DOI: 10.15276/ETR.06.2025.7
DOI: 10.5281/zenodo.18064492
UDC: 005.591.6:005.7:339.138
JEL: L81, M15, O33, R41

INNOVATIVE LOGISTICS IN E-COMMERCE: CHALLENGES, OPPORTUNITIES AND PROSPECTS

ІННОВАЦІЙНА ЛОГІСТИКА В ЕЛЕКТРОННІЙ ТОРГІВЛІ: ВИКЛИКИ, МОЖЛИВОСТІ ТА ПЕРСПЕКТИВИ

Kateryna S. Zaichenko, PhD in Economics, Associate Professor
Odesa Polytechnic National University, Odesa, Ukraine
ORCID: 0000-0002-0975-2175
Email: k.s.zaychenko@op.edu.ua

Anastasiia S. Orlenko
Odesa Polytechnic National University, Odesa, Ukraine
ORCID: 0009-0006-2961-581X
Email: 10182233@stud.op.edu.ua

Lei Van
Odesa Polytechnic National University, Odesa, Ukraine
ORCID: 0009-0004-5691-4482
Email: 9465498@as.op.edu.ua

Received 18.09.2025

Зайченко К.С., Орленко А.С., Ван Лей. Інноваційна логістика в електронній торгівлі: виклики, можливості та перспективи. Оглядова стаття.

Стаття присвячена визначенню ролі інноваційної логістики в сучасній електронній торгівлі. Проаналізовано історію становлення електронної комерції в Україні, етапи розвитку та їх характеристики. Визначено основні виклики, з якими стикаються інтернет-магазини та розроблено заходи з їх нейтралізації. На основі проведеного аналізу виявлено ключові можливості та перспективи інноваційної логістики і електронної торгівлі. Встановлено, що, незважаючи на складну політичну та економічну ситуацію в країні, інноваційна логістика активно розвивається та потребує подальшого дослідження і запровадження новітніх рішень, щоб ефективно справлятися з викликами сьогодення.

Ключові слова: логістика, електронна комерція, інновації, соцмережі, продажі, маркетплейси, споживачі, підприємство, цифровізація, конкуренція

Zaichenko K.S., Orlenko A.S., Van Lei. Innovative Logistics in E-Commerce: Challenges, Opportunities and Prospects. Review article.

The article is devoted to defining the role of innovative logistics in modern e-commerce. The history of the formation of e-commerce in Ukraine, its stages of development, and their characteristics are analyzed. The main challenges faced by online stores are identified, and measures for their neutralization are developed. Based on the conducted analysis, the key opportunities and prospects of innovative logistics and e-commerce are revealed. It is established that, despite the complex political and economic situation in the country, innovative logistics is actively developing and requires further research and the implementation of advanced solutions in order to effectively cope with current challenges.

Keywords: logistics, e-commerce, innovation, social media, sales, marketplaces, consumers, enterprise, digitalization, competition

The current stage of global economic development is characterized by the active digitalization of business processes, among which e-commerce occupies a leading position. E-commerce is becoming not only a form of organizing retail and wholesale trade but also a comprehensive ecosystem that integrates marketing, financial instruments, information technologies, and logistics solutions. At the same time, logistics serves as a key element in ensuring the efficiency of e-commerce, since the speed, reliability, and flexibility of delivery determine both consumer satisfaction and the competitiveness of enterprises. Innovative logistics in e-commerce is shaped by a number of challenges, including the growth of online sales, the need to process large volumes of data, increasing demands for personalization, environmental restrictions, and the risks of global crises. At the same time, it opens broad opportunities for implementing technological solutions, such as warehouse automation, the use of Big Data and artificial intelligence, the development of unmanned vehicles, and the adoption of "green" logistics practices. This issue acquires particular significance in the context of the full-scale war in Ukraine. Military actions have led to the destruction of transport infrastructure, changes in logistics routes, complications in international transportation, and a significant increase in delivery costs. At the same time, they stimulate the search for innovative approaches to organizing supply chains, the development of flexible multimodal solutions, the intensification of cooperation with international logistics partners, and the growing role of digital tools in ensuring the continuity

of e-commerce. The relevance of this study is determined by the need to identify innovative logistics models capable of ensuring the resilience and adaptability of e-commerce under conditions of high competition, global instability, and wartime challenges. The scientific justification of the challenges, opportunities, and prospects of innovative logistics makes it possible to formulate strategic guidelines for enterprises seeking to improve operational efficiency, optimize costs, and meet the growing needs of consumers.

The aim of the article is to determine the role of innovative logistics in the development of e-commerce in Ukraine under current challenges and to identify promising directions for its improvement. To achieve this purpose, the following objectives have been formulated:

— to examine the history of the emergence and development of e-commerce in Ukraine;
— to identify the main challenges faced by e-commerce and to develop measures for their mitigation;
— to identify the opportunities and prospects of innovative logistics and e-commerce.

