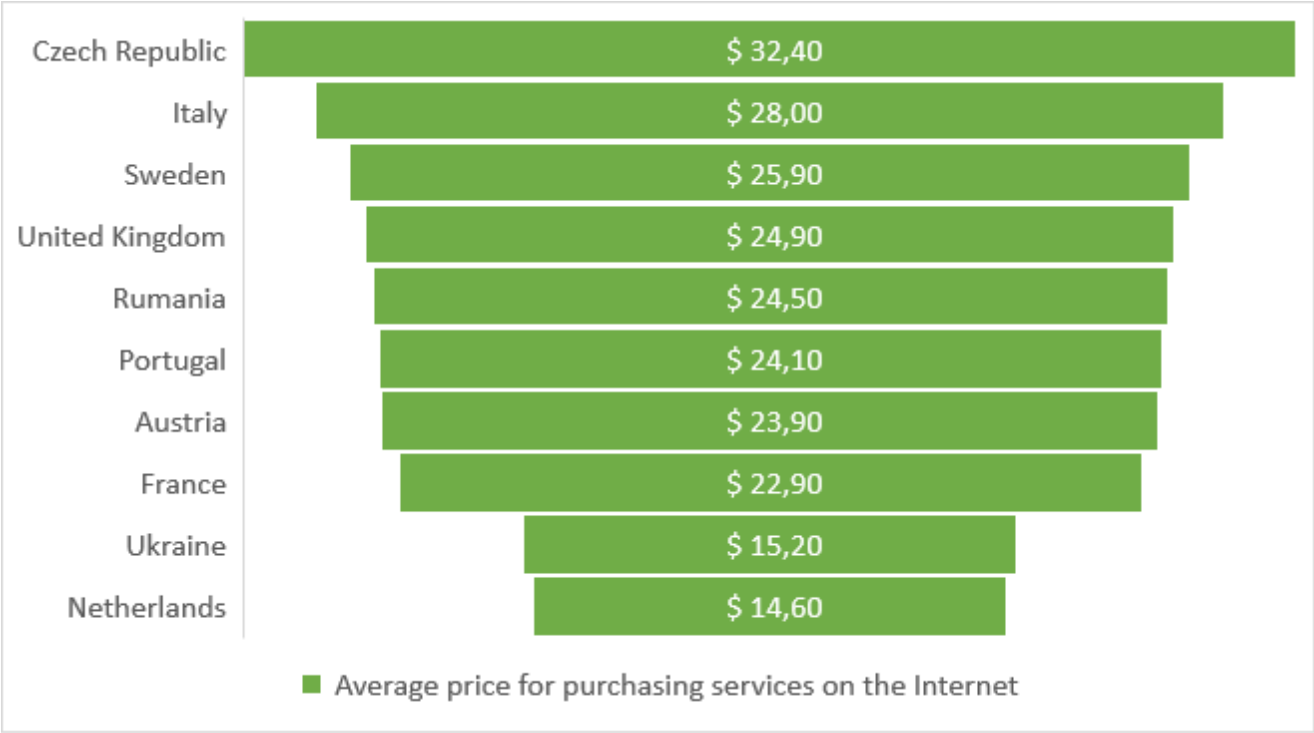

Figure 2.3. – Top 10 countries in Europe by average receipt for the purchase of services on the Internet, 2021, in USD [25].

The average check of Ukrainian users to pay for online services grew by 134% in 2021. It now stands at UAH 410 ($15.2). By this indicator, Ukraine is among the top 10 European countries (Figure 2.3).

According to data from Admitad, the trend of increasing demand for online services is global - in 2021, the number of orders increased by 38% and their amount by 40%. Ukraine, in turn, is outpacing global trends - the amount of sales in this sector in the country increased by 86% over the year. The rapid growth of cross-border e-commerce at an average annual rate of around 20% is leading to an increase in the share of express deliveries and the construction of logistics warehouses for customs storage of bulk goods (which are mainly Chinese) and requires digital transformation of the industry (electronic document management, warehouse robotics).

The third trend in modern transport logistics is containerisation, i.e. the constant growth in the volume of cargo transported in containers. Since the 70s of the last centuries, containers have been used as one of the most advanced methods of international cargo delivery, which allows for a high degree of cargo safety, significantly reduces transportation and storage costs, and increases delivery speed.

The main container traffic is concentrated in the Asia-EU-North America triangle, which accounts for more than 60 million TEU, of which about 25 million. TEU between Asia and North America and about 8 million TEU between the EU and North America. TEU between the EU and North America. Most container traffic is carried out by sea (about 1.8 billion tonnes). The price of shipping a container from China to the US or the EU is approximately $1,000 [26].

The fourth trend is the monopolisation of transport and logistics companies through concentration of ownership, including mergers and acquisitions. Mergers and acquisitions have become dominant in the transport and logistics services market in recent years. This has resulted in the emergence of transport and logistics giants that provide customers with geographical diversification of logistics services. For example, in maritime transport, more than 80% of the volume of cargo transported is accounted for by the 20 largest shipping companies, such as Maersk Sealand, P&O Nedlloyd, Evergreen, and CMA CGM, which were consolidated through mergers and acquisitions. The same trend is typical for air transport, where the majority of cargo passenger traffic is accounted for by several dozen of the largest airlines.

Table 2.1 – Efficiency of supply chain management [27].

Directions for improving efficiency	**Sources of efficiency improvement**
Efficient logistics practices contribute to an increase in the number of orders and improved demand stability.	Improved planning accuracy through unified information channels, synchronisation of business processes, joint demand forecasting, and reduced time to market for new products.
Implementing streamlined logistics processes leads to reduced insurance stocks.	Improving the quality of operational management through continuous monitoring of the entire supply chain, timely identification of deviations and disruptions in the supply chain.
Effective logistics management reduces risks and enhances the reliability of plans and deliveries.	Reduction of marketing and logistics costs by eliminating business processes associated with uncertainty in procurement and warehousing.
Optimized logistics operations result in reduced overheads and transaction costs.	Implementing effective inventory management practices, such as just-in-time (JIT) inventory systems and demand forecasting, can help reduce inventory holding costs.

Mergers and acquisitions of transport and logistics companies are driven by the need to integrate the activities of all supply chain participants towards a common end goal - quality customer satisfaction, as opposed to optimising the local function of each chain participant. It is possible to improve the efficiency of supply chain management by increasing:

- planning accuracy through synchronisation of business processes, unified information channels that allow, among other things, forecasting demand
- the quality of operational management through continuous monitoring of the entire supply chain and timely response to deviations (process disruptions) that arise;
- efficiency of business processes that help reduce logistics costs.

An important modern process that facilitates integration is the growing share of direct express deliveries from producer to consumer, bypassing intermediaries and intermediate storage. Direct delivery saves money by reducing inventory and costs associated with storing stock in the supply chain, shortening order fulfilment times, and helping consumers access a wide range of products directly from the manufacturer (express delivery companies such as FedEx, UPS, and DHL).

The fifth trend is the growth of requirements for quality indicators of international transport logistics and customisation of production. The globalisation of the world economy has led to a significant increase in competition. In the past, companies competed with companies operating in the same city, but now their competitors are companies located not only in one country but also around the world, even on other continents.

Now, a company entering the international market must meet the global level in all respects. This has significantly increased the requirements for international logistics, which includes not only the transportation of goods between companies located in different countries, storage of goods in transit, customs procedures, but also the organisation of coordinated work of providers involved in delivery. The main current trend in manufacturing is customisation, i.e. providing products with properties and parameters in accordance with the requirements of a particular consumer, which also imposes new requirements on logistics, including the coordination of deliveries with the requirements of individual products.

Currently, customers of logistics companies increasingly prefer companies that provide not only low prices but also better services, making price a secondary consideration. Increasingly, priority is being given to such logistics performance indicators as speed and timeliness of delivery, reliability, flexibility, complexity and customisation of services.

The company's competitive advantage is provided by high-quality management of the entire range of transport and logistics services for the support of goods, including information on the condition and location of goods at any given time. The logistics chain bridges the gap between procurement and supply by integrating them into a single process. Modern requirements for door-to-door and just-in-time delivery of goods imply a reasonable price for logistics services, which, in addition to the price of transportation (usually intermodal), includes remuneration for the transfer of logistics information, container rental, consignment consolidation, deconsolidation and storage fees.

The seventh trend is an increase in investment in logistics and transport start-ups by venture capital funds. Recent years have seen a sharp increase in venture capital in promising logistics start-ups, more specifically in new technologies for warehousing and robotics of warehouse operations, electric transport, drones and digital solutions. Similar to fintech companies, the term logistics companies have emerged. Logistics companies are trying to create not only new technologies, but also new business models for logistics, such as Uber Freight, based on the sharing of transport [28].

The eighth global trend is eco-friendly logistics and sustainable transport. The logistics industry is responsible for its environmental impact. Environmental requirements for logistics systems are increasing every year. Bans are being introduced on the use of vehicles that pollute the environment, generate high noise levels, and are not equipped with special systems to reduce the risk of driving and manoeuvring. The logistics industry is becoming increasingly carbon efficient.

E-commerce is placing new demands on logistics. Demand stimulates the formation of the logistics services market and the development of logistics operators. Trends in the domestic logistics services market show the development of this market in line with the rhythm of the country's economy; consolidation of existing and emergence

of new domestic logistics operators; emergence of foreign logistics operators in the market, which drives the dynamics of construction of high-quality warehouses.

2.2 Analysis of impact of transport and logistics infrastructure on the development of e-commerce in European economy

E-commerce's explosive rise has changed how trade is done on a global scale as well as among local economies. The crucial role that transport and logistics facilities have played in promoting the growth of e-commerce in Europe has been evident. The smooth flow of goods and services in the e-commerce ecosystem depends on the effectiveness and efficiency of the transportation networks, distribution hubs, and related logistics systems. Therefore, it becomes crucial to examine how the infrastructure of transport and logistics affects the growth of e-commerce in the European economy.

Beyond just logistical concerns, understanding how transport and logistics infrastructure affects e-commerce in Europe is important. It includes broader economic ramifications such as the generation of jobs, ease of trade, and general competitiveness of European companies on the international market. An efficient transport and logistics infrastructure can increase market access, lower prices, and speed up delivery times, promoting international trade and allowing companies to reach a larger client base.

E-commerce has grown to play a major part in the European economy. For some customers, purchasing online has become more natural than waiting in lines at brick-and-mortar establishments. By using metrics like e-GDP and the percentage of people who buy online in various cultures, the newly released research "2022 European E-commerce Report" by Amsterdam University of Applied Sciences and Centre of Market Insights analyses the role of e-commerce (Figure 2.4). The percentage of GDP that is produced by e-commerce is represented by e-GDP [25]. The greater the number, the more significant online trading is to that nation.

