

The research considers the construction of a supply chain management system for e-commerce enterprises in the face of political threats and the manifestation of the risks of military conflicts. In the system of political risks to the functioning of supply chains (SC) of e-commerce enterprises, the threats of military conflicts and civil confrontations are highlighted. It has been established that despite the indirect and relatively low sensitivity of e-commerce to political risks, there is a high probability of negative impact on the mechanism of functioning of supply chains of e-commerce enterprises of military conflicts. The characteristic directions of influence of the risks of military conflicts on the activities of e-commerce enterprises are revealed. Five groups of risks for the supply chain of an e-commerce enterprise caused by military conflicts have been identified: infrastructure, contractual, economic, financial, social, reputational. The consequences and directions of influence of factors of military-political instability on the functional areas of logistics of the supply chain of e-commerce enterprises are determined. The ranking was carried out using the expert method of risks of military conflicts for supply chains of e-commerce enterprises. It was established that in 1st place with an importance coefficient of 0.18 there is a risk of deterioration of information relations. It was estimated that the average period for the restoration of supply chains since the beginning of hostilities is 2–3 months. The study schematically depicts the cyclical causality of the functioning of the supply chain of an e-commerce enterprise in the face of aggravation of military-political conflicts. An algorithm for the construction of a risk management system for e-commerce enterprises has been developed

Keywords: e-commerce, supply chain, logistics, political risks, military conflicts, risk management

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ADAPTATION OF RISK MANAGEMENT IN THE SUPPLY CHAINS OF E-COMMERCE ENTERPRISES UNDER THE CONDITIONS OF POLITICAL INSTABILITY

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1. Introduction

The conditions for conducting commercial activities in any form can be defined as dynamic, changeable, often uncertain, unpredictable, and not to be forecasted. Most companies are characterized by “narrow” (deliveries from the wheels) and too branched in geography supply chains, outsourcing and “optimized” inventory management [1]. Given the riskiness of the external environment, the already established principles and concepts of the functioning of supply chains, focused on optimization and timeliness, based on predictability, often do not work, and need to be revised.

Globalization, which is often represented as a kind of leitmotif of business development, expanding opportunities for it and the world society as a whole, at the same time is an environment of a huge number of various risks, the likelihood and consequences of which are extremely difficult to assess. The scale of the importance of risks cannot be

overestimated also because not only business structures that function globally turned out to be involved in globalization processes. The vast majority of local companies are also tangential to them, whose supply chains are either part of global or depend on the directions of development of the latter.

Analytical conclusions on the development of segments of the economies of individual countries and the world as a whole invariably note the highest growth rates of e-commerce. Thus, the volume of e-commerce is constantly growing; over the period 2017–2022, it increased by USD 2.2 trillion. Positive dynamics are also observed in the B2C segment – the growth over this period more than doubled from USD 2.38 billion in 2017 to 4.89 in 2021. The development of mobile commerce is quite rapid, the share of which in e-commerce increased from 25.4 % in 2016 to 72.9 % in 2021. In turn, the number of Internet users in the world over the past 5 years increased by 1.7 billion and amounted to 4.9 billion in 2021 [2–4].

Among the most obvious prerequisites for the development of trade through the Internet, the level of coverage of the population with access to the network is distinguished. In addition, the increase in e-commerce volumes is due to the advantages for online business. This is a great potential for the development of the system of working with customers, personalization of offers, full information support; absence of barriers to enter the market, development of its new segments, expansion of the list of services provided. The advantages are the ability to expand geographical coverage, global access to world markets. The order fulfillment cycle and overall logistics costs can be significantly reduced. Contributing to the development of e-commerce is the ability to carry out most business processes online, integrate systems and automate operations, which as a result reduces total costs.

Such a scale of the e-commerce sector, on the one hand, may indicate its relative stability, autonomy from external factors, threats, risks, and influences. However, it is obvious that there are environmental risks that affect the parameters and effectiveness of any business structures. In fact, these are force majeure risks, some of which relate to force majeure circumstances and events. First of all, it concerns political risks, on which economic actors have the least leverage, as well as the true causes of which are beyond their understanding and competence.

The most destructive risks of political instability for business activities are in cases where they develop into military confrontations, armed conflicts, and hostilities. Especially if, as a result of their occurrence, a state of emergency or martial law is introduced. Such situations of chaos and panic are devastating for any market mechanisms and levers of economic activity, including in the field of e-commerce. Being generally less sensitive to most risks compared to traditional trading, the effectiveness of the logistics system of the e-commerce entity is still largely determined by the ability to identify and analyze these risks. It is also important to establish the nature and extent of their impact, to develop the ability to minimize the unpredictability of environmental factors and the negative consequences of adverse events.

Accordingly, there is a need for the e-commerce entity to introduce risk management tools aimed at identifying risks and ensuring minimization of their destructive impact on the logistics system, as well as the development of preventive measures for the future period.

2. Literature review and problem statement

Paper [5] outlines the composition of political risks, including such events as war, revolution, coup d'état, expropriation, the imposition of restrictions on imports, etc., as well as their possible consequences for the business entity. The work is aptly focused on the need to analyze political risks through the prism of the economic interests of the business structures themselves and the factors affecting it. This approach is used in the article in the process of studying the specificity of the functioning of e-commerce enterprises and determining the extent and directions of their sensitivity to political risks, in particular military conflicts and confrontations. At the same time, most studies and ratings [5] consider political risks only as part of the level of investment attractiveness of countries, and, which is also important, do not always include the likelihood of military conflicts. This limits the possibility of applying their methodology to

e-commerce enterprises, which cannot be fully considered institutional investors. After all, these entities are primarily aimed at obtaining results from the already existing state of the economic and investment environment in the country.

As a source of risks for e-commerce, a number of authors consider globalization processes, which are also one of the main triggers for the expansion of e-commerce along with the rapid development of information and communication technologies [6]. The globalization of the world business environment leads to the emergence of unknown conditions and new risks. With the ability to increase competitive advantage, supply chains have demonstrated a tendency to expand their networks beyond national markets and use a global search strategy [7, 8]. There are many motivations that encourage global search, such as access to products at lower prices, better access to new technologies, and a greater chance to enter new markets [9]. However, this phenomenon leads to a complication of supply chains and imposes on them greater uncertainty and vulnerability (for example, local political instability, exchange rate fluctuations). As a result, their effectiveness may decrease in the absence of proper management and control [9, 10].

In addition, the internationalization of suppliers emphasizes the role of economic and political relations between countries. Thus, any political or military conflicts between states have a huge impact on the company's performance. With the escalation of conflicts, one of the expected actions of governments is to impose sanctions. Obstacles to imports and exports, financial problems, including restrictions on financial transactions and reduced cooperation with foreign countries, are just some of the difficulties caused by sanctions [9]. The growing sensitivity of Internet business to unpredictable changes in the political and legal business environment outside the country of origin is also discussed in [11]. The authors also note that internet companies are likely less sensitive to traditional political and legal risks, such as expropriation or coup d'état. At the same time, they are characterized by vulnerability to such risks as non-compliance with intellectual property rights; uncertainty about the legal force of electronic contracts; changes in taxation; or the legal liability of Internet service providers. In addition, which is very important, the trust of online consumers depends on a favorable national political and legal environment that can ensure the integrity of e-commerce transactions.