Analysis of recent research and publications

The issues of e-commerce development its stages, trends, challenges, opportunities, and prospects are covered in the works of many Ukrainian scholars, including O. Dyma [2], B. Kravchenko [4], Ya. Larina and O. Nahorna [5], and I. Checheniuk and V. Shafranska [1]. At the same time, the relevance of developing e-commerce and innovative logistics is confirmed by a broad range of studies in Ukraine and abroad. Thus, N. Ilchenko [6] examines the specific features of e-commerce logistics in the B2C model, emphasizing the need to adapt business processes to the specifics of online sales and the rapidly growing consumer requirements for order delivery. Researchers T. Kharchenko and Yu. Sahaidak [7] analyze directions for improving sales logistics management, focusing on the introduction of innovative tools and the optimization of supply chains in a volatile market environment. In turn, N. Chernopyska and O. Solodka [8] underscore that e-commerce logistics is a key factor in enterprise competitiveness, with its effectiveness determined by the integration of modern information technologies into delivery and warehousing processes. Studies by Chinese scholars highlight innovative technologies and "green" logistics. For example, Chun Yunlin [9] finds that Chinese logistics companies are gradually recognizing the importance of environmental technologies and standards; however, the widespread implementation of green logistics is possible only under conditions of state regulation and market incentives. W. Qin and X. Qi [10] investigate the efficiency of green logistics in five provinces of Northwest China (2010-2019) using a three-stage super-efficiency DEA model with SFA, concluding that low scale efficiency is the main constraint on development, whereas government support and the level of technological advancement are the primary drivers of efficiency gains and reductions in carbon emissions. Meanwhile, M. Li, S. Shao, Q. Ye, G. Xu, and G.Q. Huang [11] propose applying a blockchain platform to finance logistics processes in e-commerce, thereby enhancing transaction transparency, strengthening trust among supply chain participants, and reducing financial risks for firms with limited access to capital.

Unsolved aspects of the problem

Despite the fact that e-commerce in Ukraine has existed for more than 20 years, it continues to face new challenges and obstacles. The most significant among them have been the COVID-19 pandemic and the full-scale invasion of Ukraine by Russian forces. In addition to global challenges, there remain local ones such as disruptions in logistics supply, high competition, a relatively low level of consumer trust in online stores, risks of fraud and cyberattacks, potential leakage of customers' personal data, and rapidly changing consumer preferences. Furthermore, many buyers complain about poor service quality, while shifts in consumer preferences are becoming increasingly dynamic. Therefore, retailers should not only address the aforementioned problems but also adapt quickly to changes and enhance customer engagement, which underscores the relevance of conducting further research in this field.

The main part

Informatization and digitalization have provided a strong foundation for the emergence and further development of a new direction in the modern economy e-business. E-business represents entrepreneurrial activity carried out through information networks with the aim of generating profit. Moreover, this type of business contributes to improved communication with customers, cost minimization, optimization of business processes, greater convenience and speed of purchasing, enhanced service quality, as well as the expansion of the geographical scope of enterprise activities.

E-commerce is often equated with e-business; however, it is only a component one of the elements encompassed by the broader concept of "e-business". E-commerce refers to the interaction between seller and buyer through information networks or the Internet for the purpose of mutual benefit: the sale of goods for the seller and the acquisition of desired products for the buyer. Thus, the key aspects of conducting business online include e-commerce, digital transformation, the use of network technologies, and the expansion of business connections.

The application of e-commerce became particularly relevant with the onset of the COVID-19 pandemic. Enterprises were compelled to find ways to sustain the business life cycle. At first, normal operations under the new realities seemed impossible; however, it soon became evident that the pandemic itself provided an impetus for an alternative direction of entrepreneurship online trade. Among the advantages that COVID-19 brought for businesses are the expansion of geographic reach, the opening of new opportunities, scaling through online sales, cost optimization, savings on rental expenses, and the possibility of remote work.

In general, four stages of e-commerce development in Ukraine are distinguished (Table 1).

Table 1. Stages of e-commerce development in Ukraine

Stage	Characteristic
Stage 1 – The emergence of e-commerce in Ukraine (up to 2009)	The emergence of the first online stores was accompanied by the search for suppliers, the exploration of opportunities for online and offline promotion, and the optimization of logistics operations (procurement, storage, delivery). However, to some extent, the development of e-commerce was constrained by the low level of consumer access to high-speed Internet. Interaction with end customers was carried out independently through in-house delivery services and pickup points located in major cities. The geographic scope of online stores' activities was limited to the city where the store's team was based.
Stage 2 – Outsourcing of operational activities (2010–2014)	In the early 2000s, there was no established delivery market in Ukraine: parcels were often handed over to train conductors or minibus drivers, which involved considerable risks due to the absence of guarantees and reliance on strangers. By the early 2010s, however, the express delivery market began to take shape, with the emergence of the first large clients and competitors. Companies started to develop key values such as customer service and high-quality standards. For instance, in 2001 one of the current leaders of the Ukrainian logistics market Nova Poshta was founded; today, it operates more than 6,000 branches across the country. By the early 2010s, Nova Poshta began to claim competitive positions and established itself as a significant player in the e-commerce service market. During this period, various supporting services also appeared: marketplaces, electronic payment systems and online banking, website builders, as well as solutions for automated warehouse and network business management. At the same time, the marketing services industry developed, enabling businesses to promote themselves online through SEO, SMM, contextual and display advertising, among others.
Stage 3 – Intensification of e-commerce development in Ukraine (2015-2017)	The greatest impetus for the development of e-commerce in Ukraine was provided by the introduction of 3G and later 4G Internet. An increasing number of consumers gained access to the Internet anytime and anywhere. Services that enhanced the operations of e-commerce players in Ukraine continued to develop. At the same time, major offline retailers began creating their own online stores and started to perceive e-commerce companies as direct competitors. Notably, this period also saw the growth of services such as OLX, UKLON, and UBER.
Stage 4 – Development of new services by online stores and the expansion of e-commerce in the service sector (2018 – present)	The main trends include: intensifying competition from international players; a growing number of orders placed through international marketplaces; stronger competition for consumers' purchasing power; and, as a result, lower product prices. At the same time, the need to ensure high-quality service has led to rising costs. Consequently, e-commerce companies have begun to optimize their business processes. The HORECA sector has also become increasingly active online. Initially, companies organized delivery using their own resources, and later through third-party operators. In recent years, major international players such as GLOVO and UBER have significantly expanded their presence.