As shown in the graph above, the share of e-commerce in the European economy was 3.92% in 2021 and is projected to account for 3.7% in 2022. As a comparison, the spending on defense in Europe amounted to 2 % of GDP in 2022.

The projected decline in the percentage of E-GDP in Europe in 2022 can be explained by several factors. Firstly, market saturation may lead to demand saturation, as most consumers have already made the transition to online shopping. In addition, changes in the regulatory environment, such as new consumer protection or taxation rules, may create additional barriers to e-commerce. Changes in consumer preferences and increased competition may also contribute to a decline in the E-GDP percentage. Given these factors, it is important to understand that e-commerce remains an important sector, but its impact may vary depending on economic and social conditions.

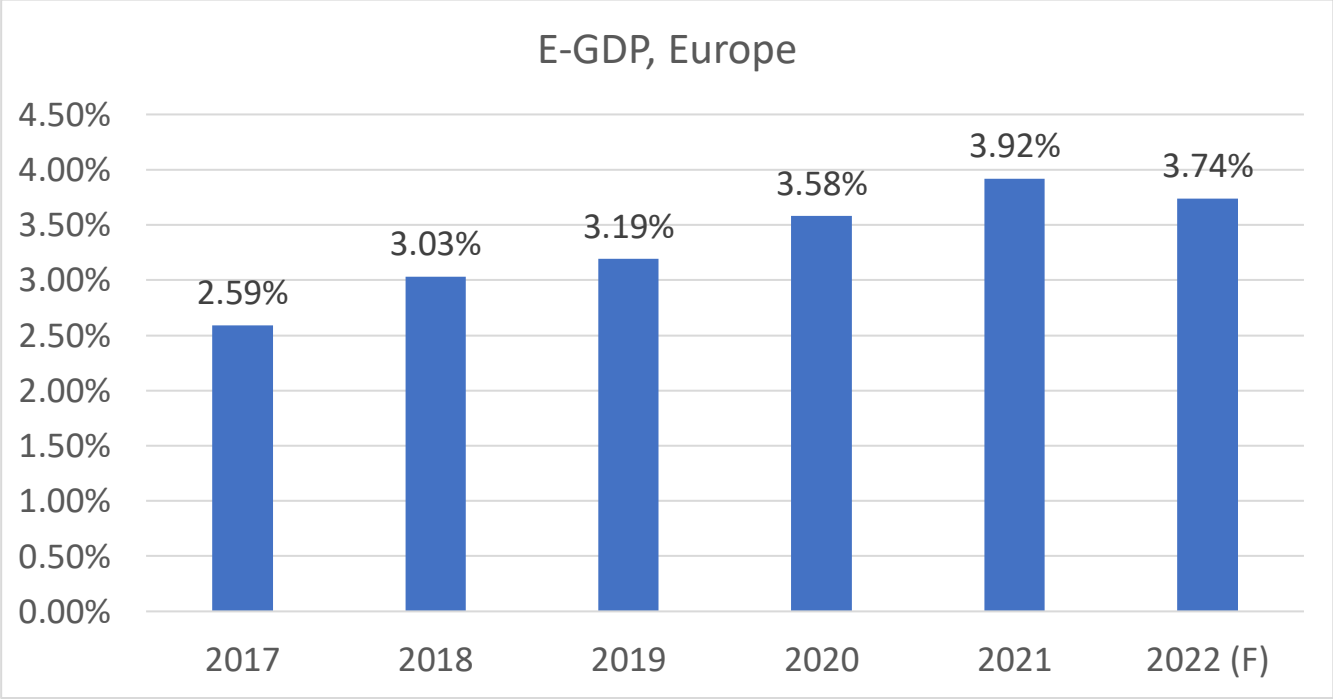

Figure 2.4 - The percentage of GDP comprised of e-commerce sales in Europe, 2017-2022 (Forecast) [25].

In recent years, e-commerce has significantly expanded and changed across Europe, propelled by a variety of causes such as rising internet penetration, rising mobile usage, and shifting customer behaviour. Additionally, cross-border e-commerce has been growing in Europe, where it is expected to reach $55.47 billion by 2026, with a compound annual growth rate (CAGR) of 11.71%.

The Netherlands (92%), Denmark (90%) and Ireland (89%) had the greatest percentages of internet users who made purchases or orders for goods or services online in 2022 (Figure 2.5). However, only 49% of Bulgarians had done any online shopping.

In the EU, 75% of those between the ages of 16 and 74 who used the internet in 2022 made purchases or placed orders for personal use. The percentage of online shoppers increased by 20 percentage points (pp), from 55% in 2012 to 75% in 2022.

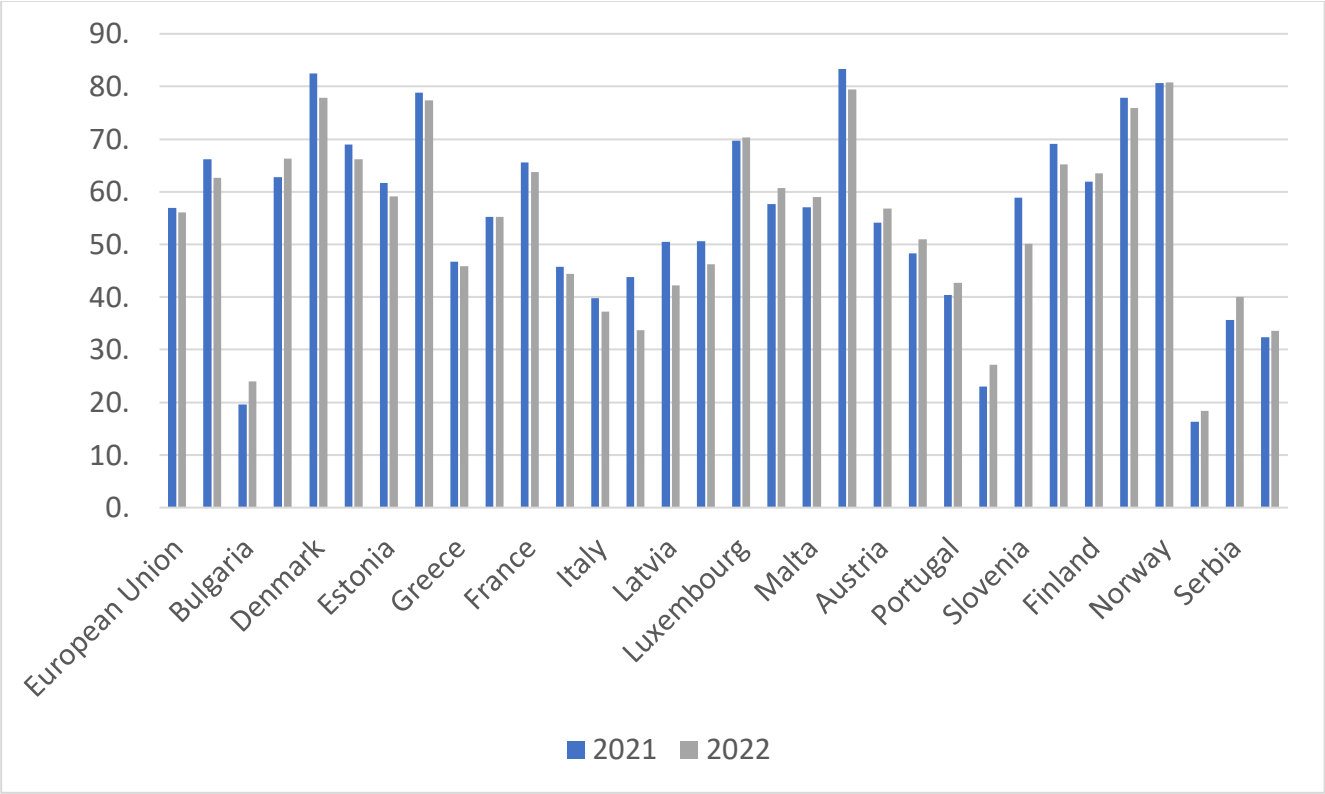

Figure 2.5 – Internet purchases by individuals, 2021-2022 [29].

The European Union has become a major force in the field of business-to-consumer (B2C) e-commerce in today's globally interconnected world. With the combined economic power of its 27 members, the EU-27 has made a name for itself in the digital economy. The EU's e-commerce economy has shown extraordinary endurance and expansion, even in the face of the difficult Covid-19 pandemic and the upheavals that resulted from the United Kingdom's exit from the EU single market.

The EU-27 had a strong increase in e-commerce turnover in 2021 despite the pandemic measures being gradually lifted (Figure 2.6); this outstanding growth rate of 16% was recorded. This development highlights the EU's digital market's adaptability and tenacity, which have allowed it to flourish despite unforeseen difficulties.

Additionally, as more people in the EU-27 access the internet, more people are developing online shopping habits. Incredibly, it is predicted that 76% of internet users

would shop online in 2022. This indicates how consumers are coming to accept and trust e-commerce and are increasingly favouring the convenience, choice, and accessibility provided by online shopping platforms.

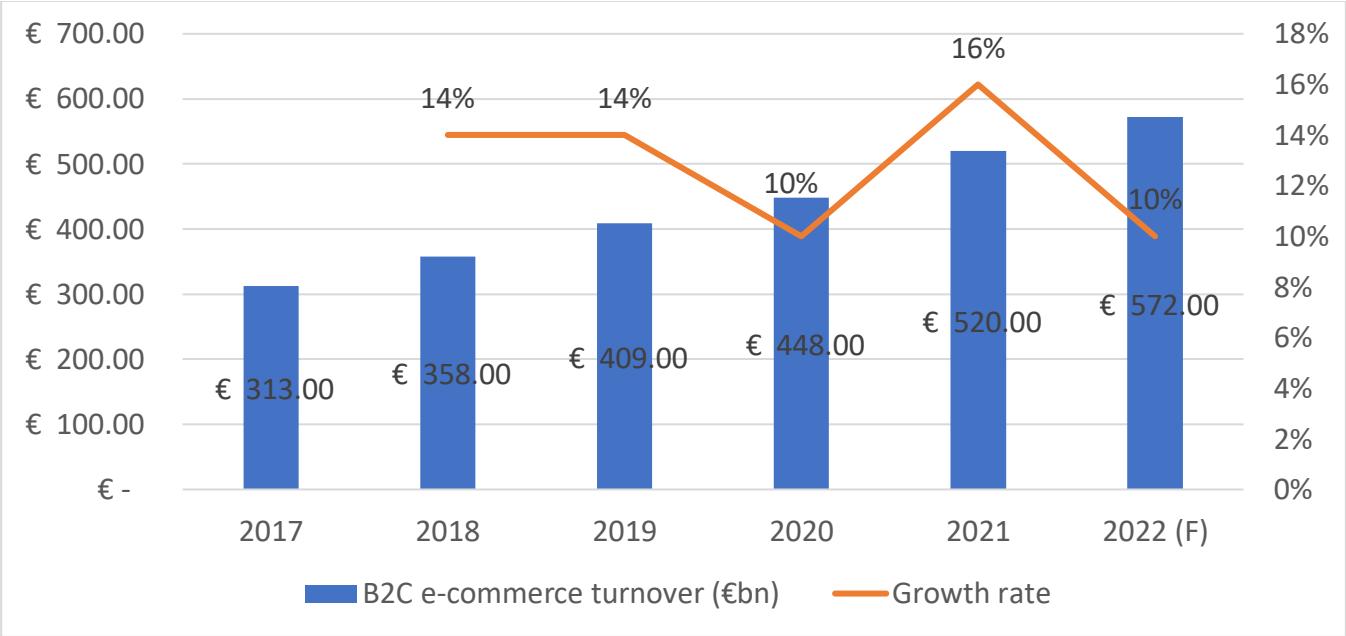

Figure 2.6 – B2C e-commerce turnover (€bn) in EU-27 countries, 2017-2022 [25].