Study [12] emphasizes, in general, the lower importance for e-commerce of political and regulatory risks compared to economic ones. At the same time, there is a higher level of sensitivity of internet companies of transboundary trade to the logistical risks associated with customs clearance, transportation, and distribution procedures. In [13], there are three groups of risks for e-commerce: economic, social perception and awareness, and legal and institutional. In interaction, these risks determine the development of e-marketplaces in general, including through the impact on the readiness of consumers, companies, and the macro environment for e-commerce and the legitimacy of this type of activity. The political factors of the external environment of e-commerce mainly relate to regulatory processes involving the establishment of rules, monitoring and authorization of e-commerce. In general, the study also demonstrates the relative indirectness of the influence of political factors on the activities of e-commerce enterprises. Therefore, there are grounds for identifying risk groups that are caused by military conflicts and have a direct im-

impact on the conditions for the functioning of supply chains in e-commerce.

From the point of view of supply chain management (SCM), there are different interpretations of risks and their directions of influence on e-commerce. In particular, in [9], supply chain risk is interpreted as any risk to the flow of information, materials, and product from the original suppliers to the supply of end products to the end user.

There are different classifications of risks in the literature on supply chain risk management (SCRM), and their relevance depends on the aforementioned chain [9]. Since risk identification is the first step of SCRM [9], a risk categorization system can be useful for successful identification of risks. The study also revised a risk classification system that includes the risks of supply, demand, security, macro, political, competitive, and resource risks. However, this risk classification still does not cover all aspects of the supply chain. In [9], it is emphasized that in order to identify and classify complex risk problems, it is better to divide the supply chain system into subsystems by financial, informational, and material flows. A special place in study [14] is given to the analysis of economic sanctions in the SCM system. They are considered as a source of failures (unplanned and unpredictable events) and can interrupt the flow of materials, information and cash, lead to delays for customers and loss of sales and income. In the course of researching the risks of the external environment for SCs of e-commerce enterprises, it is important to rank them and determine the degree of vulnerability of the Internet company to the consequences of each of them [15].

Reducing vulnerability to risk is a key risk management concept. Thus, SCRM is based on the coordination and cooperation of supply chain actors to predict risks to develop and implement appropriate strategies that would be suitable for overcoming the negative consequences of such risky events [16]. A wide range of qualitative and quantitative processes and methods have been developed and used to manage supply chain risks [17]. The main components of most of them are risk identification, risk analysis, risk management, monitoring, and risk assessment [9]. However the consideration of the characteristic features of the construction and functioning of the risk management system for military conflicts for e-commerce enterprises remained unattended.

A large body of e-commerce research is mostly focused on the analysis of its scale, causes and motives for the development of this area in trade, as well as on the peculiarities of the construction and functioning of supply chains of Internet companies. E-commerce includes any form of economic activity carried out through the establishment of electronic links [18]. The growth of its scale in recent decades has significantly changed the role of logistics in the supply chain of goods. In [19], e-commerce is presented as one of the megatrends in the global economy, contributing to a change in the configuration of the trade industry. Moreover, e-commerce is making changes to logistics, causing the emergence of E-Logistics and the construction of electronic supply chains (ESC). Consideration of the relationship between e-commerce and logistics is of interest in academia [19]. In particular, a study into the impact of e-commerce on logistics services [19] showed that there are two main areas of it: the elimination of traditional elements of the supply chain and the growth of activities in the online environment.

In the context of the prerequisites for the intensive development of e-commerce, its characteristic logistical

capabilities are highlighted in [20]. They lie in the plane of pre-sale and post-sale service, speed and reliability of delivery, sensitivity to the target market, delivery information, web-based ordering, widely branched distribution, and its low total cost.

The relationship between logistics performance and customer loyalty is much closer in e-commerce than in any other industry [21]. Orders in e-commerce are always small. However, the delivery of these orders is a rather complicated process, especially for cross-border online stores, logistics services are provided directly to the end customer who always has high expectations regarding their level. A study showed that the level of customer satisfaction with cooperation with an online seller is significantly influenced by the efficiency of logistics organization, especially the "last mile" delivery function [21].

Logistics in the context of e-commerce is characterized by fragmented and variable order volumes, high-speed flow, a variety of delivery options, and drop shipping to end users. Hence, the ability to fulfill and deliver online orders on time is fundamental to the success of e-commerce. And it is precisely the threats of its implementation that the analysis of environmental risks and the development of risk management tools to prevent and minimize the consequences should be directed.

Another approach to studying the conditions for the functioning of supply chains in e-commerce is to highlight their functional areas: supply chain network design (SCND) [22]; output logistics (OL) [23]; reverse logistics (RL) [24]; warehousing (WR) [18, 22, 25–27]; IT and electronic data management (E-IT) [18, 28]. We share a point of view [18, 22–28] but, at the same time, emphasize the need to define characteristic features of the impact of risks of military conflicts on the functional areas of logistics of e-commerce enterprises.

The complexity, dynamism, and versatility of e-commerce logistics have prompted Internet companies to outsource their logistics services, including packaging, warehousing (inventory management) and delivery of goods to customers, third-party contractors. Rightly in this context, it is noted in [28] that increasingly the most popular strategy in e-commerce logistics is the transfer of one or more logistics operations/functions of 3PL to operators".

Obvious changes in the analysis of the impact of military conflicts on the activities of companies in the field of e-commerce occurred with the beginning of the Russian military invasion of Ukraine. In [29], five main negative consequences of the war for e-commerce enterprises are identified: disruption of supply chains, additional delivery costs, altered consumer demand, higher interest rates associated with inflation, panic accumulation of products. But this list of negative consequences can be much wider, which will be confirmed by the results of the conducted research. The destructive effect of this conflict for all stages of the e-commerce business process, that is, from the search for sources to the sale of products and changes in consumer behavior, is also discussed in [30]. The paper also predicts that inflation, sanctions, shortages of goods, and numerous changes in consumer behavior caused by the conflict will undoubtedly become an obstacle to the growth of e-commerce in many parts of the world. The analysis of changes in the e-commerce market as a result of a full-scale invasion of the country in study [31] demonstrated, on the one hand, its sensitivity to environmental risks and various risks, and

on the other hand, its ability to recover quickly. However, the issues related to the development of an appropriate algorithm for preventing the emergence and minimization of the manifestation of the negative consequences of military conflicts remained unresolved.

At the same time, it is obvious that insufficient attention in the scientific community is paid to the analysis of the composition and directions of the impact of supply chain risks on the activities of e-commerce enterprises. In particular, political, information risks and threats associated with relations between participants in the supply chains of Internet companies remain much less studied. Separated from the problems of risk management are also studies of supply chains in electronic channels for the sale of goods.

All this suggests that it is expedient to conduct a study aimed at analyzing the impact of the risks of political instability on the functioning of supply chains of e-commerce enterprises. The result of such an analysis should be the development of a set of approaches and measures for the construction and functioning of the risk management system of the supply chain of an e-commerce enterprise.

3. The aim and objectives of the study

The aim of this study is to establish the nature of the sensitivity of e-commerce enterprises to the risks of military conflicts and to identify the main threats to the functioning of their supply chains. This will make it possible to identify promising directions for the development of their supply chain risk management systems in the face of political threats around the world.

To accomplish the aim, the following tasks have been set:

- to highlight in the system of political risks the functioning of supply chains of e-commerce enterprises the threats of military conflicts and civil confrontations;
- to identify the characteristic directions of influence of the risks of military conflicts on the activities of e-commerce enterprises and evaluate them by structural, temporal, and qualitative parameters;
- to develop an algorithm for the construction and functioning of a risk management system for e-commerce enterprises, aimed at preventing and minimizing the negative consequences of military conflicts.