Source: elaborated ny the authors based on [2]

At the same time, the year 2000 marked the beginning of the mass expansion of the e-commerce market worldwide. Large European and American companies quickly embraced this trend, immediately implementing new technologies in their operations and offering goods and services to customers via the Internet. NetMarket was the name of the first store to embark on the path of digitalization and begin selling through Internet technologies. Its first customer is considered to have been a resident of Philadelphia, and the first item sold was a Sting album priced at $12.48. Later, in 1994, Amazon was founded by Jeff Bezos.

Today, global e-commerce sales volumes continue to grow annually. By the end of 2020, 20% of purchases worldwide were made online. In the same year, global e-commerce sales increased by 24%, while in Ukraine the growth reached 40% [1].

In this type of activity, the number of active Internet users plays a primary role. According to the analysis of available data, Internet usage has become widespread, with about 70% of the population actively using it. The number of regular online purchases has also increased, which in turn has led to a growing base of loyal customers in online stores. By the end of 2020, online shopping covered one-third of the population 10.6 million people. Moreover, COVID-19 not only contributed to the expansion of e-commerce adoption but also changed consumer habits people increasingly preferred purchasing food and medicine online. In 2020, personal protective equipment and household goods enjoyed high demand. However, despite a number of positive developments in e-commerce, due to uncertainty and consumers' reluctance to take risks, the average order value declined.

Active purchasing of goods through social media has become a key trend of the 21st century. The number of Instagram users is increasing significantly every day, while Facebook faces greater challenges in attracting new audiences. As a result, Instagram has long surpassed the boundaries of a typical social network and has become a full-fledged platform for selling goods. The growing popularity of e-commerce has increased the workload on delivery services and raised consumer expectations. Customers now demand to receive their purchases as quickly as possible and under the most favorable conditions. Consequently, the development of e-commerce has driven the demand for delivery services, leading to the modernization and optimization of logistics processes. During the COVID-19 period, investment in courier services increased eightfold, according to data from the State Statistics Service, making this sector one of the most attractive and profitable for investment at that time.

The development of e-commerce has also driven a number of innovations, such as inventory management practices and the use of cash registers and electronic settlement recorders (RRO/PRRO). Moreover, in 2022 the use of cash registers became mandatory. In addition, Ukraine enacted a language law requiring online stores to provide customer service exclusively in the state language. Later, requirements for the mandatory availability of a Ukrainian-language version of websites are expected to be introduced, with non-compliance subject to fines. Nevertheless, despite the rapid growth of e-commerce in a relatively short period of time, consumers are still not ready to abandon shopping in traditional stores. As a result, businesses operating solely in the virtual marketplace lose ground to retailers that adopt multichannel strategies.

Taking into account the information outlined above, a number of problems related to the development of e-commerce in Ukraine can be identified:

— conservatism among the older generation, as many elderly people still remain skeptical about the new realities of trade;
— insufficient user awareness regarding the proper selection of goods and order placement, which generates fear of making online purchases;
— inconsistency in product quality, since a certain share of unscrupulous sellers provide descriptions that do not correspond to reality;
— an increase in cases of fraud under the guise of standard product payment;
— difficulties in organizing logistics to certain settlements.

Based on the above-mentioned problems in e-commerce, a set of measures can be proposed to minimize their negative impact:

— introduction of a mandatory requirement for the availability of cash-on-delivery options in online stores. This measure would increase consumer trust in online shops, reduce the gap between expectations and reality, and decrease the incidence of fraud;
— implementation of a unified standardized size chart. This would help consumers navigate clothing choices more easily and allow sellers to reduce the rate of product returns;
— development of legislation to penalize sellers in cases where product descriptions do not correspond to reality. Such a measure would encourage sellers to provide honest and accurate product characteristics, while ensuring greater protection for consumers against poor-quality goods. This step would also promote trust-based, long-term relationships among market participants;
— creation of a publicly accessible rating system for online stores based on customer satisfaction. This would help potential clients make informed choices when selecting online shops, while motivating sellers to pay greater attention to service quality and customer care.

The introduction of e-commerce has significantly transformed the operations of trading enterprises and their opportunities for interaction with consumers. The organization of e-commerce eliminates many of the barriers of traditional trade while simultaneously adopting new business principles. The differences between traditional trade and e-commerce are presented in Table 2.

Table 3 presents the barriers for consumers and entrepreneurs related to the functioning of e-commerce, which also extend to the sphere of e-trade.

Table 2. Differences between traditional trade and e-commerce

Criterion	Traditional Trade	E-commerce
1. Communication	Direct communication with customers through intermediaries or documents sent by mail, fax, or telephone.	Communication via the Internet: search engines, e-mail, portals, and other digital communication tools.
2. Business flexibility	Low flexibility, difficulties in modifying or expanding product offerings, numerous administrative barriers.	High flexibility enabled by the market intermediary.
3. Production logistics	Products are stored or manufactured on-site, with limited operational capacity or the need for multiple production and supply points.	Possibility of separation from the production process, with goods shipped either from the company's own wholesaler or an external distributor directly to the customer.
4. Distribution logistics	Vertical structure, supply chain, and the requirement for the customer to visit the retail outlet, which operates according to its own schedule.	Creation of platforms equipped with appropriate technologies, allowing consumers to make purchases from their place of residence 24/7.
5. Forms of payment	Traditional: payment card, cash, check; possibility of maintaining anonymity during purchase or sale; acceptable level of security.	Money transfer, electronic money, cash on delivery, payment card; lower level of security.
6. Sales parameters	Dependence between the place of sale and the purchase price, resulting from the limited universality of goods and services.	Globalization generates price competition, creating pressure on even minor price differences, which may be offset by complex delivery conditions (for example, over long distances).