E-commerce has firmly established itself in the European economy and society following the peak of the COVID-19 pandemic. Two general tendencies can be found. On the one hand, online sales are returning to normal and stabilising after an unprecedented 2021. E-commerce parcel volumes climbed on Black Friday and Cyber Monday (BFCM) 2022 by only 64.2%, which is noticeably less than the 69.7% growth seen the previous year. This 7.89% reduction in growth is consistent with our forecasting report's predictions, which predicted a decline in Europe's parcel volume increase during peak season 2022 ranging from 5.3% to 20.1%.

On the other hand, due to the impact of many variables including the conflict in Ukraine and a pervasive sense of uncertainty, consumers are taking a cautious approach to their spending. Nevertheless, despite this pattern, the digital commerce industry has proven remarkably resilient, as e-commerce revenues have only slightly decreased. Additionally, during the past year, the online services sector, which includes e-tourism, events, and tickets, has shown continuous signs of revival.

Many advanced economies will reach what some refer to as "economic tipping point" in 2023. Due to the combination of skyrocketing prices, intensifying geopolitical tensions, and swiftly rising interest rates, global consumer confidence has suffered greatly. Families all over the world are being compelled to drastically reduce their spending in all areas due to a tremendous impact on their personal budgets.

Europe will be among the regions most impacted by a consumer slowdown in 2023, claims Retail Economics. Due to their relatively high rankings in the Shopper Sensitivity Scorecard (Figure 2.7), which ranks important developed nations using a combination of consumer sentiment and official economic benchmarks, the United Kingdom and Germany have particularly dim development prospects.

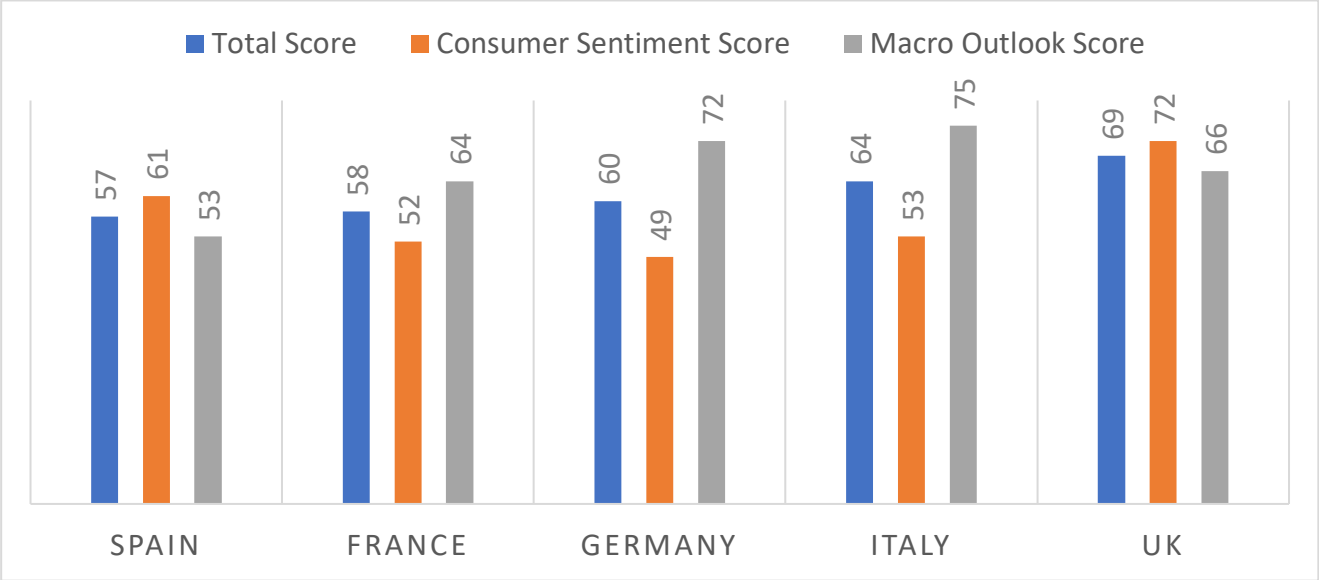

Figure 2.7 – Shopper Sensitivity Score, 2023 [30].

Approximately 57% of European businesspeople anticipate the same or better trading conditions in 2023 than in 2022, despite the economic slowdown and bleak overall outlook. In the meantime, as part of their efforts to thrive in this fiercely competitive market, retail enterprises all over the region are also investing in cutting-edge technologies to provide personalised shopping experiences and better delivery alternatives. As economic pressure grows, consumer expectations for online buying are shifting quickly, favouring value over convenience (such as delivery time and location).

During the pandemic, convenience became a primary concern for online purchasers. Customers who were "stuck at home" were anxious to have what they wanted,

when they wanted it, whether it be ultra-rapid delivery, contactless pick-up, or selecting precise delivery slots - and many were willing to pay for the opportunity. However, when consumers' priorities shift and financial concerns overshadow Covid-19 anxieties, the cost of delivery is unquestionably the most crucial conversion element (Figure 2.8).

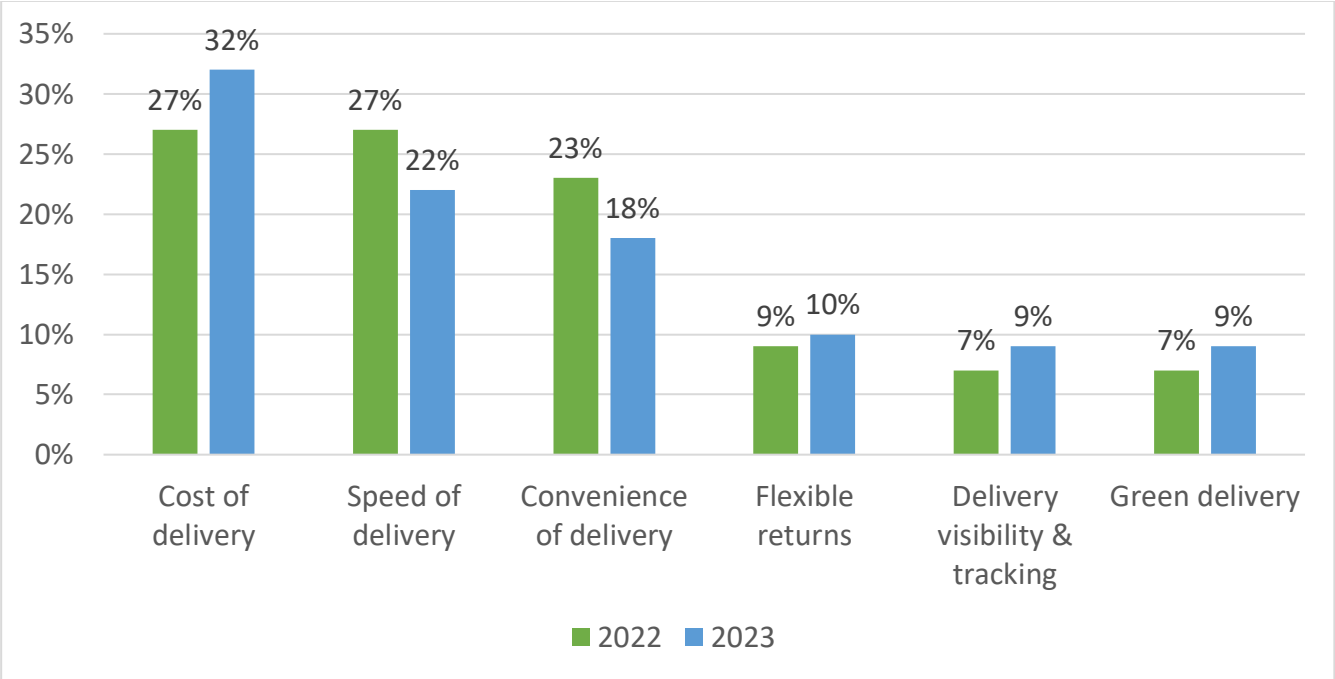

Figure 2.8 – Cost of delivery rises in importance for online shoppers in 2023 [31].

Several sizable e-commerce logistics firms with global operations are based in Europe. The most popular logistics operators in Europe are [49]: DHL, FedEx, UPSTNT, Express, DB Schenker, GLS, Hermes, PostNL, DPD, Royal Mail.

According to the International Road Transport Union's (IRU) most recent study (Figure 2.9), which was published in 2022, there is now a shortage of 380,000 truck drivers in Europe, which represents around 10% of the overall demand. The IRU has estimated that this gap could rise to 14% by the end of the year.

A shortage of truck drivers could lead to delays in the delivery of goods and increased delivery costs, which could affect e-commerce. For example, many online retailers offer free delivery on a certain order threshold and if delivery costs increase due to a shortage of truck drivers, this could affect the attractiveness of these offers to shoppers.

Moreover, a shortage of truck drivers can have an impact on logistics networks and warehouse operations, which can lead to delays in order processing and an increase

in the time it takes to prepare goods for shipment. This can cause problems for e-shops that are seeking to process orders quickly and meet customer needs.