4. The study materials and methods

The object of this study is the process of forming a system for managing the risks of military conflicts in the supply chains of e-commerce enterprises and ensuring its functioning.

The main hypothesis of study assumes that the threats of military conflicts as a component of political risks require adapted risk management since they have a direct impact on the already established mechanism of functioning of supply chains of e-commerce enterprises.

The assumption adopted in our study suggests that the risks of military conflicts have characteristic features of the impact on the activities of e-commerce enterprises. In accordance with this, the mechanism of adapted management is embodied in the appropriate algorithm for the construction of a risk management system for e-commerce enterprises. Its operation will contribute to the prevention of occurrence

and minimization of the manifestation of negative consequences of military conflicts.

The methodological apparatus of this study consists of general scientific methods (system analysis, causal relationships between economic phenomena and processes, comparative). To achieve the goal set, special economic methods are also used: statistical and analytical, method of qualitative and quantitative analysis, method of situational analysis, expert method. In addition, we used software tools for visualization of risk management processes of military conflicts of the e-commerce enterprise – the means of notation of business process modeling (BPMN) Microsoft Visio.

The materials of the research were modern scientific concepts and theoretical developments on the effective organization of supply chains in e-commerce in the face of the risks of the global political environment. Analytical materials of international rating agencies, consulting organizations, Promodo Agency, the Association of Retailers of Ukraine, statistics of the World Bank, as well as expert opinions of representatives of SC of e-commerce enterprises were also studied during study.

5. Results of investigating the construction of a risk management system related to military conflicts in the supply chains of an e-commerce enterprise

5.1. Investigating the sensitivity of e-commerce enterprises to the risks of military conflicts

A characteristic feature of the modern stage of development of world retail trade is the growing role of electronic channels for the sale of goods and the provision of services, the diversification of organizational forms of trade activities using modern information and communication technologies. According to a recent study, it was predicted that by 2024 the global e-commerce market will reach more than USD 6388 billion, showing annual growth of about 13.5 % [32].

The volume and effectiveness of e-commerce directly depend on the characteristics of demand, including the number of consumers of the corresponding age and gender structure. In this regard, it is important to remember that the assessment of the impact of political risks and the identification of ways out of crisis situations by Internet companies should be carried out with a focus on ensuring the quality and reliability of supplies. After all, the economic results of trading activities for an online seller will directly depend on the quality of customer satisfaction and customer loyalty. Therefore, the role of the logistics function in ensuring the uninterrupted flow of materials, products and information throughout the company's supply chain is also obvious [28].

Since the logistics system of the e-commerce entity is open, complex, with many elements in its structure and stable relationships between them, there is an objective need to develop specific approaches and an algorithm for organizing risk management.

It is important for the subject of e-commerce in order to ensure the sustainability and efficiency of the logistics system to assess and predict the impact of external risks associated with political instability. Their negative action causes an aggravation of crisis phenomena, deterioration of the investment climate, a decrease in innovation potential, creating the basis for the emergence of new and active negative effects of existing risks [33]. Risks related to mili-

tary-political and territorial conflicts lead to the destruction of established processes within the supply chains of e-commerce, make it impossible to effectively perform logistics functions and operations.

Accordingly, the initial stage of managing the risks of military conflicts of an e-commerce enterprise should be their detailing, identifying the most significant among them and assessing the likelihood of their occurrence. At the same time, it is necessary to assess possible scenarios for the development of events for participants in the supply chain, as well as the scale of their negative consequences.

Identification of risks involves the identification of factors, events, and circumstances that cause their occurrence in the e-commerce supply chain. Risk analysis involves determining the causes and sources of their occurrence, the consequences of a possible manifestation with the help of subjective judgments of specialists and an expert research method.

Identifying and assessing the impact of political risks on the activities of e-commerce enterprises, first of all, it is necessary to distinguish between situations when it is direct and when it is indirect. Thus, the nature of the impact of political risks on online trading is determined by the characteristics of the companies in this segment themselves. In particular, the enterprise e-commerce directly depends on the political environment if it:

- functions as a resident of this country, that is, like any other business entity;
- participates in investment projects, scales and diversifies areas of activity (construction of fulfillment centers, omnichannel trade, provision of a range of services for delivery, warehousing of orders, etc.);
- lobbies the interests of representatives of the e-trade market through participation in the work of relevant committees, associations, etc.

More indirectly, political obstacles to business are experienced by those e-commerce enterprises that consider the region in question only as a market or their global supply chains include local suppliers and partners.

Different types of political risks are not the same in the direction and degree of influence on the activities of e-commerce enterprises. In particular, the risks associated with the institutional and regulatory regulation of the activities of Internet companies are of paramount importance in the process of strategic planning of supply chains of e-commerce enterprises. And already at the operational level, they form the framework conditions of activity: settlements, customs clearance of goods on Internet trade, etc.

In general, the sensitivity of e-commerce to political risks is mostly not direct and relatively low. However, with a high probability of their escalation into military conflicts, e-commerce reacts instantly because this has a direct impact on the already established mechanism of functioning of supply chains of e-commerce enterprises. The importance of military risks, in particular for e-commerce supply chains, is confirmed by study [34], in which business representatives from 124 countries were asked to identify 5 of the 35 most significant risks over the next 2 years. The 5 most dangerous risks included interstate conflicts, threats of terrorist attacks, which also have a political basis, and risks of forced migration. They were noted in 16 countries, mostly politically unstable, such as Armenia, Georgia, Greece, Republic of Kazakhstan, Latvia, Lithuania, Moldova, Poland, Ukraine, etc.

Separately, it is worth noting the fact that the onset of risks of military conflicts requires a prompt response. Accordingly, military actions and armed confrontations should no longer be seen as purely political risks, but rather as operational ones. Thus, in some rating assessments, for example, the Fitch rating agency (USA), when determining the country's risk index, the risks of interstate conflicts, terrorism, along with crime (including cyber-crime) are classified as operational risks [6].

As a confirmation of the sensitivity of e-commerce to the risks of military conflicts and armed civil confrontations, let us analyze the dynamics of the B2C E-commerce Index (UNCTAD) values for countries where these events occurred. The following countries were selected for the analysis: Azerbaijan, Afghanistan, Armenia, Egypt, Moldova, and Serbia. Thus, in the period 2016–2020, there is a correspondence of the dynamics of e-commerce development in these countries to the general global trend and averages 18.2 % in these countries, also, short-term fluctuations in the index are characteristic of them, which may indicate a lower sensitivity of e-commerce to this risk group and the ability to recover quickly compared to other areas of the economy. A more obvious evidence of the impact of threats of military risks on e-commerce can be the example of the situation in Egypt in 2017, where a state of emergency was imposed at that time. For that country, there was a decrease in the B2C E-commerce Index (UNCTAD) from 39.9 in 2016 to 29 in 2017. However, the following year, this figure began to increase to 34.4, and in 2018 it reached the pre-crisis level [35].

The impact of risks associated with military-political and territorial conflicts on the functioning of supply chains in e-commerce should be considered in the context of threats to the smooth implementation of tasks in the main functional areas of logistics. We are talking about:

- 1) supply chain network design (SCND), covering strategic management and cooperation with suppliers and partners in electronic sales channels;
- 2) outbound logistics (OL), the main task of which is to meet demand by ensuring proper delivery conditions;
- 3) reverse logistics (RL) of returns, which is also a factor in customer satisfaction and the efficiency of the online seller;
- 4) warehousing (WR), in particular, distribution centers and inventory storage systems;
- 5) IT and Electronic Data Management (E-IT), which directly determines the level of information support for customers and partners in the e-supply chain.