Source: elaborated ny the authors based on [5]

Table 3. Limitations and barriers related to the organization of e-commerce

Barriers for consumers	Barriers for producers
Risk associated with making online payments.	High costs of product delivery.
Lack of confidence in the seller's integrity; difficulty in verifying products in advance.	Lack of an effective delivery system.
Inability to communicate directly with the seller; long waiting times for feedback.	Lack of effective credit card services and diversified payment methods.

Source: elaborated ny the authors based on [5]

It is important to note that business models in e-commerce should be more consumer- and partner-oriented than in traditional trade. The experience of well-known companies such as Intel and Cisco has demonstrated that the Internet can be used not only to efficiently manage every link in the consumer value chain but also to reduce the final cost of production. Moreover, according to Intel, the use of e-commerce can save about 70% of the time required for a sales transaction, which constitutes a significant competitive advantage. In Ukraine, the development of e-commerce has accelerated rapidly over the past five years, although before the pandemic this channel was growing much more slowly compared to the United States, Asia, and Europe.

According to a Deloitte survey, 22% of users began purchasing goods online more frequently, while only 9% increased their offline shopping. This trend was further reinforced by the impact of COVID-19. In 2020, the e-commerce market grew by 41% and reached $4 billion, accounting for 8.8% of the total retail trade volume in Ukraine, according to research by Soul Partners and Baker Tilly Ukraine. On the eve of the full-scale invasion, a pronounced trend was observed in Ukraine, with e-commerce volumes surpassing those of traditional trade by a factor of two.

Factors such as the active spread of the Internet, the growing number of touchscreen mobile device users, changes in consumer behavior, and the COVID-19 pandemic have contributed to the popularization of e-commerce in Ukraine. With the advent of mobile Internet and smartphones, users gained the ability to shop online from anywhere in the world and at any time. During the COVID-19 period, e-commerce became a lifeline for many Ukrainians, as it eliminated the need to visit offline stores and interact with other people.

The events of February 24, 2022, shook not only ordinary Ukrainians but also created new threats to entrepreneurial activity. According to Promodo, within the first three months online stores lost over 80% of their traffic, while revenues decreased by 92% during the first week. Imports of non-essential clothing and footwear dropped by almost 60%, and some international operators were forced to suspend their activities. However, despite the severity of the situation, by the end of March revenues began to grow again, and traffic gradually recovered. The most in-demand categories included pet supplies, cosmetics, and household goods. Demand also rose for discounted products, food, and drinking water. The problems of e-commerce are illustrated in Figure 1.

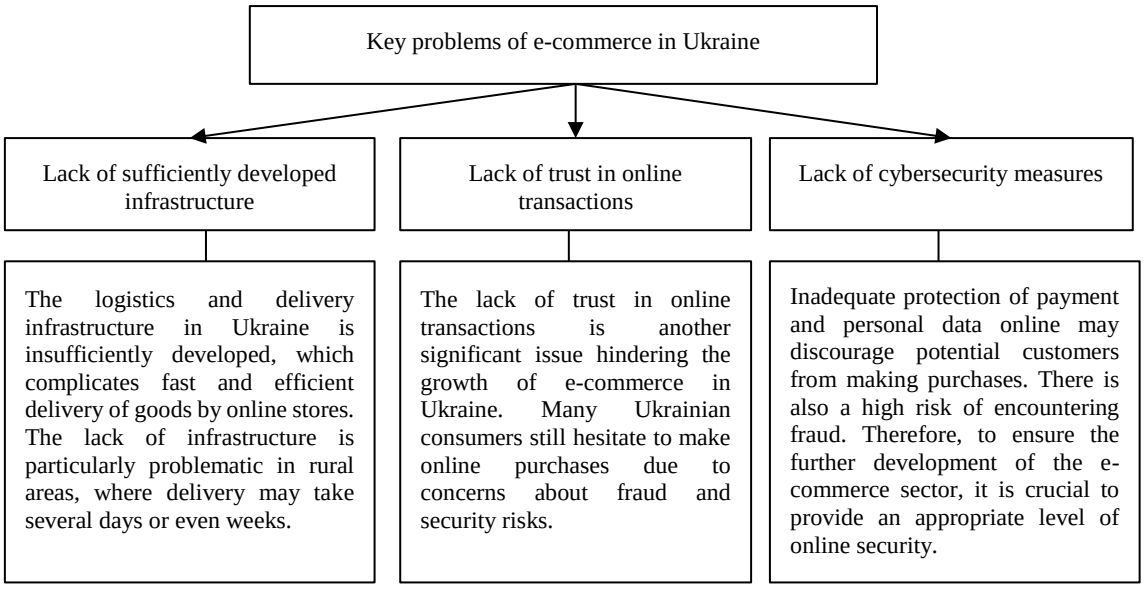

Figure 1. Problems of e-commerce in Ukraine
Source: elaborated ny the authors based on [5]

In addition to the main problems presented in Figure 1, there are several other factors that hinder the more intensive development of e-commerce, including the high cost of Internet services and frequent power outages. For online stores, collecting users' personal data is important for building a loyal customer base;

however, another challenge arises here users are reluctant to share such information and prefer cash-on-delivery options. In Ukraine, different business models of online stores exist. For example, classifieds platforms (OLX) are oriented toward B2C and C2C models of commercial activity. Marketplaces (Prom.ua, Rozetka, Shafa.ua) have broader functionality, enabling effective communication with customers and ensuring safe transactions. Specialized online supermarkets such as Kasta, Eldorado, Foxtrot, and others sell goods on behalf of vendors but use their own inventories. Ria, a classifieds platform with a price aggregator, allows users to compare company offers and choose the most advantageous option.