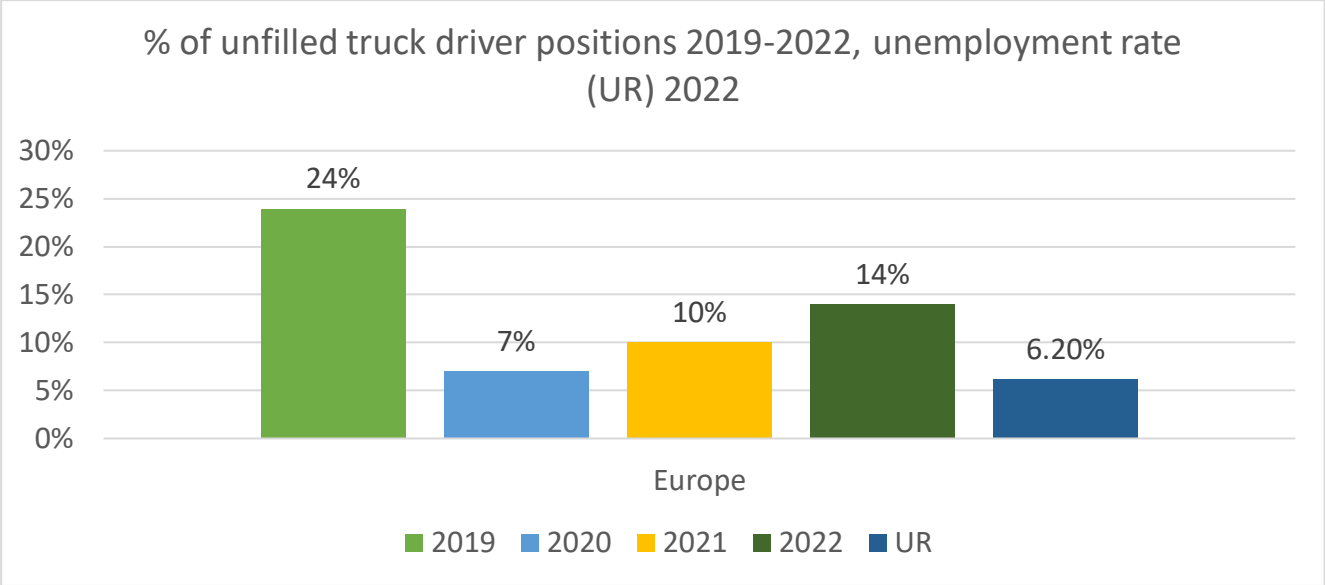

Figure 2.9 – Percentage of unfilled truck driver positions 2019-2022, unemployment rate (UR) 2022 [32; 33].

Overall, a shortage of truck drivers could have a significant impact on e-commerce in Europe, causing delays in the delivery of goods, higher delivery costs and problems with logistics networks and warehouse operations. This underlines the need to develop strategies to address the shortage of truck drivers, including increasing the number of drivers and improving working conditions in the industry.

Numerous European merchants are looking into non-traditional delivery options to fill their e-commerce orders as a result of the pandemic-induced e-commerce boom and the constantly evolving demands of modern consumers. In Europe, there are more than 336,000 PUDO stations, 43,000 of which are automated parcel machines (APMs), according to Last Mile Experts. Additionally, research reveals that since mid-2019, PUDO points have increased by 40% in the European Union and the United Kingdom.

Belgium used collection points (CPs) the most in 2022 (Figure 2.10), with a utilization rate of 8.7%, followed by France (7.3%), Germany (7.1%), and the Netherlands (5.4%). With the exception of France, all of the aforementioned markets saw a decline in CP consumption according to our historical data. The largest decrease, however, was seen in Germany, where the percentage of packages transported to

collection sites fell from 12.2% in 2021 to 7.1% in 2022, a huge 41.7% decrease. The neighboring countries of Belgium and the Netherlands, whose CP usage fell by 2.69% and 14.6%, respectively, also showed a declining trend.

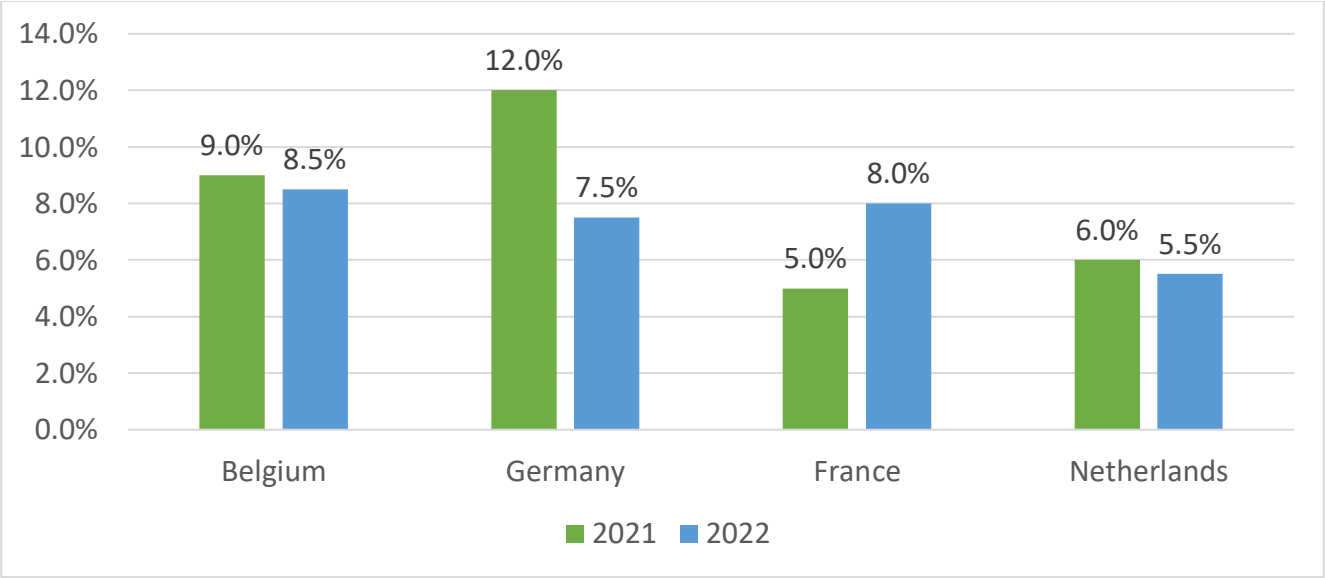

Figure 2.10 – Collection Points Ratio 2022 in comparison with 2021 [34].

According to plans by La Poste Groupe to install 50 smart lockers in 45 metro and RER regional train stations in Paris by the end of the first quarter of 2022, there was a 14.6% increase in CP usage across France at the same time. It can be concluded that e-commerce will continue to grow and have a significant impact on European logistics, driving demand and changing distribution strategies. While Germany and the Netherlands will remain at the top of the e-commerce market, the fastest growth will be in Eastern Europe. Existing online retailers will continue to expand their warehousing facilities in the coming years, while new market players will be looking for suitable premises and delivery operators. In the coming years, we will see both online and omni-channel retailers rethink their warehousing and delivery strategies. Developers and 3PL providers who can quickly adapt and change their offerings will be in high demand.

2.3 Effectiveness of strategies for development of transport and logistics infrastructure of international e-commerce

The development of e-commerce is impossible without the active participation of the international economy. Increasing globalisation and technological advances in information technology are creating unique opportunities for businesses and consumers to trade goods and services over the Internet. International e-commerce is estimated to be growing rapidly and is expected to continue to grow.

According to the United Nations International Trade Centre (UN/CEFACT), global e-commerce reached $29.8 trillion in 2022, representing a 10% increase year-on-year [62]. This impressive growth confirms the importance of e-commerce as a key driver of international trade and economic growth.

In the context of international electronic commerce, understanding consumer preferences and concerns is crucial for developing effective strategies. The Figure 2.11 presents data on individuals' preferences and concerns related to online shopping in five different countries: Netherlands, Croatia, Hungary, Poland, and Portugal.

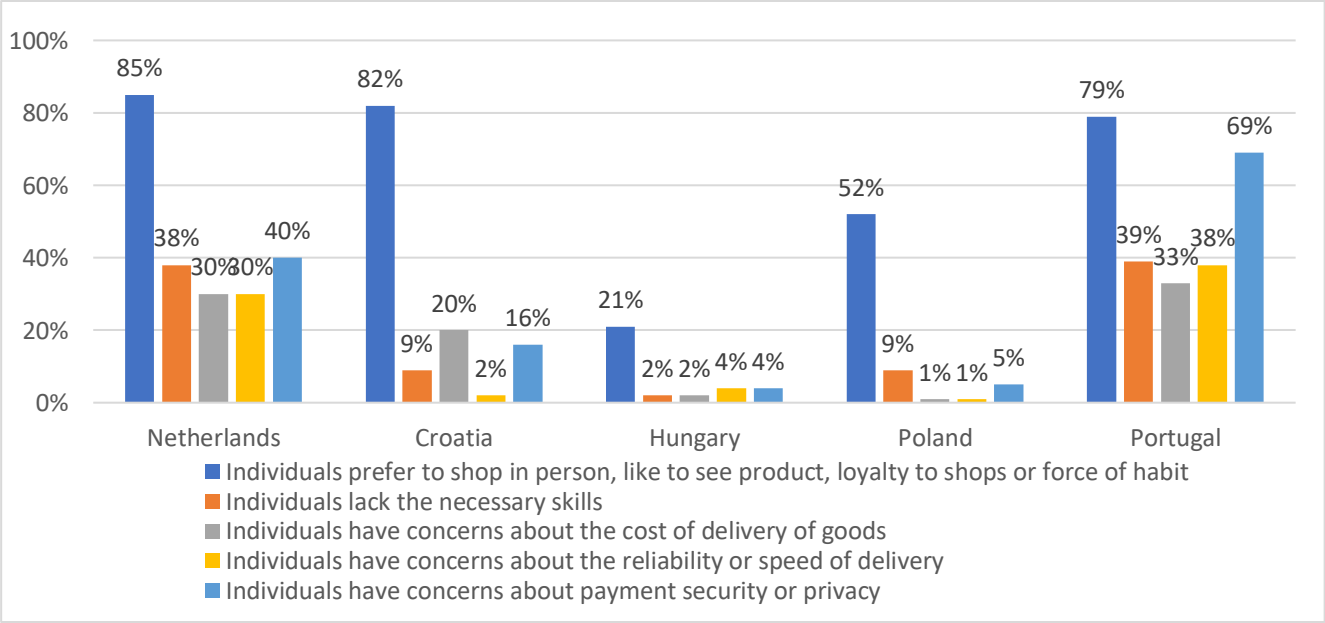

Figure 2.11 – Barriers to online shopping in Netherlands, Croatia, Hungary, Poland, and Portugal, 2022 [25].

The Figure 2.11 shows unique patterns and variances in preferences and concerns. For instance, higher percentages of people prefer in-person shopping experiences in

nations like the Netherlands and Portugal (85% and 79%), highlighting the value of hands-on connection with goods. Hungary, on the other hand, has a significantly lower number (21%), indicating a less strong preference for in-person shopping. There are also differences in digital literacy levels, with Poland and Hungary showing smaller percentages of people without the abilities needed for online purchasing (2% and 9%) than the Netherlands and Portugal (38% and 39%). These statistics show how different customers' levels of digital readiness.