Let us single out the following groups of risks that are caused by military conflicts and have a direct impact on the conditions of functioning of supply chains in e-commerce:

1. Infrastructural – risks of destruction/damage/blocking of transport/warehouse/trade/Internet infrastructure providers. The negative consequences of this risk group for e-commerce are manifested due to disruptions/delays in the supply and delivery of orders to consumers; loss of inventory and sales; reducing the quality of logistics services.

In particular, damage or blocking of distribution centers and warehouses in e-commerce, which support various processes related to the storage of goods, order processing, collection of shipments, etc., requires a change in the configuration of supply chains. Tangible for consumers are changes in the speed and quality of order fulfillment by an e-commerce enterprise.

The destruction of transport infrastructure as a result of hostilities has a direct impact on the organization of the delivery of orders to online consumers (last-mile logistics) and the movement of products within SC. In addition to the high probability of non-fulfillment of orders, transportation processes become longer and more expensive, which together negatively affects the level of customer service for e-commerce enterprises.

The loss or blocking of the work of shopping facilities of online stores (offices, showrooms, points of issue of orders) also causes the risks of loss of inventory and sales volumes. An increase in the volume of returns due to the inability to provide the buyer with proper conditions for choosing a product and its physical inspection is also highly likely.

2. Contractual – related to the impossibility of fulfilling contractual obligations between participants in e-commerce supply chains: suppliers, providers of logistics services, and consumers themselves.

Analysis of the consequences of the risks of military conflicts for e-commerce enterprises should be carried out from the standpoint of the subject of contractual relations and its role in SC. Thus, for Internet companies operating in the market of a country where there are military confrontations, the urgent issue will be, first of all, the organization of the delivery of products from abroad, and then directly to the online buyer. In this case, the most tangible will be the risks of outsourcing or “third-party risks” related to the conditions of cooperation with partners in SC, primarily 3PL providers. In addition, in a situation of the impossibility of importing products of foreign suppliers into the country, the online seller will have to reorient to domestic manufacturers of similar products or, even, change the commodity specialization.

Accordingly, the possible consequences for contractual relations in the SC of e-commerce enterprises are:

- 1) conclusion of cooperation agreements with new suppliers of goods and services;
- 2) making changes to previous agreements with partners in SC regarding obligations on terms, cost, volume of supplies, terms of payment, liability of the parties, etc.;
- 3) changes in the contractual terms of sale to the final consumer, in particular regarding the terms and conditions of delivery, payment and return.

3. Economic and financial risks – external factors of formation of costs and added value in the supply chain of e-commerce, as well as management of financial flows – financial, settlement and currency transactions.

Economic and financial manifestations of the risks of military, armed confrontations for the activities of the e-commerce enterprise are tangible in the following areas:

- 1) a decrease in gross income due to loss of sales, a decrease in consumer demand;
- 2) an increase in total costs in SC;
- 3) restrictions on financial transactions, both with suppliers and partners in SC, and with online buyers.

Accordingly, e-commerce enterprises are experiencing the economic consequences of military conflicts in working with partners in SC. The latter react to the increase in credit rates, inflationary processes, and currency restrictions, and in interaction with buyers, for whom the ability to make purchases in installments, etc. may become limited.

4. Social risks involve changes in the characteristics of the demand of online buyers during hostilities, armed confrontations.

For e-commerce, migration processes pose the greatest risk, leading to a significant reduction in the volume of trade.

For example, during the period from the beginning of the full-scale Russian invasion of Ukraine to May 2022, more than 7 million people crossed the state border, and more than 6.5 million people changed their place of residence within the country. In the 1st week, online stores experienced a decrease in traffic by an average of 82.7%. However, from next week, there began to be a positive trend in the number of sessions, especially in the regions of the country, where the main internal migration flows were directed [31]. Positive dynamics of e-commerce are possible if the population moves within the country, then at the initial stages the number of orders for necessary things increases significantly. If the population emigrates to other countries, they can be followed by online sellers (both domestic and international). The demand for goods in online stores during the period of military and political instability of the country may increase due to the relatively higher danger of visiting offline stores. In addition, the shortage of goods in traditional stores, along with the moods of panic accumulation among consumers, determine their desire to compensate for it through online purchases. Therefore, they, diversifying their sales channels, also move to the electronic space. The scale of e-commerce in the domestic market, which is more stable in terms of logistics, can increase and cause an increase in the number of online stores and the expansion of their range.

The decrease in online sales is also influenced by the structure of demand, which shifts toward essential goods and lower costs. Thus, the TOP-7 categories of online shopping during the war in Ukraine included:

- food – 58 %;
- medicines – 33 %;
- clothes and shoes – 30 %;
- hygiene and personal care products – 29 %;
- household chemicals – 17 %;
- pet products – 17 %;
- goods for children – 14 % [31].

Gender inequality in migration flows caused by departure due to hostilities, mainly women and children, which generate the bulk of online orders, also significantly affects e-commerce. Its most obvious consequence is the reduction in sales and changes in their product structure more in accordance with the basic needs and preferences of the male audience of online stores. In particular, in Ukraine, the gender ratio of consumers and e-commerce has changed as follows: 37.65% (men) to 61.64% (women) as of March 2021 and 44.39% (men) to 51.9% (women) in March 2022 [31]. The redistribution of market share in favor of local Internet companies may also be noticeable since due to an unpredictable tomorrow, consumers prefer domestic, more controlled delivery of orders.

Such a social effect of migration as a decrease in the number of employees due to their dismissal, obtaining refugee status or temporarily displaced persons also has its effect on the activities of an e-commerce enterprise. As a result, the quality of processing customer orders decreases, and in some cases, they are not accepted at all, since there is no one to advise, accept, and send the order.

In situations of aggravation of military-political conflicts, it is important for the business to adhere to socially oriented standards. In particular, to maintain a socially oriented price level despite inflationary processes and the rise in logistics prices; to fulfill the obligations to deliver orders to online buyers as much as possible, etc.

A negative social effect may also have a violation of the guarantees of information security in the network under

conditions of military-political instability in the country. In particular, we are talking about the confidentiality of information about consumers and customers, the prevention of fraud with payment cards, etc. Such situations can arise as a result of phishing attacks, hacking of websites, malware, ransomware attacks, and unsecured web services. Therefore, it is important to strive to achieve the trust of online consumers, which depends on a favorable national political and legal environment that can ensure the integrity of e-commerce transactions. That is, consumers must believe that the judicial system can effectively combat fraud or other illegal activities.

Moreover, information threats, in addition to social ones, can entail serious financial and reputational risks for the e-commerce enterprise itself.

5. Reputation risks are associated with the formation of consumers and supply chain partners' impression of the Internet company as an insufficiently reliable partner or seller. Such an unfavorable situation may arise in the case

of failures in supply, non-compliance with the deadlines and completeness of delivery. In addition, e-commerce enterprises may feel reputational risks as a result of their mistakes in the context of compliance with the political and patriotic moods of consumers. For example, if goods of producers of the aggressor country or with symbols that are negatively perceived by society are offered for sale, etc. A significant negative reputational effect for an e-commerce enterprise relates to difficulties with information support of the client, which are highly likely as a result of damage to the IT infrastructure and/or insufficient staffing of the online store. The consequence of reputational risks may be the loss of orders, changes in the structure of the range, the composition of suppliers, the geography of sales, etc.