Under modern conditions, e-commerce operates through the following organizational and economic models:

1) Business-to-Business (B2B) – includes all aspects of interaction between companies;

2) Business-to-Consumer (B2C) – electronic retail trade;

3) Business-to-Administration (B2A) – interaction between businesses and public administration, including business relations between companies and government authorities;

4) Consumer-to-Consumer (C2C) – interaction among consumers for exchanging commercial information and conducting auctions between individuals;

5) Consumer-to-Administration (C2A) – interaction between government organizations and consumers;

6) Administration-to-Administration (A2A) – interaction between government authorities and document flow among them.

It is also appropriate to consider the interaction between a company and its employees as a model of e-commerce (B2E – Business-to-Employee). This model is implemented through corporate portals (websites) of organizations. Thanks to digital transformation, e-commerce plays an increasingly important role in the development of retail trade. In 2023, the following e-commerce trends were observed (Figure 2).

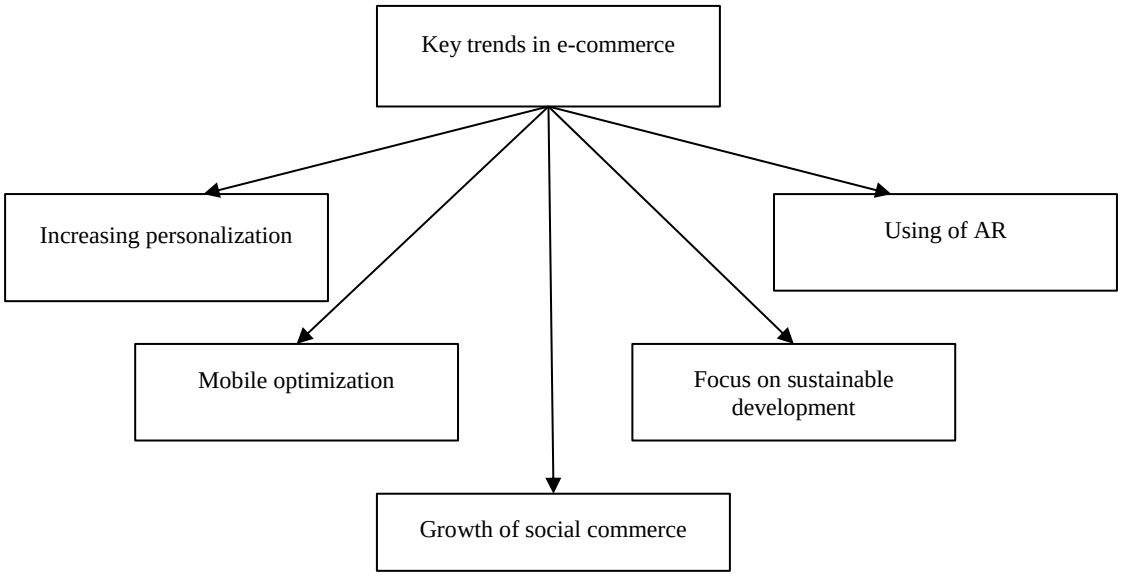

Figure 2. Key trends in e-commerce
Source: elaborated ny the authors based on [5]

Let us take a closer look at the above-mentioned trends [4]:

— increasing personalization through the use of artificial intelligence and machine learning. Retailers provide individual and relevant recommendations to customers based on their purchase history and online behavior.
— mobile optimization, which has become a key factor in the growth of e-commerce, as consumers increasingly use mobile devices for online shopping.
— growth of social commerce, where social media platforms are becoming key players in the e-commerce sphere.
— greater focus on sustainable development, as e-commerce companies pay more attention to environmental safety and responsible production practices.
— use of augmented reality (AR) to provide customers with an engaging and interactive shopping experience.

Thus, e-commerce is currently one of the leading business models; however, attention should be paid to addressing existing problems, as the prospects for the development of this sector remain highly positive. E-commerce has already demonstrated its readiness for further transformation and globalization. Therefore, the Government of Ukraine should place strong emphasis on improving the regulatory framework, developing the necessary infrastructure, and increasing trust in online stores.

High competition intensity is the main drawback of the e-commerce sector, since no idea or marketing

strategy can remain hidden on the Internet. Therefore, it would be appropriate to develop a legal framework prohibiting the copying or imitation of ideas. This could significantly increase the number of new online companies. Among the advantages of purchasing goods and services online, the following can be highlighted: the ability to thoroughly study all information about a product, compare prices, choose the most optimal delivery method, gain a positive shopping experience and high-quality service, save time, use online banking, eliminate economic barriers, support healthy competition, and access modern information and communication technologies.

Considering the outlined trends in the development of e-commerce, it is appropriate to highlight the key opportunities and prospects emerging for innovative logistics. The growing role of digital technologies, the emergence of new organizational and economic models of interaction between businesses, the state, and consumers, as well as the strengthening of environmental requirements, are shaping new approaches to organizing logistics processes in the e-commerce sector. Modern enterprises strive to meet consumer demand and ensure speed, reliability, and sustainability of delivery. In this context, the summarized opportunities and prospects for the development of innovative logistics and e-commerce are presented in Table 4.