Online shopping-related issues often reveal regional trends. Portugal stands out for having particularly high rates of people who are concerned about delivery costs (33%) and payment security or privacy (69%). Poland and Hungary, on the other hand, have smaller percentages in these categories, indicating less of a problem. For instance, only 2% of people in Hungary are worried about shipping costs, while 4% are worried about payment security or privacy. These discrepancies are a result of regional variations in things like logistics infrastructure, trade agreements, and cybersecurity measures.

The development of transport and logistics infrastructure in e-commerce is a key success factor for companies involved in this area. In its e-commerce activities, "Zammler Ukraine" LLC is one of the entities that directly experience the impact of the effectiveness of transport and logistics infrastructure development strategies.

Currently, Zammler is a 3PL (Third Party Logistics) operator, which includes warehousing and additional services, as well as the use of subcontractors. According to the information on Zammler's official website [65], the company's current development direction is to develop 4PL services: full integration of its own resources, capacities, and technologies with those of a partner in the supply chain.

The company is actively expanding its warehouse space, which currently amounts to 80,000 m² in Ukraine through the construction of its own warehouse and is also expanding its warehouse space in Poland to 5,000 m². The company is actively working to gain the largest market share among service operators in Ukraine, services in Poland are developing rapidly, the company is working to improve the quality and flexibility of services and is conducting an active marketing campaign. The rolling stock is represented by modern vehicles: Volvo, Renault, Volkswagen, Hyundai, Citroen, MAZ with a

carrying capacity of 0.5 to 25 tonnes. According to its strategy for 2017-2022, the company is actively developing representative offices in Poland and China, and plans to expand its geographical presence by exploring the markets of Kazakhstan and the United States to open representative offices, which will help attract even more customers in the future.

To assess transport logistics, it is worth considering in more detail the indicators of transport logistics of the enterprise to identify problem areas of the company's development (Table 2.2). The return on investment in logistics infrastructure - an indicator that characterizes how effective the investment in logistics is - is 105%, which means that investments in logistics pay off and bring profit. It has also been determined that logistics costs account for 58.6% of the total cost structure, which is the average figure for a transport company. The indicator of transport capacity utilization, which characterizes the actual utilization of transport capacities and reflects how efficiently the company uses vehicles, is 80%, which means that the company should pay attention to the efficiency of vehicle use and take measures to improve this indicator. The profitability of sales channels - reflecting how efficient the sales channels are - is 515% and indicates that the sales system is paying off.

Table 2.2 – Transport logistics efficiency of Limited Liability Company "Zammler Ukraine" in 2020.

Indicator	Indicator value, 2020
Utilisation of transport capacities	80%
Profitability of sales channels	515%
Reliability of delivery	92,07%
Total public expenditure	3500
Vehicle performance	75%

Source: compiled by the author based on [Table C.1; Table D.1].

The indicators of supply reliability and the number of "perfect orders", which are key not only for the company but also for the end consumer, are 92.07% and 91.94%, respectively. This indicator is high, but in order to increase the company's competitiveness, it is also necessary to pay attention to possible ways to reduce the risk of loss, damage, and late delivery of products to the end user. The total economic costs of the enterprise amount to UAH 3,500 thousand per year, which is a moderate indicator for

a transport company. Vehicle productivity is 75% and is moderate, but this indicator also requires attention for optimization.

As shown in Table 2.3, the largest part of the expenses of Limited Liability Company "Zammler Ukraine" is road transport, which increased by 39,73% in 2020 compared to 2019, followed by air transport - UAH 2632 thousand, followed by rail transport - UAH 1289 thousand, then sea transport, total expenses - UAH 1189 thousand in 2020.

Table 2.3 - The transport costs of company "Zammler" by type of transport in 2018-2020, thousand UAH

Type of transport	Years			Absolute deviation		Relative deviation	
	2018	**2019**	**2020**	**18/19**	**19/20**	**18/19**	**19/20**
Car transport	2196	2402	3356	206	954,1	9,38	39,73
Railway	1123	1234	1289	111	55	9,88	4,457
Air transport	1952	2345	2632	393	287	20,13	12,24
Sea transport	989	1002	1189	13	187	1,31	18,66
Total transport costs	6259,5	6982,5	8465,6	723	1483	11,55	21,24

Source: compiled by the author based on [65].

These figures can be explained by the fact that the largest share of traffic is accounted for by road transport, as it is mobile, relatively fast, highly maneuverable, and the company is increasing its vehicle fleet every year. Air transport itself is an expensive mode of transport, but since it has a high speed of transportation, can be transported over long distances, and the company is engaged in international transportation, this mode of transport is in demand. Given the disadvantages of rail transport - irregularity of transportation, inaccessibility, the company carries out a smaller share of transportation by this mode of transport, however, when there is a need for large-sized transportation, the company uses this mode of transport. Relatively rarely does the company uses sea transport relatively rarely due to the low speed of transportation, dependence on weather conditions, and low frequency of shipments.

For a variety of financial reasons, the success of initiatives for the development of the transport and logistics infrastructure in global e-commerce is crucial. A well-developed transport and logistics infrastructure is essential for promoting frictionless trade and enabling companies to access international markets in today's interconnected global economy, where e-commerce has seen unprecedented growth. It supports global trade by bringing together customers and merchants from different countries and continents [35]. A strong infrastructure system eliminates trade barriers, improves market access, and lowers transaction costs by offering effective and dependable transportation networks, storage facilities, and distribution channels. These elements not only encourage economic growth but also competitiveness, investment, and job creation, positioning nations and companies for long-term success in the quickly developing global e-commerce market.

1. Infrastructure Investment: Investing in transport infrastructure is a key tactic for fostering global e-commerce. Strong transportation infrastructure, such as highways, ports, airports, and railroads, makes it easier to move goods, lowers transportation costs, and improves supply chain effectiveness. According to statistical evidence, e-commerce activity is more common in nations with superior infrastructure. For instance, a World Bank study discovered that a 10% improvement in infrastructure quality is linked to a 1% rise in e-commerce sales.

2. Multimodal Connectivity: Another successful tactic for promoting global e-commerce is the development of multimodal transportation options. Delivering goods across borders can be done more efficiently and with greater flexibility by integrating various means of transportation, such as air, sea, and land. Statistics show that nations with highly developed multimodal connectivity typically have higher levels of international e-commerce transactions. For instance, the quantity of international express deliveries and the caliber of the transportation infrastructure were found to be positively correlated in the Global Enabling Trade Report from the World Economic Forum.

3. Cross-border Trade Facilitation: For international e-commerce to run smoothly, effective cross-border trade facilitation measures are essential. The efficiency of transport and logistics infrastructure can be greatly increased by streamlining customs

procedures, lowering trade barriers, and harmonizing laws. According to statistical data, the expansion of e-commerce is positively impacted by simplified customs procedures. For instance, according to a study by the United Nations Conference on Trade and Development (UNCTAD), cutting the average customs clearance time by one day can improve e-commerce exports by up to 2.6% [36].

4. Adoption of Technology: Adopting technology-driven solutions is essential for optimizing the transport and logistics network for global e-commerce. Inventory management, route optimization, and tracking capabilities are made more effective by automation, data analytics, and artificial intelligence [37]. Statistics show that e-commerce performance is positively impacted by technology usage. Companies that use advanced analytics for logistics operations can save costs by 15-20% and enhance service levels by 10-15%, according to a McKinsey analysis.

5. Collaboration: A successful logistics and transportation infrastructure depends on cooperation between e-commerce enterprises, logistics service providers, and transportation operators. Partnerships make it possible to share knowledge, assets, and networks, resulting in integrated supply chains and smooth operations. Although there is a lack of precise statistical evidence on the effects of collaborative partnerships, case studies indicate that they can improve logistics efficiency, save costs, and increase customer satisfaction.

The aforementioned tactics are successful in creating the transportation and logistics network needed to support global e-commerce. Efficiency and performance are increased through investments in infrastructure, multimodal connectivity, cross-border trade facilitation, technology adoption, and cooperative partnerships. Statistics show a favorable association between the expansion of e-commerce and these techniques, proving their value in promoting global trade [38].

These tactics ought to be given top priority by policymakers if they want to create an atmosphere that supports global e-commerce. Although statistical evidence supports the efficacy of these measures, it is crucial to take into account country-specific elements such institutional capacity, geographic location, and degree of development.

Governments and pertinent stakeholders must modify their strategies in light of their unique situations [39].

Furthermore, to make sure the adopted tactics remain effective, regular monitoring and evaluation are essential. Regular evaluations of infrastructure quality, trade facilitation policies, acceptance rates for new technologies, and cooperative partnerships can shed light on areas that need further development and improvement.

In conclusion, the success of global e-commerce depends on the growth of the transportation and logistics infrastructure. Infrastructure investments, multimodal connectivity, the facilitation of cross-border trade, the adoption of new technologies, and cooperative partnerships have all shown to be helpful in increasing efficiency and fostering the expansion of e-commerce. To ensure these methods' sustained efficacy in the dynamic global e-commerce landscape, it is crucial to take into account country-specific characteristics and continuously assess their impact. Countries may create an atmosphere that encourages international trade and supports the expansion of e-commerce by putting these methods into practice and improving them, which will be advantageous to firms, consumers, and the entire economy.

2.4. Current state and perspectives of development of transport and logistics infrastructure of e-commerce in Ukraine

The rapid development of logistics owes much to online commerce. It was with the massive emergence of online stores that the need arose to deliver the purchased goods to the customer quickly and safely. Today, the transport and logistics component is an integral part of the e-commerce market.

The coronavirus pandemic and subsequent massive quarantine restrictions have led to the so-called sofa revolution, when most people buy goods online. And this growth is quite dramatic. According to a study by EVO, in 2020, the e-commerce market in Ukraine grew by 41% and reached UAH 107 billion. In 2022, affected by all the goings-on, e-commerce volumes declined. But in April of the same year, the segment began to

revive. According to Admitad (Fig. 2.12), in February 2023, sales almost reached the figure of February 2022.