The consequences and directions of influence of factors of military-political stability on the functional areas of logistics of the supply chain of e-commerce enterprises are summarized in Table 1.

Table 1

Directions of influence of risks of military conflicts on the functional areas of logistics of e-commerce enterprises

SC functional link	Risk				
	Infrastructural	Contractual	Economic and financial	Social	Reputational
SCND	<ul style="list-style-type: none"> – the need to change SC configuration; – monitoring of the composition and performance of infrastructure facilities in SC; – view routes and methods of delivery of orders 	<ul style="list-style-type: none"> – change in product specialization of the online store; – reducing the width and depth of the assortment; – change in the composition of suppliers and partners; – review of logistics outsourcing strategies 	<ul style="list-style-type: none"> – increase in expenses in SC; – decrease in gross income; – the need for optimization of SC; – reorientation of the composition of suppliers towards internal ones; – decrease in the share of imports in the structure of the assortment 	<ul style="list-style-type: none"> – change in the geography of sales (following migration flows); – change in the structure of consumption; – reorientation to other market segments 	<ul style="list-style-type: none"> – availability of suppliers from unfriendly countries; – the assortment of goods does not correspond to the patriotic and political sentiments of consumers; – SC does not meet information security requirements
OL	<ul style="list-style-type: none"> – loss of orders; – impossibility of delivering orders to consumers; – increasing the delivery time of orders 	<ul style="list-style-type: none"> – violation of contractual terms of shipment and delivery; – non-compliance with agreed product quality standards; – change of settlement conditions 	<ul style="list-style-type: none"> – increase in the cost of logistics services; – problems of supply of imported goods; – disruptions in the operation of payment systems; – an increase in the level of sales prices 	<ul style="list-style-type: none"> – reduction of purchasing flow; – the difficulty of maintaining an affordable level of delivery costs; – decrease in the level of delivery reliability; – the need for operational adjustment of processes 	<ul style="list-style-type: none"> – decrease in the level of service of orders; – problems with informing about the availability and parameters of the product; – problems with delivery tracking
RL	<ul style="list-style-type: none"> – problems with processing returns at warehouses; – delays of reverse flows; – loss or blocking of returns; – increasing the volume of returns 	<ul style="list-style-type: none"> – revision of the terms of service of reverse flows by the local 3PL provider; – reviewing the conditions for returning goods by customers 	<ul style="list-style-type: none"> – increase in costs for processing reverse flows; – fines 	<ul style="list-style-type: none"> – the impossibility of observing the principles of sales loyalty within the limits of the return policy 	<ul style="list-style-type: none"> – a decrease in the level of satisfaction of the online buyer
WR	<ul style="list-style-type: none"> – loss of commodity stocks; – additional costs for redeployment and/or evacuation of stocks 	<ul style="list-style-type: none"> – impossibility of fulfillment of contractual obligations by the warehouse real estate operator 	<ul style="list-style-type: none"> – increase in costs for warehouse maintenance 	<ul style="list-style-type: none"> – decrease in the quality of after-sales service; – errors in inventory accounting and order processing due to lack of personnel in the warehouse 	<ul style="list-style-type: none"> – errors in ordering orders; – cancellation of orders due to lack of stocks
E-IT	<ul style="list-style-type: none"> – deterioration of the client's information support; – increasing the duration of order processing 	<ul style="list-style-type: none"> – non-compliance with contractual obligations by Internet providers, SaaS and CMS platforms; – problems with maintenance of information systems by developers 	<ul style="list-style-type: none"> – restrictions on non-cash payments; – complicating access to financial and legal information; – limitations in tracking the process of passing customs control 	<ul style="list-style-type: none"> – the threat of misuse of data about online buyers; – lowering the level of information support for the client 	<ul style="list-style-type: none"> – deterioration of the client's awareness of the status of the order; – problems with feedback; – cooperation with SaaS and CMS platforms, site designers of unfriendly countries

It is important to note that all the risks associated with military-political and territorial conflicts have the greatest impact on the operational functioning of the SC of e-commerce enterprises. That is, they lead to the destruction of well-established processes, make it impossible to effectively perform logistics operations for transportation, warehousing, procurement, and distribution.

5. 2. Ranking the risks of military conflicts and modeling the directions of their impact on the SC of e-commerce enterprises

Assessing the impact of risks associated with military-political, civil, and territorial conflicts, we determine the most significant threats that they pose to e-commerce enterprises. The selection of such consequences was carried out in relation to the main advantages, driving forces, and opportunities for the development of the e-commerce market.

Thus, for the analysis, ten threats posed by military conflicts for e-commerce were selected:

- the risk of destruction of established supply chains (loss of relations with suppliers, blocking of supplies from suppliers, destruction of the production capacity of suppliers; disruptions in the work of logistics providers, obstacles on transport routes of delivery);
- risk of property losses (loss of inventories, property of the online store);
- the risk of imbalance of the product range (change in the product specialization of the online store, reduction in the breadth and depth of the range, reduction of marginality, shortage of goods with an acceptable price-quality ratio, reduction in the share of imported goods);
- risk of late execution of orders (violation of delivery times);
- the risk of increasing total logistics costs;
- the risk of destruction of established transport routes of delivery (destruction, blocking of transport routes, restrictions, and prohibitions on crossing customs borders);

- risk of deterioration of information relations (information support of the client and interpersonal communications with customers, suppliers, and logistics operators);
- risk of violations of work with the reverse material flow (reverse) (increase in the number of returns, loss/blocking of returns);
- the risk of disruptions in the operation of payment systems (the impossibility of non-cash payments, settlements with suppliers, making payments);
- the risk of staffing the work of the e-commerce enterprise (migration of personnel, inaccessibility to shops/offices, problems of Internet communications).

From the set of identified risks, it is necessary to choose by ranking the most significant in terms of the probability of occurrence and the consequences of the impact on the subject of e-commerce. The significance of risks can be determined using the method of expert assessments on the basis of an integrated approach. In order to exclude the negative side of the chosen method – subjectivism, specialists in e-commerce, trade organization, management of foreign economic activity, transport and warehouse logistics were selected as experts. The assessment of the importance of risks was carried out on the basis of a survey of representatives of SCs of e-commerce enterprises, which were grouped into four groups:

- 1) representatives of Internet companies;
- 2) representatives of supplier companies;
- 3) representatives of 3PL providers;
- 4) representatives of demand in e-commerce.

Each expert is asked to assess each risk on a 5-point scale (1 – the least tangible threat, 5 – the maximum significance), as well as indicate the expected duration of the occurrence of adverse effects of the corresponding risk for the e-commerce enterprise. For each group of experts for each risk, the average value of its weight is derived, on the basis of which the total weight ratio is calculated (the average between risk assessments for 4 groups). In the same way, the limits of the period when the risks of military conflicts are the most tangible for an e-commerce enterprise are determined. The results of the calculations are given in Table 2.