Table 4. Opportunities and prospects for the development of innovative logistics and e-commerce

Direction	Opportunities	Prospects
1. Personalization and AI	Application of artificial intelligence and machine learning algorithms for demand forecasting and personalized delivery.	Formation of intelligent logistics systems that minimize delays and reduce costs.
2. Mobile optimization	Growth of mobile payments and purchases via smartphones.	Integration of mobile applications with logistics services for real-time tracking.
3. Social commerce	Use of social networks as sales channels	Development of "social logistics" – fast delivery integrated with online platforms.
4. Sustainable development	Implementation of "green logistics" (electric transport, packaging recycling).	Achievement of environmental goals ("double carbon") and enhancement of corporate reputation.
5. Augmented reality (AR)	Possibility of virtual product fitting and interactive shopping experience.	Reduction of returns and reverse logistics costs.
6. Organizational and economic models of e-commerce	Development of B2B, B2C, C2C, B2A, C2A, A2A, and B2E models	Deepening the integration of business, government, and consumers through digital platforms.
7. Innovative last-mile logistics	Use of drones, delivery robots, and parcel lockers.	Formation of contactless and flexible delivery systems with a minimal environmental footprint.
8. Legislative support	Development of legal mechanisms for protecting innovations in the field of e-commerce	Creation of a favorable business environment and stimulation of innovation

Source: elaborated ny the authors based on [12-20]

Thus, the development of innovative logistics and e-commerce is based on the integration of technological innovations, digital platforms, and legislative support mechanisms. The implementation of artificial intelligence, mobile and social services, environmental practices, and augmented reality tools creates the conditions for improving the efficiency of logistics processes and expanding the e-commerce market. In the long term, this will contribute to enhancing the competitiveness of enterprises, integrating Ukraine into the global digital space, and shaping new strategies for sustainable development.

Conclusions

The conducted study has made it possible to comprehensively assess the state and prospects for the development of e-commerce and innovative logistics in Ukraine within the global context. First, the history of e-commerce in Ukraine was examined. It was established that the development of this sector has gone through several stages from the initial attempts at online sales to today's integrated digital platforms. At its current stage, e-commerce has evolved into one of the leading business models, combining mobile technologies, social networks, and innovative logistics solutions. Second, the main challenges faced by online stores and logistics operators were identified, including high market competition, growing consumer demands for delivery speed and personalization, the need to ensure cybersecurity, the necessity of modernizing transport infrastructure, as well as the impact of wartime conditions in Ukraine. Proposed measures to mitigate these challenges include improving the regulatory framework, increasing trust in online trade, introducing environmentally sustainable logistics practices, and fostering digitalization. Third, the study revealed key opportunities and prospects for innovative logistics and e-commerce, such as the use of artificial intelligence and machine learning for service personalization and demand forecasting, integration of mobile and social sales channels, the development of "green logistics" to achieve global climate goals, the introduction of augmented reality to reduce product returns, and the application of blockchain technologies in financing and logistics management. These directions define the trajectory of

the industry's further transformation and create the prerequisites for its sustainable development. Thus, innovative logistics has become an integral component of e-commerce, ensuring its competitiveness and integration into the global economic space. For Ukraine, the priority tasks include improving legal regulation, developing digital and transport infrastructure, and stimulating innovation in logistics processes, which will strengthen its position in both domestic and international markets.

Abstract

The war has led to the destruction of transport infrastructure, changes in logistics routes, complications of international transportation, and a significant increase in delivery costs. At the same time, this stimulates the search for innovative approaches to the organization of supply chains, the development of flexible multimodal solutions, the intensification of cooperation with international logistics partners, as well as the growing role of digital tools in ensuring the continuity of e-commerce. The relevance of the study is determined by the need to search for innovative logistics models capable of ensuring the resilience and adaptability of e-commerce in the conditions of high competition, global instability, and wartime challenges. The scientific substantiation of the challenges, opportunities, and prospects of innovative logistics makes it possible to form strategic guidelines for enterprises that seek to increase the efficiency of their activities, optimize costs, and meet the growing needs of consumers. The purpose of the article is to define the role of innovative logistics in the development of e-commerce in Ukraine under current challenges and to identify promising directions for its improvement. E-business is understood as entrepreneurial activity carried out through information networks with the aim of generating profit. In addition, this type of business contributes to improving communication with clients, minimizing costs, optimizing business processes, increasing the convenience and speed of purchases, improving service quality, and expanding the geographical scope of enterprises. Four stages of e-commerce development in Ukraine are distinguished: the emergence of e-commerce in Ukraine, outsourcing of operational activities, activation of e-commerce development in Ukraine, and the development of new services by online stores themselves along with the expansion of e-commerce into the service sector.

The history of the emergence of e-commerce in Ukraine has been studied. It has been established that the development of this sector took place in several stages: from the first attempts at online sales to modern integrated digital platforms. At the current stage, e-commerce has become one of the leading business models that combines mobile technologies, social networks, and innovative logistics solutions. Secondly, the main challenges faced by online stores and logistics operators have been identified. These include high market competition, growing consumer demands for speed and personalization of delivery, the need to ensure cybersecurity, the necessity to modernize transport infrastructure, as well as the impact of wartime conditions in Ukraine. Proposed measures to neutralize these challenges include improving the regulatory framework, strengthening trust in online trade, promoting the greening of logistics processes, and stimulating digitalization. Thirdly, key opportunities and prospects for innovative logistics and e-commerce have been identified, including: the use of artificial intelligence and machine learning for service personalization and demand forecasting; integration of mobile and social sales channels; the development of green logistics in the context of achieving global climate goals; the introduction of augmented reality to reduce return rates; and the application of blockchain technologies in the financing and management of logistics processes. These directions define the vector of further transformation of the sector and create prerequisites for its sustainable development. Thus, innovative logistics is becoming an integral part of e-commerce, ensuring its competitiveness and integration into the global economic space. For Ukraine, priority tasks include improving legal regulation, developing digital and transport infrastructure, and stimulating innovations in logistics processes, which will strengthen its positions in both domestic and international markets.