According to Admitad's research, in 2022, there will be a significant increase in the average amount of online purchases. The average receipt in the e-commerce segment in Ukraine grew almost by a factor of two to $33. Ukraine is currently ranked fourth in the top 10 European countries in terms of the average receipt size:

- Italy - $43.30
- Sweden - $35.61
- Netherlands - $33.09
- Ukraine - $33

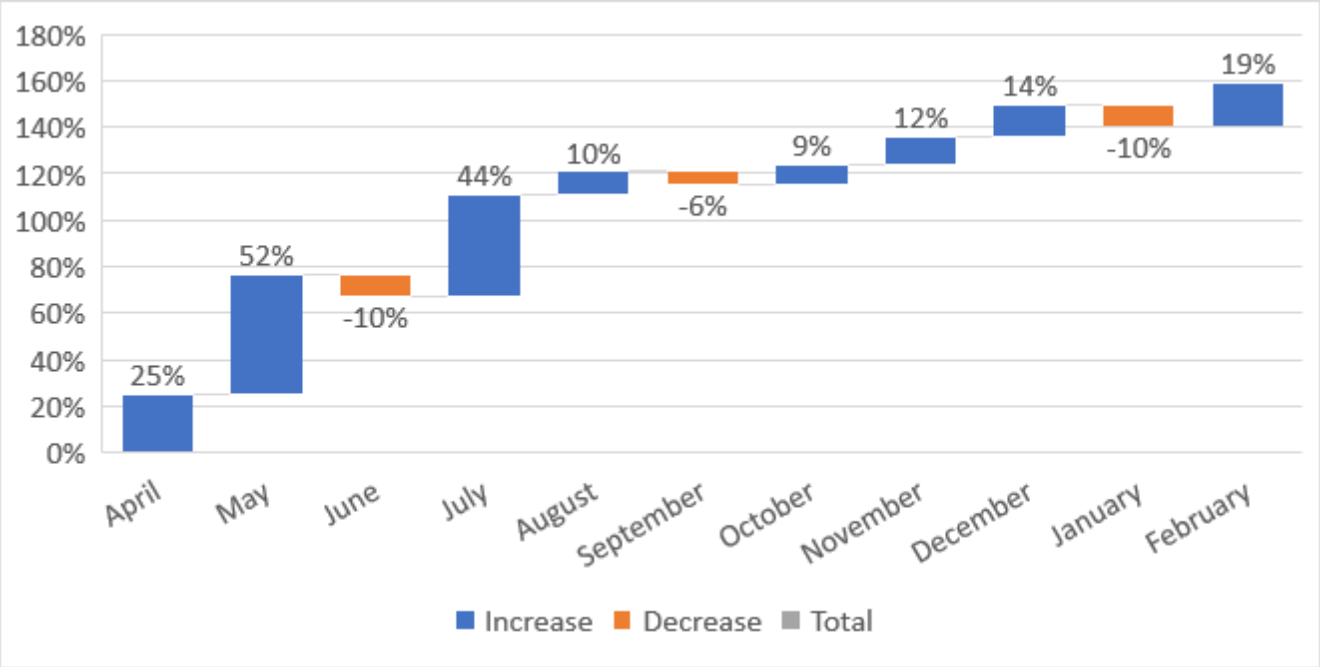

Figure 2.12 – Growth in the number of e-commerce orders since April 2022 [41].

It is safe to say that the growth of the logistics and e-commerce markets will equalise in a few years. In addition, it is worth noting that after the introduction of quarantine measures, logistics became more expensive for small and medium-sized businesses, in particular, this led to an increase in operating costs, as large 3PL providers do not systematically work with small companies.

E-commerce is based on a model of business processes that operate on the Internet. After analysing the work of companies, we can determine the specifics of online trading operations:

- the ability to keep records of transactions using cloud technologies and distributed data processing;
- virtual offer of goods is supported by appropriate graphic objects and web resources; small size of storage space;
- high level of information technology support for customer communication; high level of integration with other services, such as control of the product promotion chain, access to virtual social networks, payment schemes, etc;
- conducting operations without "territorial binding";
- mobility of operations in customer relationship management;
- elimination of psychological barriers between the seller and the buyer during virtual communication.

At the same time, solving the problems of administration and coordination of sales, storage and transportation processes in virtual relations with the client is entrusted to a well-functioning e-commerce logistics system. New opportunities have led to increased requirements for the use of Internet resources, resulting in:

- new cost items for administration and management of information flows;
- problems with synchronisation of virtual orders and deliveries of materials within the infrastructure
- shortage of professional content providers on the Internet;
- problems with the formation and communication support of web resources.

E-commerce logistics can be defined as the optimal management of the distribution of goods and related flows from the supplier to the end consumer by synchronising them in the virtual space. The success of e-commerce logistics depends on the efficient use of information resources and the entry of an online store into the digital economy [42].

The end consumer of the logistics system is always dispersed at different distances from the point of sale, and choosing the right delivery policy will help to reduce storage and transportation costs. Therefore, large retail chains whose business is built on digital platforms are trying to enter into agreements with delivery operators to coordinate networks according to the territorial and cost characteristics of the consumer. The main

issue that e-commerce logistics addresses is redirecting the flow of customers from a real trading floor to an online store. This process is the basis of logistics technologies, such as:

- delivery technology: the availability of delivery centres;
- pick-up, availability of own vehicle fleet with routing;
- technology with the ability to automate the warehouse process, use robotics, artificial intelligence;
- technology of interaction with customers;
- digital codes to identify customers and goods.

Today, e-commerce logistics should be based on a management mechanism that includes the following mandatory components:

1) forecasting online demand, considering the range of goods and Internet traffic on the network;
2) availability and monitoring of personalised loyalty programmes for regular customers;
3) development of an operations management system - cost planning;
4) development of an online warehouse management system and network information infrastructure;
5) organising access to the electronic payment system.

It is worth noting that there is always no direct contact with the buyer, and therefore the information content should have a special impact. That is, the presentation of the product and its promotion on the market should be based on the image component and a price that can compete with the current retail price.

Customers often choose popular logistics companies that have extensive experience and high reliability for transportation. According to the analysis of market in 2022, the most popular logistics operators in Ukraine are: “Ukrposhta”, “Nova Poshta”, “Justin”, “MistExpress”, “Autolux”, “Zammler”, “Raben”, “Kuehnel+Nagel” and “NP Logistic”. According to other studies conducted by EVO in 2021, Nova Poshta was recognised as the most popular logistics company. And this was a fairly predictable result, as 97% of the surveyed customers use Nova Poshta's logistics (Fig. 2.13).

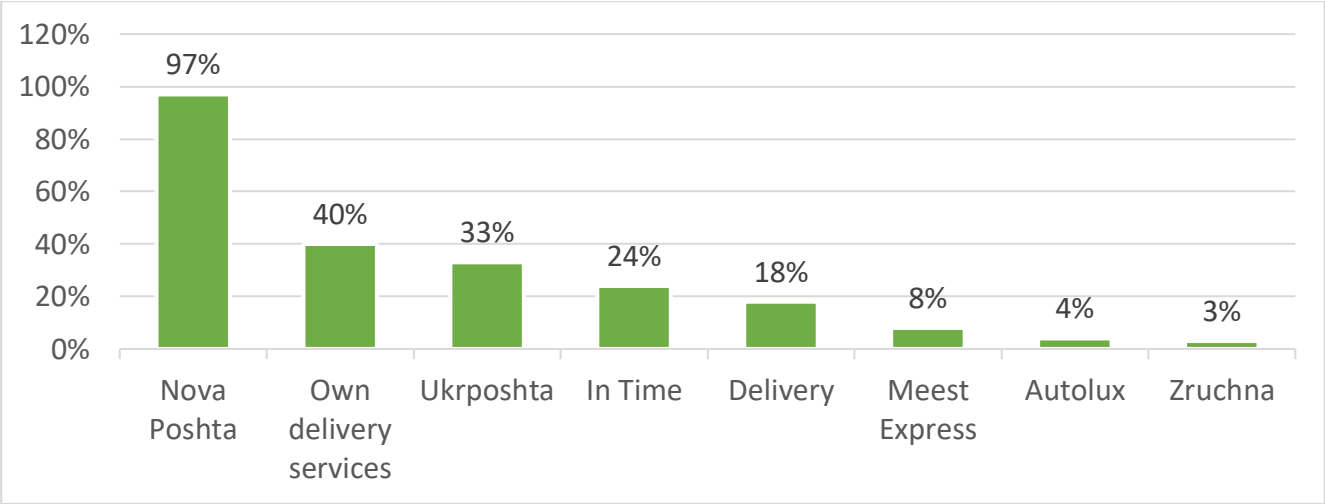

Figure 2.13 – Popularity of delivery services among Internet retailers [43].

The closest competitor of Nova Poshta is Ukrposhta (33%). The least popular are Autolux (4%) and Zruchna (3 %). However, the popularity of logistics operators shown in Figure 2.13 does not reflect the full and real picture of the assessment. After all, the result is significantly influenced by the number of people participating in the survey. For example, Nova Poshta received the highest score (8.45 points), but it has significantly more customers than, for example, Delfast, which received the lowest score of 3.47 points (Figure E.1).

In order to analyse the state of e-logistics in Ukraine and obtain more qualitative assessments of logistics companies' work with online stores, it is necessary to expand the number of respondents. However, there is virtually no official statistical data on the development of the logistics industry and e-commerce in Ukraine. Today, there are a sufficient number of companies providing logistics for online stores in Ukraine. And each of them has both advantages and disadvantages. Each client can choose a company that meets the criteria that are suitable for a particular customer. Thus, each customer can choose what is currently a priority for him or her: price, delivery speed, location of branches, availability of a loyalty programme, etc.

Most attention is paid to the availability of the service, i.e., the location of the company's branches. Today, Ukrposhta has the largest number of branches in Ukraine - more than 11,000 and Nova Poshta - more than 8,500. And the smallest number is with Autolux, with only 52 branches.

For Delfast and Zruchna, it is not relevant to have many separate branches at all, as their specialisation is targeted delivery. And these companies have the fastest delivery speeds, as Delfast couriers deliver parcels in Kyiv on electric bicycles, and Zruchna delivers orders in addition to Kyiv, in Kharkiv and Dnipro and between these cities. Customers often choose logistics services based on delivery time. Today, Ukrposhta delivers parcels to the addressee in 4-6 days, which is the longest time, although it has an option that customers do not often use - express delivery. The parcel's journey time here is only 1-2 days [45].

Nowadays, each of the operators can track the parcel's location using a mobile app. It is also possible to interact and connect software systems using the API interface.

All logistics companies, except for Mist Express, have their own customer loyalty programmes. The principles of incentives vary, including crediting money to a bonus account, discounts on time intervals (Ukrposhta's Happy Hours programme), etc [46].

The newest service today is fulfilment, but currently only Nova Poshta can offer it. Only this company can offer all the necessary operations from the moment a customer places an order to the moment he receives the purchase.

An exotic service offered by logistics companies for the e-commerce market is sending several products to choose from. This service is quite convenient because the buyer can choose only the product that really suits him or her. The niche for this service is free, as there are no companies specialising in this option. Another service is interval delivery, which allows customers to choose an hourly interval to receive their delivery. This function is available in all major logistics providers, except Ukrposhta and Mist Express [47].

Having analysed the positive and negative factors that influence the development of e-commerce of enterprises and logistics structures in Ukraine, we see that today e-commerce in Ukraine has stable development indicators. However, there are certain barriers that may hinder positive changes in the logistics system. Positive and negative factors are presented in Table 2.4.