Table 2

Ranking the risks of military conflicts for the SC of an e-commerce enterprise

No. of entry	Risk	Group 1	Group 2	Group 3	Group 4	Mean value	Ranking	Significance coefficient	Response average time
1	the risk of destroying established SCs	4.75	4.5	4.25	2.25	3.94	4	0.13	1 week – 2 months
2	risk of property losses	3	4.5	4.25	2.25	3.50	7	0.07	1 week – 1 month
3	the risk of product range imbalance	4	3.75	2.25	4.25	3.56	6	0.09	1 week – 1 month
4	the risk of late fulfillment of orders	4.25	3	4.25	4.75	4.06	3	0.15	1 week – 1 month
5	the risk of increasing total logistics costs	4.5	3.75	5	4	4.31	2	0.16	3 weeks – 3 months
6	the risk of a decrease in the number of online buyers	5	4	4	2.5	3.88	5	0.11	1 week – 1 month
7	the risk of deterioration of information connections	4.5	4.5	3.5	5	4.38	1	0.18	1 week – 1 month
8	the risk of reverse flow violations	3.5	3	3.5	3	3.25	9	0.04	1 week – 1 month
9	the risk of disruptions in the operation of payment systems	4.25	2.75	2.75	4	3.44	8	0.05	1 week – 1.5 months
10	the risk of personnel support for the operation of an e-commerce enterprise	3	2.75	2.25	1.75	2.44	10	0.02	1 week – 1 month

For greater clarity, we represent the results of calculations in the form of the following diagrams (Fig. 1, 2).

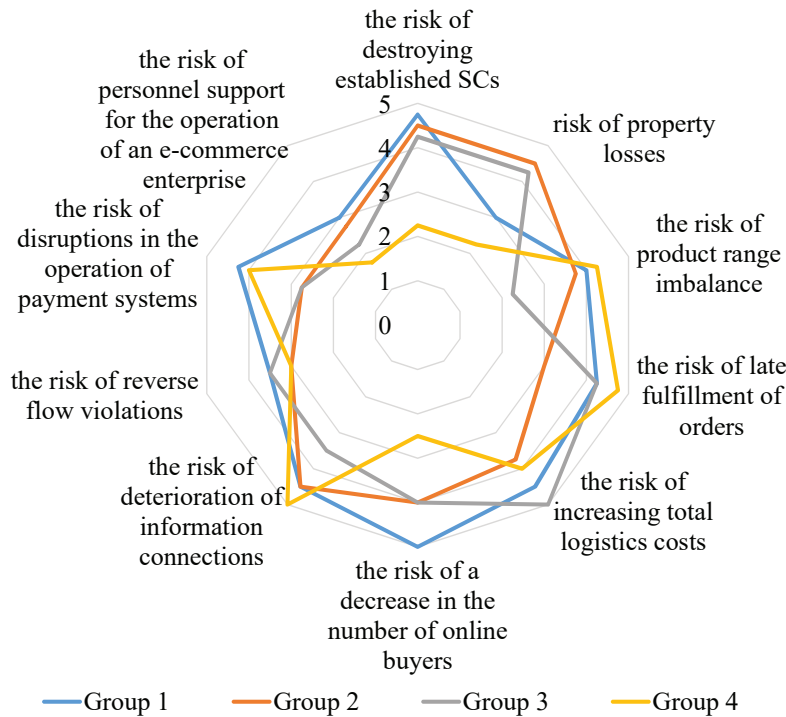


Fig. 1. Diagram of the assessment of the significance of the risks of military conflicts for 4 groups of participants in the supply chain of the e-commerce enterprise

The processing of the obtained data and the distribution of risks according to their significance creates a kind of basis for making a decision on the possibility of reducing risks or predicting their negative consequences for the subject of e-commerce. In particular, the top 5 threats posed by military conflicts for the SC of e-commerce included:

- 1) the risk of deterioration of information relations;
- 2) the risk of increasing total logistics costs;
- 3) the risk of late execution of orders;
- 4) the risk of destruction of established SC;
- 5) the risk of reducing the number of online buyers.

Accordingly, the greatest threats of military conflicts to e-commerce are those events and situations that lead to a decrease in the number of active online buyers; reducing the level of logistics service for the delivery of orders and information support of customers.

The directions of influence on e-commerce enterprises of threats associated with the aggravation of military-political conflicts, armed confrontations can be described with the help of reinforcing (green arrow) and balancing (red arrow) feedback. The main causal relation-

ships are represented in the form of a diagram of cyclic causality (Fig. 3). All threats posed by military conflicts potentially have a negative impact on the volume of turnover, and therefore the income of online stores. However, sometimes there is a possible reinforcing effect for e-commerce, caused, for example, by intensive internal migration flows or a shift in demand for online trading due to difficulty in accessing offline stores. This diagram is complemented by the clarification of the periods of occurrence of negative consequences for the e-commerce enterprise. According to the observations of participants in supply chains in e-commerce, their recovery takes place within 2–3 months from the beginning of the active phase of the military conflict.

Diagnosing the sensitivity of e-commerce supply chains to the risks associated with military conflicts, we highlight the following specific features:

- less likelihood of capital losses due to the small scale of ownership of infrastructure facilities;
- the negative consequences of expropriation, nationalization and economic sanctions are less likely;
- a high level of sensitivity to communication and information disruptions, given the dispersion of stocks and the orientation of e-commerce supply chains to information support of orders;
- a fairly high level of sensitivity to changes in demand since the range of e-commerce is much less represented by essential goods, in the direction of which the emphasis in purchases is shifting;
- relatively greater flexibility in reformatting the supply chain in the context of the range of goods, the composition of participants and partners, the geography of sales;
- rapid recovery of supply chains.

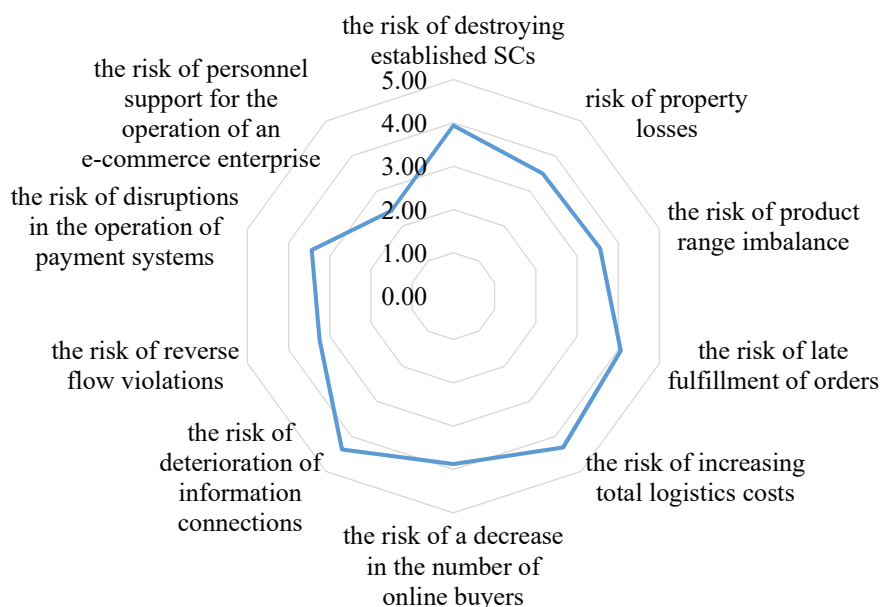


Fig. 2. Diagram of the significance of the risks of military conflicts for supply chains of e-commerce enterprises