Список літератури:

1. Чеченюк І., Шафранська В. Розвиток електронної комерції в Україні. Формування механізму зміцнення конкурентних позицій національних економічних систем у глобальному, регіональному та локальному вимірах: матер. VII міжнар. наук.-практ. конф. 2021. С. 161-162.
2. Дима О. Етапи розвитку електронної торгівлі в Україні. 2020. [Електронний ресурс] – Режим доступу: https://ir.kneu.edu.ua/server/api/core/bitstreams/37d3dbd2-2954-473f-9cee-891ee48abf0d/content.
3. Електронна комерція – історія, факти, тренди, новинки. [Електронний ресурс] – Режим доступу: https://project-seo.net/blog-uk/elektronna-komercija-istoria-fakty-trendy.
4. Кравченко Б.О. Розвиток електронної комерції в Україні: перспективи, виклики та тенденції розвитку у 2023 році. Цифрові трансформації та інноваційні технології в економіці: виклики, реалії, стратегії. (17-19 травня 2023 року, Сумський державний університет, м. Суми), 2023. Суми: СумДУ, 2023, С. 5-8.

5. Ларіна Я., Нагорна О. Сучасний стан та тенденції розвитку е-торгівлі в Україні. Herald of Khmelnytskyi National University. Economic Sciences. 2024. №326(1). С. 373-380. DOI: 10.31891/2307-5740-2024-326-59
6. Ільченко Н. Логістика електронної комерції: моделі B2C. Матеріали XV Міжнародної науково-практичної конференції «Глобальне конкурентне середовище». Київ: НАУ, 2017. С. 179-181.
7. Харченко Т. Б., Сагайдак Ю. А. Удосконалення управління логістикою збуту в сучасних умовах. Науковий вісник Полтавського університету економіки і торгівлі. Серія: Економічні науки. 2024. 1 (111). С. 59-64. DOI: 10.37734/2409-6873-2024-1-8
8. Чернописька Н.В., Солодка О.В. Логістика електронної комерції. Львів: Видавництво Львівської політехніки, 2007. 220 с.
9. Yunlin C. Awareness of green logistics technology, certification, and standards among Chinese logistics firms. Journal of Traffic and Transportation Engineering. 2023. Vol. 10, Issue 5. P. 798-812. DOI: 10.1016/j.ajsl.2023.10.004
10. Qin W., Qi X. Evaluation of Green Logistics Efficiency in Northwest China. Sustainability. 2022. Vol. 14, No. 11. Article 6848. DOI: 10.3390/su14116848.
11. Li M., Shao S., Ye Q., Xu G., Huang G. Q. Blockchain-enabled logistics finance execution platform for capital-constrained E-commerce retail. Robotics and Computer-Integrated Manufacturing. 2020. Vol. 65. Article 101962. DOI: 10.1016/j.rcim.2020.101962.
12. Зайченко К.С. Діджиталізація економік та суспільства: світові тенденції. Актуальні проблеми економіки. №9 (267). 2023 [Електронний ресурс] – Режим доступу: https://eco-science.net/wp-content/uploads/2023/09/09.23._topic_Kateryna-S.-Zaichenko-21-30.pdf.
13. Башинська І.О., Петрова Л.С., Попович К.Ф. Управління ризиками у впровадженні інноваційних проектів. Економіка. Фінанси. Право. 2020. №2. С. 11-13. DOI: 10.37634/efp.2020.2.2.
14. Філиппова С.В., Джахан Фавзі Салем Ісмаєіл Тенденції постіндустріальної трансформації соціально-економічних відносин та чинники конкурентоспроможності підприємницьких структур. Економіка: реалії часу. Науковий журнал. 2024. № 1 (71). С. 114-123. DOI: 10.15276/ETR.01.2024.14. DOI: 10.5281/zenodo.13121161.
15. Zaichenko K. S., Filyppova S.V. Innovative development of small industrial enterprise in conditions of informatization of economy: organizational component: monograph / Schweinfurt: Time Realities Scientific Group UG (haftungsbeschränkt), 2019. 225 p.
16. Некрасова Л. А. Мацко Н. Г. Оцінка виробничого потенціалу інноваційно-активних промислових підприємств на основі ІЕКО-аналізу. Бізнес Інформ. 2021. №5. С. 188-193. DOI: 10.32983/2222-4459-2021-5-188-193.
17. Башинська І.О. Розділ 23. Інноваційно-інформаційні технологій для забезпечення інтелектуально-кадрової складової економічної безпеки підприємства. Інноваційна економіка: теоретичні та практичні аспекти: монографія. Херсон: Грінь Д.С., 2016. Вип. 1. С. 607-635.
18. Zhou Y., Li Q., Wang C. How digital transformation enhances corporate innovation: Evidence from Chinese manufacturing firms. Heliyon. 2024. Vol. 10, №6. DOI: 10.1016/j.heliyon.2024.e34905.
19. Захарченко В. І., Єрмак С. О. Ключові завдання антикризового управління при проектуванні та моделюванні організаційно-технологічних систем у високотехнологічному виробництві (Частина 1). Економіка: реалії часу. Науковий журнал. 2022. № 2 (60). С. 5-21. [Електронний ресурс] – Режим доступу: https://economics.net.ua/files/archive/2022/No2/5.pdf. DOI: 10.15276/ETR.02.2022.1.
20. Башинська І.О., Філіппов В.Ю., Чернягіна Н.С. Індустріальні парки України: сучасне становище та перспективи розвитку в умовах цифровізації інноваційної економіки. Економіка. Фінанси. Право. 2021. № 10. С. 9-12. DOI: 10.37634/efp.2021.10.2.

References:

1. Checheniuk, I., & Shafranska, V. (2021). Development of e-commerce in Ukraine. In Formation of the mechanism for strengthening the competitive positions of national economic systems in the global, regional and local dimensions: Proceedings of the VII International Scientific and Practical Conference (pp. 161-162) [in Ukrainian].
2. Dyma, O. (2020). Stages of e-commerce development in Ukraine. Retrieved from: https://ir.kneu.edu.ua/server/api/core/bitstreams/37d3dbd2-2954-473f-9cee-891ee48abf0d/content [in Ukrainian].
3. E-commerce – history, facts, trends, innovations. (n.d.). Retrieved from https://project-seo.net/blog-uk/elektronna-komercija-istoria-fakty-trendy [in Ukrainian].
4. Kravchenko, B.O. (2023). Development of e-commerce in Ukraine: prospects, challenges and development trends in 2023. In Digital transformations and innovative technologies in the economy: challenges, realities, strategies: Proceedings of the International Conference (pp. 5-8). Sumy: Sumy State University [in Ukrainian].