Table 2.4 – Positive and negative factors affecting the development of e-commerce in enterprises and logistics structures in Ukraine [48].

Opportunities	Threats
Growth of online customers;	High level of competition in the market;
Availability of e-commerce platforms and marketplaces;	Insufficient security of information for its storage;
Development of new market segments;	Influence of macro factors: economic, political and cultural environment;
Rapid business growth;	Unfair competition;
Impact on the target audience through advertising channels is more cost-effective.	Insufficient customer support and after-sales services.

Thus, in today's e-commerce market, the segment of small and medium-sized online stores has great opportunities to choose efficient logistics services tailored specifically to their needs. The key to the success of a logistics company can be the service of simultaneously servicing dozens or hundreds of online stores. The logistics or transport provider that can be the first to offer such a package of services will win the logistics market. Modern logistics and transport companies in Ukraine have every chance to develop their business in the new segment of digital commerce, as they have all the tools and modern methods of operation.

CONCLUSION

The research conducted on the topic of transport and logistics support for the development of international e-commerce has shed light on the critical role played by transportation and logistics infrastructure in facilitating the growth and success of e-commerce on a global scale. The results of this study have provided essential details about the theoretical underpinnings, significant developments, and efficacy of strategies for the growth of transport and logistics infrastructure in the context of global e-commerce.

The following conclusions can be made on the basis of the research:

1. E-commerce is divided into B2B, B2C, C2C, B2G, and C2G segments. It has evolved through formation, fragmentation, development, standardization, and the emergence of online retailing. It significantly impacts the national economy, enabling companies to engage with authorities. E-commerce involves electronic production, distribution, marketing, and sale of goods and services, offering benefits like accessibility, customization, and price comparison. However, drawbacks include privacy concerns and shipping costs. It utilizes computer networks, electronic workflow, digital signatures, and internet advertisements. The internet's growth has facilitated global participation in e-commerce, and marketplaces serve as platforms for exchange and price negotiations with shared information.

2. E-commerce has revolutionized global communication and business practices, enabling businesses to expand their reach and operate around the clock. It presents opportunities for individuals but requires adaptability to evolving technology. The development of international e-commerce infrastructure faces challenges such as internet connectivity, logistics, payments, regulations, cultural differences, and integration. Different models, including national development, logistics enhancement, information and social infrastructure, and advanced technology adoption, contribute to the growth of e-commerce. These models aim to improve interaction, create business opportunities, and enhance the purchasing experience. E-commerce development impacts international trade, job creation, consumer behaviour, competition, and business

opportunities while posing security and regulatory challenges. It is crucial to address legal requirements and provide market access for sustained growth.

3. The international economy is intricately linked to transport and logistics, with international trade and e-commerce playing significant roles. The growth of international trade relies on efficient transportation, reliable delivery, warehousing, and reverse logistics. Speed of delivery is a crucial factor in international e-commerce, enhancing customer satisfaction and reducing cancellations. Logistics companies must optimize order processing, delivery times, and costs to provide effective services. Logistics Management Analysis principles, including strategy alignment and cost accounting, inform product analysis, inventory management, planning, logistics costs, IT support, and service evaluation. Benchmarks such as the Logistics Performance Index, Ease of Doing Business Index, E-Government Development Index, Inclusive Internet Index, and Integrated Postal Development Index measure supply chain performance, business environment, technology utilization, and internet accessibility. Transport logistics is integral to solving market service areas, material flow forecasting, transport organization, and inventory management. Indicators like Total Public Expenditure and Vehicle Performance aid in monitoring financial resources and identifying cost-saving opportunities. Criteria such as delivery time, costs, productivity, energy intensity, and labour intensity guide transport decision-making. Research methods help understand customer needs and adapt to industry trends in the ever-evolving technological landscape.

4. The impact of logistics and transportation systems in e-commerce is significant in the international economy, especially with the shift towards online retail and the need for adaptive supply chains due to the global pandemic. Companies are grappling with increased costs, scalability challenges, demand unpredictability, and reliance on manual labour. The Logistics Trend Radar indicates that logistics innovations are closely tied to social, business, and technological advancements. Digital transactions have transformed the way customers conduct business, with digital wallets surpassing credit cards in global e-commerce transactions. However, some countries face hurdles in building robust payment infrastructure.

5. Key trends in e-commerce include digital logistics systems, prompt response to road conditions, reduced inventory through digitalization, and closer partnerships with suppliers and consumers. Containerization, mergers and acquisitions, customization, eco-friendly logistics, and sustainable transport are shaping the logistics services market. Effective management of transport and logistics services is crucial for companies seeking a competitive edge. The logistics chain integration ensures a seamless procurement and supply process. Investments in logistics and transport start-ups are increasing, and regulations promoting environmental sustainability are emerging. E-commerce is driving the growth of logistics services and the evolution of logistics operators.

6. E-commerce has greatly impacted Europe's economy, with transport and logistics playing a crucial role. A strong infrastructure enhances market access, lowers costs, and speeds up delivery, facilitating international trade and expanding customer reach. However, the percentage of e-commerce sales in Europe's GDP is projected to decline in 2022 due to market saturation, regulatory changes, shifting consumer preferences, and increased competition. Cross-border e-commerce is growing, expected to reach $55.47 billion by 2026, but a shortage of 380,000 truck drivers in Europe may lead to delivery delays and increased costs. Adapting to changing consumer expectations and developing strategies to address the driver shortage will be vital in the evolving e-commerce landscape.

7. An analysis of financial data from the Limited Liability Company "Zammler Ukraine" confirms that transport and logistics infrastructure strategies have an undeniable influence on the efficiency of international e-commerce. Efficient logistics infrastructure in global e-commerce eliminates trade barriers, improves market access, and lowers transaction costs. Technology-driven solutions, collaboration, and investments in infrastructure are essential for optimizing the transport and logistics network. Regular monitoring and evaluation are necessary for continued effectiveness, benefiting firms, consumers, and the economy at large.

8. The rapid development of logistics is driven by the growth of online commerce, leading to significant changes in the Ukrainian market. E-commerce volumes have experienced both growth and decline but are expected to equalize in the coming

years. E-commerce logistics involves optimizing the distribution of goods through virtual space, leveraging cloud technologies, personalized loyalty programs, and online payment systems. Popular logistics operators in Ukraine include "Nova Poshta," "Ukrposhta," and "Justin," with customer preferences based on factors such as delivery speed, price, and location of branches. While the development of e-commerce in Ukraine faces barriers like competition and information security, small and medium-sized online stores have ample opportunities to leverage efficient logistics services tailored to their needs. Modern logistics and transport companies are well-equipped to thrive in the digital commerce segment.

In conclusion, the research on transport and logistics support for the development of international e-commerce has provided a comprehensive understanding of the theoretical foundations, key trends, and strategies involved in optimizing transport and logistics infrastructure. The findings underscore the importance of investing in robust transportation networks, efficient logistics operations, and collaborative partnerships to enable the growth of international e-commerce. The insights from this research can guide policymakers, businesses, and industry stakeholders in making informed decisions and implementing effective strategies to leverage the full potential of e-commerce in the global marketplace.

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APPENDIX

Appendix A

Table A.1 – Periods of e-commerce evolution in the world [12].

Name of phase	Time period	Characteristics
The formation period	1950-1960	The era of "Mainframe-based" applications. The earliest applications were ticketing applications and the exchange of information between departments to prepare flights. As technology for sales automation emerged, the cost of services decreased.
The period of fragmentation	1970	In the United States, a special TDCC (Transportation Data Coordination Committee) committee was set up to coordinate industry standards in aviation, rail and road transport. The results of this committee's activities provided the basis for a new standard for organising electronic data exchange between organisations - Electronic Data Interchange. At the same time, England is in the process of finding standard solutions for trade-oriented data exchange. Tradacoms standards for international trade are emerging, which are becoming international GTDI standards (General - purpose Trade Data Interchange standards).
The period of development	1980-1990	Based on GTDI standards, the international standard EDIFACT (Electronic Data Interchange for Administration, Commerce and Transport), adopted by ISO, was created. E-mail is widely used.
The period of standardisation	1990-2000	In 1997, another, more pressing issue emerged - the possibility of conducting e-commerce transactions via the Internet. The rapid growth of the Internet due to the emergence of Web technologies prompted analysts to reconsider their plans for the further development of e-commerce. A new type of business has emerged - online retailing.

Appendix A

Name of phase	Time period	Characteristics
The period of standardisation	1990-2000	Since the Internet is a cheaper medium for transmitting information than using e-mail, EDIINT (EDIFAC Tover Internet) was created. In the same year, the standard OBI (Open Buying on the Internet) was created. It declares the principles that e-commerce software must meet. OBI builds on EDIINT but addresses a wider range of issues to standardise the interaction between organisations during e-commerce transactions.
The period of convergence	2000 to now	The use of all e-commerce perspectives by entities, the existence of elements of traditional and e-commerce.

Table B.1 - Ratings for determining the level of development of transport and logistics infrastructure for international e-commerce [40],[41].

Rating	Characteristics
LPI – Logistics Performance Index	Measures the performance of a country's domestic supply chain. It is an interactive benchmarking tool designed to help countries identify the challenges and opportunities they face in their trade logistics activities. The LPI allows for comparisons across 160 countries [40].
EDBI – Ease of Doing Business Index	Countries are ranked by ease of doing business from 1 to 190. A high ease of doing business rating means that the regulatory environment is more conducive to starting and operating a local firm. The ranking is determined by sorting aggregate scores across 10 areas, each of which consists of several indicators. The rankings for all economies are linked to May 2019.
EGDI – E-Government Development Index	Measures the readiness and capacity of national administrations to use information and communication technologies to deliver public services. In addition to assessing website development patterns, the index identifies characteristics of access to the online environment, such as infrastructure and education. The EGDI is a composite indicator of the following important dimensions of e-government: telecommunications connectivity, online service delivery, and human capacity.
Inclusive Internet Index	The overall index score is based on an assessment of the following categories: availability: examines the quality and breadth of available infrastructure required for access and level of Internet use; affordability: assesses the cost of access in relation to income and the level of competition in the Internet market; relevance: checks the availability and extent of local language and relevant content; readiness: checks the ability to access the Internet, including skills, cultural knowledge and supportive policies.