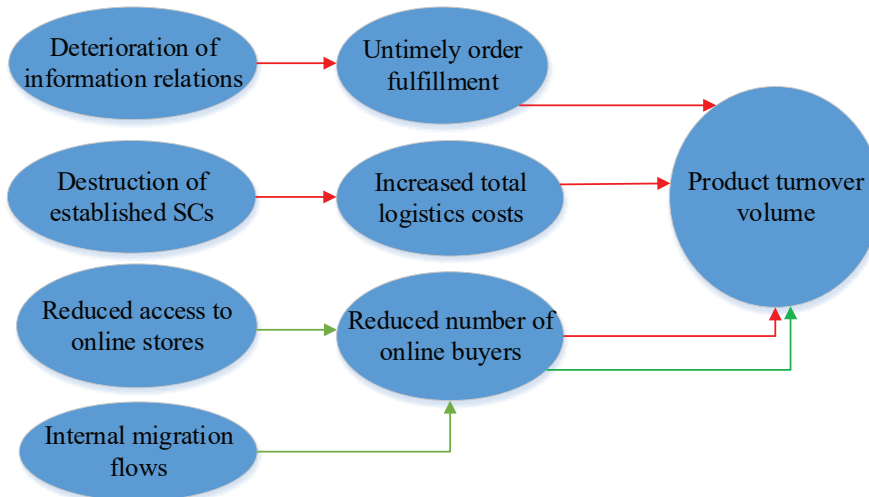


Fig. 3. Diagram of the cyclical causality of the functioning of e-commerce supply chains in the context of aggravation of military-political conflicts

5. 3. Algorithm for the construction and functioning of the risk management system related to military conflicts for the e-commerce enterprise

From the standpoint of the e-commerce enterprise, risk management of military conflicts involves the implementation of organizational and process approaches.

The organization of risk management at an e-commerce enterprise may involve the creation of a separate department, the formation of temporary risk management groups or the work of a full-time risk manager, depending on the scale of the enterprise itself and the geographical branching of its SCs. However, given the specificity of the risks of political instability that could potentially develop into military conflicts, the functions of their study, analysis, and evaluation are appropriate to involve external experts in the political conditions of the business environment. Such specialists can be either full-time risk managers of an e-commerce enterprise, or they can be specialists “in the fields” who will provide operational information about the political situation for further analysis and management decision-making.

From an organizational point of view, it is extremely important for an e-commerce enterprise to create an effective network of information transmission channels to manage the risks of political instability and military conflicts in particular. The participants of these channels, in addition to experts and risk managers themselves, should be suppliers, partners, 3PL providers from all countries related to the SCs of the e-commerce enterprise.

The performance of all risk management functions from the standpoint of the process approach should be based on the development of an algorithm for sequential management actions and formalization of processes. The main stages of risk management of military conflicts at the e-commerce enterprise are summarized in Fig. 4.

The presented model of the algorithm for managing the risks of military conflicts of the e-commerce enterprise includes the functions of the strategic and operational level. At level 1, tasks aimed at identifying, identifying, assessing risks, and planning a system of preventive measures are focused. This applies to the occurrence of adverse events in any country that is tangential to the SC of the e-commerce enterprise (supplier country, country of sale, country of concentration of logistics capacities, etc.).

At the stage of modeling the situation, a set of solutions is generated taking into consideration risks, alternative management decisions are evaluated. Examples of alternative management decisions in the main functional areas of logistics of SC enterprises of e-commerce are given in Table 3.

The criteria for choosing the most appropriate management decision should be the degree of achievement of the chosen goals, minimization of negative consequences in the activities of the e-commerce enterprise, the ratio of income and expenses, the maximum possible reduction in logistics costs, etc.

The result of strategic risk management of military conflicts is the development of a “Plan B”, which

should include the following components:

- alternative sources of supply – a list of additional suppliers with whom it is necessary to establish preliminary agreements on the possibility of supplying products for commodity items of the existing range, as well as adapted to the conditions of military conflicts;

- reformatting the configuration of SC – changing the sequence of passage of SC units by products and changing the composition and number of SC participants. For example, a delivery system can be introduced through a distribution center located in a relatively safer territory, or, conversely, directly from suppliers, bypassing the warehouse capacity of a 3PL operator;

- pool of partners – development of a list of additional partners in SC, in order to diversify the composition of logistics providers at the expense of new local partners or from countries with a relatively higher level of political stability;

- delivery routes – change of transport routes for the delivery of products to end consumers, which involves the development of alternative, safer and more reliable routes for the delivery of orders and returns;

- assortment structure – a set of measures aimed at updating the assortment in view of changes in the structure of consumption dictated by military confrontations. Changes in the structure of the range may also be associated with a change in the product profile of the e-commerce enterprise in cases of loss of sources of supply or reorientation to another segment of consumers;

- ways of communication – a set of information and communication measures aimed at preliminary and operational communication with suppliers, partners, and customers;

- payment methods – diversification of settlement and payment transactions with suppliers, partners, and consumers;

- contingent of consumers – a system of measures aimed at preserving the customer base, as well as identifying possible alternative segments of consumers and markets.

It is important to note that the process of developing “Plan B” should take place under conditions of constant communication with all participants in the SC, including potential ones, and its final version should be immediately communicated to them.

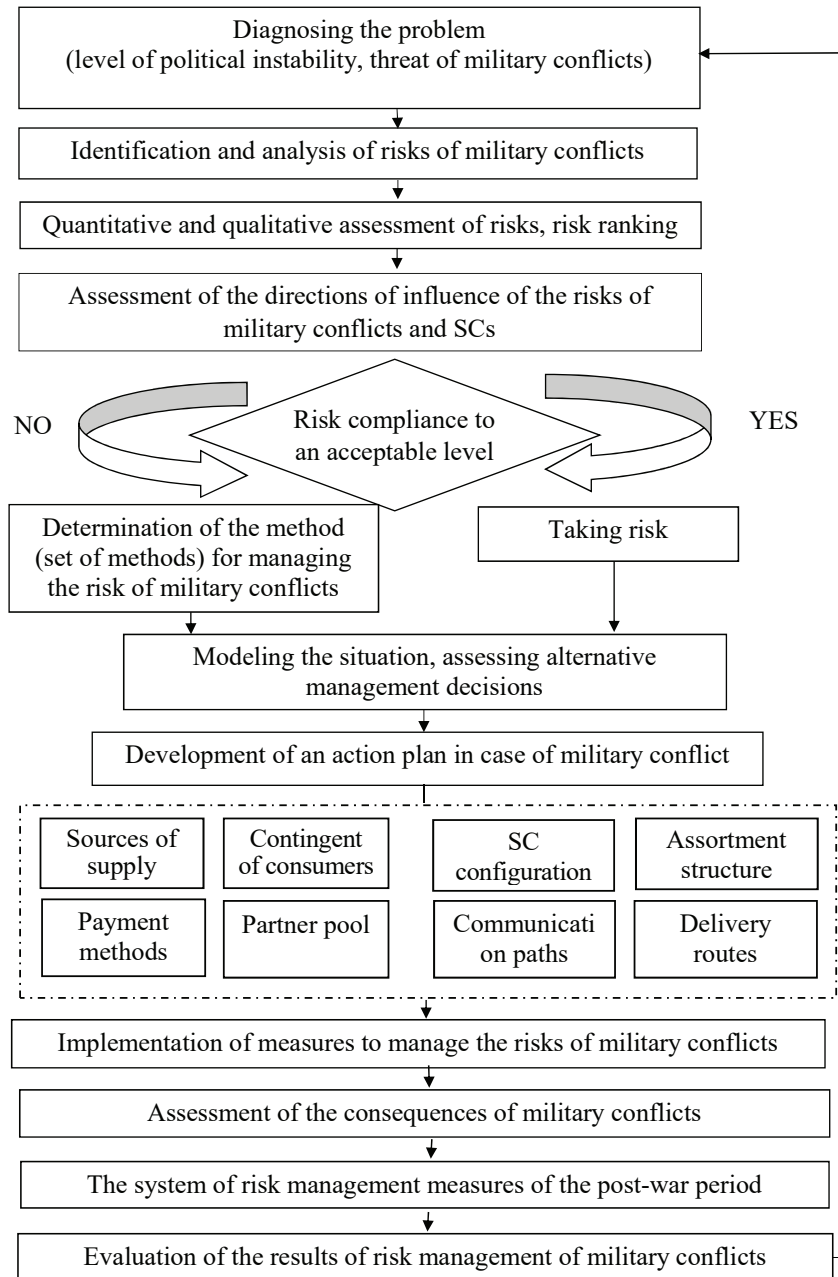


Fig. 4. Stages of the process of managing the risks of military conflicts at the e-commerce enterprise

From the moment of occurrence of the risks of military conflicts, the implementation of “Plan B” is envisaged, which means taking operational measures within the risk management system. Schematically, the main processes of operational risk management of military conflicts in the e-commerce enterprise are shown in Fig. 5.