5. Larina, Ya., & Nahorna, O. (2024). Current state and trends of e-commerce development in Ukraine. Herald of Khmelnytskyi National University. Economic Sciences, 326(1), 373-380. DOI: 10.31891/2307-5740-2024-326-59 [in Ukrainian].
6. Ilchenko, N. (2017). E-commerce logistics: B2C models. In Proceedings of the XV International Scientific and Practical Conference "Global Competitive Environment" (pp. 179-181). Kyiv: NAU [in Ukrainian].
7. Kharchenko, T.B., & Sahaidak, Yu.A. (2024). Improving sales logistics management in modern conditions. Scientific Bulletin of Poltava University of Economics and Trade. Economic Sciences, 1(111), 59-64. DOI: 10.37734/2409-6873-2024-1-8 [in Ukrainian].
8. Chernopyska, N.V., & Solodka, O.V. (2007). E-commerce logistics. Lviv: Lviv Polytechnic Publishing House [in Ukrainian].
9. Yunlin, C. (2023). Awareness of green logistics technology, certification, and standards among Chinese logistics firms. Journal of Traffic and Transportation Engineering, 10(5), 798-812. DOI: 10.1016/j.ajsl. 2023.10.004 [in English].
10. Qin, W., & Qi, X. (2022). Evaluation of green logistics efficiency in Northwest China. Sustainability, 14(11), 6848. DOI: 10.3390/su14116848 [in English].
11. Li, M., Shao, S., Ye, Q., Xu, G., & Huang, G. Q. (2020). Blockchain-enabled logistics finance execution platform for capital-constrained E-commerce retail. Robotics and Computer-Integrated Manufacturing, 65, 101962. DOI: 10.1016/j.rcim.2020.101962 [in English].
12. Zaichenko, K.S. (2023). Digitalization of economies and society: global trends. Actual Problems of Economics, 9(267), 21-30. Retrieved from: https://eco-science.net/wp-content/uploads/2023/09/09. 23._topic_Kateryna-S.-Zaichenko-21-30.pdf [in Ukrainian].
13. Bashynska, I.O., Petrova, L.S., & Popovych, K.F. (2020). Risk management in the implementation of innovation projects. Economy. Finance. Law, (2), 11-13. DOI: 10.37634/efp.2020.2.2 [in Ukrainian].
14. Fylyppova, S.V., & Jahan Fawzi Salem Ismail. (2024). Trends in the post-industrial transformation of socio-economic relations and competitiveness factors of business structures. Economics: Time Realities, 1(71), 114-123. DOI: 10.15276/ETR.01.2024.14 [in Ukrainian].
15. Zaichenko, K.S., & Fylyppova, S.V. (2019). Innovative development of small industrial enterprise in conditions of informatization of economy: organizational component. Schweinfurt: Time Realities Scientific Group UG (haftungsbeschränkt). [in English].
16. Nekrasova, L.A., & Matsko, N.H. (2021). Assessment of the production potential of innovation-active industrial enterprises based on IEKO-analysis. Business Inform, (5), 188-193. DOI: 10.32983/2222-4459-2021-5-188-193 [in Ukrainian].
17. Bashynska, I. O. (2016). Innovation and information technologies for ensuring the intellectual and human resource component of enterprise economic security. In Innovative economy: theoretical and practical aspects: monograph (Vol. 1, pp. 607-635). Kherson: Hrin D. S. [in Ukrainian].
18. Zhou, Y., Li, Q., & Wang, C. (2024). How digital transformation enhances corporate innovation: Evidence from Chinese manufacturing firms. Heliyon, 10(6), e34905. DOI: 10.1016/j.heliyon. 2024.e34905 [in English].
19. Zakharchenko, V.I., & Yermak, S.O. (2022). Key tasks of crisis management in the design and modeling of organizational and technological systems in high-tech production (Part 1). Economics: Time Realities, 2(60), 5-21. DOI: 10.15276/ETR.02.2022.1 [in Ukrainian].
20. Bashynska, I.O., Filippov, V.Yu., & Cherniagina, N.S. (2021). Industrial parks of Ukraine: current state and prospects of development under digitalization of the innovation economy. Economy. Finance. Law, (10), 9-12. DOI: 10.37634/efp.2021.10.2 [in Ukrainian].

Посилання на статтю:
Zaichenko K.S. Innovative Logistics in E-Commerce: Challenges, Opportunities and Prospects / K.S. Zaichenko, A.S. Orlenko, Lei Van // Економіка: реалії часу. Науковий журнал. – 2025. – № 6 (82). – С. 74-83. – Режим доступу: https://economics.net.ua/files/archive/2025/No6/74.pdf.
DOI: 10.15276/ETR.06.2025.7. DOI: 10.5281/zenodo.18064492.

Reference a Journal Article:
Zaichenko K.S. Innovative Logistics in E-Commerce: Challenges, Opportunities and Prospects / K.S. Zaichenko, A.S. Orlenko, Lei Van // Economics: time realities. Scientific journal. – 2025. – № 6 (82). – P. 74-83. – Retrieved from: https://economics.net.ua/files/archive/2025/No6/74.pdf.
DOI: 10.15276/ETR.06.2025.7. DOI: 10.5281/zenodo.18064492.