Rating	Characteristics
2IPD-Index for Postal Development	The Integrated Postal Development Index reflects the development of postal services around the world. As of 2020, it covers 170 countries. The index offers a performance score (from 0 to 100) across four postal development dimensions: reliability, coverage, relevance and sustainability. In addition to measuring the performance of postal operators around the world, the 2IPD sets out directions for postal development and improving the efficiency of postal infrastructure. This makes the 2IPD a unique tool for policymakers, regulators, postal operators and other stakeholders seeking to understand the role postal services can play in the e-commerce era.
UNCTAD B2C E-commerce Index	This index measures the readiness of an economy to support online shopping. The rating consists of four indicators that are directly related to online shopping. These are the share of residents with mobile payment accounts, the share of Internet users in the population, the reliability of the postal service and the availability of secure Internet servers. Each indicator was scored on a 100-point scale, and the arithmetic mean of the four indicators was used to create the final index.
EPI – Environmental Performance Index	The EPI is a data-driven summary of the state of sustainability in the world. It uses 32 performance indicators across 11 problem categories. The EPI ranks 180 countries on the state of the environment and ecosystem resilience. These indicators allow us to assess on a national scale how close countries are to existing environmental policy goals. The EPI offers a scorecard that highlights leaders and laggards in environmental performance and provides practical recommendations for countries seeking to move towards a sustainable future. The EPI's overall ranking shows which countries are tackling the environmental challenges that each country faces. A detailed look and comparative perspective can help in understanding the determinants of environmental progress and in refining policy decisions.
GCI – Global Cybersecurity Index	This index reflects the implementation of member states' cybersecurity commitments in five areas: legal measures; technical measures; organisational measures; capacity building; and cooperation measures. The scores for each area are summed up into an overall score.

Table C.1. – Key criteria for transport logistics efficiency [21].

Indicator	Method of calculation	Explanation
Utilisation of transport capacities	$\frac{Actual\ capacity\ utilisation}{Regulatory\ capacity\ utilisation} * 100$	The indicator characterises the actual utilisation of transport capacities and reflects how efficiently the company uses vehicles
Profitability of sales channels	$\frac{Total\ gross\ profit}{Total\ cost\ of\ sales} * 100$	The indicator reflects how profitable the company's transport logistics is
Reliability of delivery	$\frac{Number\ of\ orders\ completed\ on\ time}{Total\ number\ of\ orders} * 100$	It is one of the main indicators of the quality of the transport company's work and is one of the decisive factors in the choice of a carrier by a client
Total public expenditure	$E_1 + k_s + E_2,$ where E_1 is operating costs, k_s is the standard capital investment efficiency ratio, and E_2 is capital investment in permanent equipment, rolling stock, and freight weight	The indicator reflects the sum of current expenses and investments in the transport component
Vehicle performance	$\frac{T * g * k}{21/V + t},$ where T is the duration of the shift (8 hours), g is the vehicle's carrying capacity, tonnes; k is the vehicle utilisation rate per shift, L is the average distance of cargo transportation, km; V is the average speed, km/h; t is the vehicle's idle time during loading and unloading	The indicator reflects the efficiency of vehicle use

Appendix D

Table D.1 – Statement of financial results of Limited Liability Company "Zammler Ukraine" in 2020 [64].

Statement of financial results			
Name of the line	**Line Code**	**For the reporting period, thousand UAH**	**For the same period of the previous year, thousand UAH**
Net income from sales of products (goods, works, services)	2000	177237,1	110134,9
Cost of products (goods, works, services) sold	2050	128429,1	53361
Other operating income	2120	16576,4	8947,2
Other operating expenses	2180	59187,1	59796,2
Other income	2240	1241,9	4834
Other expenses	2270	4807,1	9360,9
Total income (2000 + 2120 + 2240)	2280	195055,4	123916,1
Total expenses (2050 + 2180 + 2270)	2285	192423,3	122518,1
Financial result before taxation (2280 - 2285)	2290	2632,1	1398
Income tax expense	2300	750,7	902,1
Net profit (loss) (2290 - 2300)	2350	1881,4	495,9

Figure E.1 – Average rating of delivery services from e-shop owners [44].

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Збірник тез здобувачів вищої освіти факультету міжнародної економіки і менеджменту укладено за підсумками їх досліджень, представлених на науковій конференції КНЕУ 17 квітня – 20 травня 2023 р. Доповіді здобувачів присвячено інноваційним проєктам для післявоєнного відновлення та розвитку України.

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PROSPECTS OF COOPERATION BETWEEN GREAT BRITAIN AND UKRAINE IN THE POST-WAR PERIOD

The prospects for cooperation between the Great Britain and Ukraine in the post-war period are an important issue from an economic, political and social perspective. In today's global economic order, where international relations and globalisation are becoming increasingly valuable, cooperation between countries is essential to ensure their competitiveness and sustainability. At the same time, the Great Britain and Ukraine, as countries with an important geopolitical position and developed economies, can play a significant role in shaping and updating the global economic order.

Cooperation between Ukraine and the United Kingdom has great potential for the development of the economies of both countries, as it provides joint access to new technologies, markets and investments, which allows for better realisation of the economic potential of the countries. Ukraine has substantial reserves of low-value-added commodities, such as grain, metals, oil and gas, as well as highly skilled human resources in information technology and engineering [6]. At the same time, Great Britain is one of the largest financial centres of the world, has developed infrastructure and great cultural and tourist potential. Cooperation between Ukraine and the Great Britain can increase the availability and competitiveness of products and services in both countries and ensure economic stability and prosperity in the region [8, p.40].

Over the years of cooperation, several problems can be identified that may have a negative impact on the development of mutually beneficial relations between Ukraine and the Great Britain:

1. Political instability
2. Economic problems

3. Corruption
4. Migration restrictions
5. Restricted access to capital
6. Restrictions on trade
7. Differences in legal systems

Ukraine faces several economic challenges, such as low competitiveness, high inflation, low economic growth and high unemployment. These problems can create obstacles to attracting foreign investment to Ukraine. According to the National Bank of Ukraine, as of the end of 2021, the total volume of British investment in the Ukrainian economy was more than USD 3.69 billion [2].

Ukraine ranks 155th in the Doing Business ranking according to the World Bank's 2021 report. However, to attract investment, it is necessary to create favourable conditions for businesses and investors [8, p.39]. For example, infrastructure can be developed, business procedures can be simplified, the administrative burden on companies can be reduced, and other measures can be taken to improve the investment climate.

Despite the fact that the volume of trade between the two countries reached USD 1.95 billion in 2021, some goods and services are still restricted in trade [3]. Ukraine has a trade surplus with the Great Britain, where imports from Ukraine (USD 1.1 billion) exceed exports from the Great Britain (USD 0.8 billion) [2]. Due to the interest in developing trade relations between Ukraine and the Great Britain, Boris Johnson and Volodymyr Zelenskyy signed a Digital Trade Agreement (DTA) in March 2022 [10]. The agreement extends the UK-Ukraine Free Trade Agreement, modernising bilateral trade in the digital age and deepening the Great Britain's economic ties with Ukraine.

The limited access to capital in Ukraine can hinder business development and force companies to use more expensive sources of financing, which impairs their financial performance and competitiveness. The solution could be to improve the investment climate, reduce political instability, improve the business environment, reform the legal system and increase transparency in all sectors of the economy [7]. This will increase confidence in the Ukrainian economy and business environment, leading to more foreign investment and more affordable sources of financing for Ukrainian companies.

A joint green energy project could be another area of cooperation between the two countries. They are already developing relevant technologies and initiatives that will reduce the use and import of traditional fuels such as oil, gas and coal. The development of alternative energy can be a driving force for economic growth and job creation, particularly in Ukraine, which has great potential in this area. The development of new technologies and infrastructure for alternative energy could also facilitate the export of Ukrainian goods and services to other countries, including the Great Britain. This cooperation could have a positive impact on public health and attract environmental investments in both countries.

In the post-war period, the Great Britain will be interested in expanding cooperation with Ukraine in order to secure its national interests, especially in the context of the renewed global economic order and the changing geopolitical situation in the world [9, p.1690]. According to the European Commission, Ukraine became the largest exporter of grain crops to the EU in 2020 and is also the world's 5th largest producer of sunflower oil [5]. This could be an incentive for British

investors and businesses looking for new opportunities after Brexit. Deepening relations with Ukraine could be an important step towards achieving its national interests for the Great Britain.

As well, Ukraine should follow the Great Britain's lead in formulating and promoting its national economic interests. The Great Britain has an impressive experience in running a successful economy and positioning itself in the international market. By exploring their approaches and strategies, Ukraine can improve its competitiveness, attract investment and strengthen its foreign economic relations.

Overcoming the problems that hinder cooperation between Ukraine and the Great Britain could lead to significant improvements in the economic performance of both countries, particular:

1. Increased mutual trade and investment can lead to GDP growth in both countries [1]. Countries can exchange goods and services that have competitive advantages, such as IT services, agricultural products, educational and cultural services, etc.
2. Improving living standards by creating new jobs in various areas of cooperation.
3. Growth in exports and imports. The harmonisation of legal and regulatory norms between countries can make it easier to do business and increase trust between companies. This could lead to an increase in trade between the two countries [4].

Considering the problems and prospects of international relations between Ukraine and the Great Britain in the post-war period, the following possible scenarios should be highlighted:

- Improvement of relations. In this scenario, both countries can continue to develop their economic and trade relations, which will lead to an increase in trade and investment between the two countries. Agreements may also be made to reduce tariffs and other barriers to imports, which will increase the favourable conditions for business.
- Stagnation of relations. If the current state of relations between Ukraine and the Great Britain remains unchanged, trade and investment flows between the two countries may stop or slightly decrease. This may be due to changing priorities and challenges faced by each country.
- Deterioration of relations. If relations between Ukraine and the Great Britain deteriorate, trade and investment activity could decline, and barriers to imports could increase. Such a situation could arise as a result of political or economic risks, such as a change in the ruling elite, war or a crisis in global markets.

Thus, it can be concluded that the prospects for post-war cooperation between the Great Britain and Ukraine are quite broad and diverse. In addition, cooperation in the areas of high technology, renewable energy, and cultural exchange could lead to the creation of new opportunities and increase the competitiveness of the Great Britain and Ukraine on the global stage.

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FOREIGN INVESTMENT OF THE CEE COUNTRIES IN THE POST-WAR RECOVERY OF THE ECONOMY OF UKRAINE

In modern world, the foreign direct investments play a crucial role in the developing and growing national economy, because they provide technology transfers from developed countries to developing ones which are the host countries to many FDI flows. FDI increase the competency of countries which create or obtain technologies and know-hows. Additionally, foreign direct investments boost economic growth, as with the appearing of technologies, production becomes enhanced and thus, the production output increases in volumes. FDI have a positive impact not only on business environment but they also create new job opportunities reducing unemployment level.

According to World Investment Report 2022, the global FDI inflows amounted to $1.6 trillion. If we compare this figure with data for 2002, then the global FDI increased by 112% from that period. The main recipients of FDI are the United States ($86 billion), Ireland ($37 billion) and Great Britain ($36 billion). However, we will focus on the studying of the FDI flows on the Central and Eastern Europe countries which are the members of the European Union and Ukraine as the