A business process flowchart is built using Microsoft Visio’s Business Process Modeling Notation (BPMN) tools. The processes are grouped by strategic and operational level and are considered in terms of functional areas of the e-commerce enterprise supply chain. The sequence of execution is demonstrated according to the rules of business process modeling, using designations of initial and final events, task flows and information. Tasks at the strategic level are carried out sequentially while operational-level processes launched after the risk of a military conflict are proposed to be launched in parallel.

This will make it possible to quickly and swiftly respond to challenges in all functional areas of the supply chain of an e-commerce enterprise. The block diagram of business processes in the event of a risk of military conflicts involves a set of actions aimed at preserving or increasing the volume of turnover of an e-commerce enterprise and determines the assessment of the consequences of risk as the final stage.

An important direction of the system of risk management of military conflicts in the SC of e-commerce enterprises is the identification, evaluation, and adoption of preventive measures regarding the risks of the post-war period. Such risks are associated with the possibility of restoring the volume and directions of commercial activity on the Internet, as well as the prospects for its development, to the level of the pre-war period.

The main threats to the e-commerce enterprise at the end of the military conflict may be:

- reduction in the number of orders due to the return of only a part of displaced consumers;
- shift in the commodity structure of demand due to the reorientation of consumers to other needs;
- loss of suppliers due to the destruction of their capacities in the regions of hostilities;
- inability to deliver or deterioration in the level of logistics service of orders due to damage to the logistics infrastructure.

The task of risk management of an e-commerce enterprise at the stage before and during a military conflict should be the development of variable strategic and operational decisions on risk management in the post-war period. Such decisions should be based

on the results of constant monitoring of the target audience of the online store. In particular, it is urgent to track migration flows, forecast based on consumer sentiments of the scale of their return, the level of solvency and the structure of demand. It is also important to monitor the situation with other participants in the SC, in particular with suppliers and logistics providers.

Management decisions aimed at minimizing risks in the post-war period can be determined and detailed only upon the completion of hostilities, given the unpredictable duration and consequences of military conflicts. The adoption of operational measures will largely depend on assessing the scale of destruction and forecasting the pace of economic recovery of the affected regions.

In general, the risk management of military conflicts of an e-commerce enterprise is based on the integrated

application of the following methods of influencing risks: equalization, preservation, reduction, and transfer. It is worthwhile to dwell on the main directions and methods of influencing the risk of military-political and territorial conflicts in the context of supply chain management of an e-commerce enterprise:

1. Risk equalization involves parallel operations to obtain a guaranteed positive result or the distribution of losses among subjects experiencing the negative impact of risk. Depending on the content of the activities carried out, risk equalization can occur in space, time, or through risk diversification.

The application of this method provides the e-commerce company with ample opportunities to adapt and continue to carry out business activities under martial law. In order to diversify risks, it may be decided to change the product specialization of the online store and the structure of the assortment, enter a new market and expand the boundaries of the existing one, change the business model of e-commerce, etc.

2. Risk-taking at the existing level can occur through the creation of reserve funds, self-insurance, obtaining loans, loans or government subsidies to compensate for losses and resume activities. Under the conditions of hostilities, the use of this method is limited since not all of its tools can be used. For an e-commerce enterprise, the most likely may be the construction of reserve funds and the implementation of self-insurance.

3. Risk reduction, carried out with the help of preventive measures, involves reducing the size of possible losses or the likelihood of unexpected events of a negative nature. When applying this method, an e-commerce company can carry out limiting, carry out preventive organizational and technical measures, ensure the optimization of

inventories and decentralize the process of their storage. Diversification of sales markets, assortment, and sources of supply can be a significant preventive measure for an e-commerce company. In addition, in order to preserve the contingent of consumers and on the basis of previously predicted directions of their migration, the e-commerce company must work out the SC in advance to these new locations of its customers.

4. The transfer of risk involves, first of all, the transfer of responsibility for its occurrence to third parties while maintaining the existing level of risk. Some of the most common methods of risk transfer are insurance, hedging, financial guarantees, assignments, etc. In the context of military-political and territorial conflicts, the use of this method has significant limitations since all participants in the supply chain almost equally become the affected party and suffer losses. Especially when the supply chain is of a national nature and its functioning takes place within the country in which martial law is declared. However, an e-commerce business has opportunities to transfer risk in situations of military conflict, for example, by resorting to responsible inventory storage schemes by suppliers, or by delineating the terms of sharing responsibility with 3PL providers and consumers.

The final stage of the process of managing the risks of military conflicts is to evaluate the results of a management decision using key indicators. Such indicators should reflect the level of efficiency of the risk management process at the e-commerce enterprise. The main requirements for the performance indicators of the risk management system for military conflicts in the SC of e-commerce enterprises are quantitative expression, comparability of values for a certain period of time, ease of interpretation, and control of data.

Table 3

Alternatives to management decisions in the functional areas of logistics in the supply chains of an e-commerce enterprise in the face of the risks of military conflicts

SC functional link	Alternatives to management decisions
SCND	<ul style="list-style-type: none"> - change in the geographical configuration of SC; - geographic diversification of the pool of SC partners; - reorientation to alternative segments and sales markets; - change in product specialization of an e-commerce enterprise
OL	<ul style="list-style-type: none"> - making changes to agreements with suppliers and logistics providers; - development of alternative delivery routes for orders; - implementation of delivery crowdsourcing in various combinations: involvement of delivery services, services of crowdsourcing platforms and third-party carriers, fleets of suppliers and logistics operators; - creation of a pool of alternative carriers; - establishment of cooperation with other e-commerce enterprises; regarding the consolidation of delivery routes; - implementation of flexible logistics service for customers
RL	<ul style="list-style-type: none"> - adjustment of routes, schedules, and methods of movement of the reverse flow; - delegation of reverse flow management functions to suppliers; - development of a system of bonuses and discounts for consumers on goods as an alternative to returning them; - transition to the drop shipping model
WR	<ul style="list-style-type: none"> - short-term rental of warehouses, use of warehouses of suppliers and partners located in safe regions; - implementation of a decentralized approach to the organization of storage of commodity stocks; - taking measures aimed at reducing product storage periods in warehouses: promptness in order picking and shipping; cross-docking; residual monitoring
E-IT	<ul style="list-style-type: none"> - implementation of the optical channel strategy in communication with the client in order to choose the most convenient and effective channel (provided that several communication channels are used); - use of alternative channels of communication with suppliers, partners, consumers; - diversification of payment methods for orders; - increasing the level of information protection of the online store and the functioning of electronic payment systems; - transfer of the online store to SaaS and CMS platforms of domestic production

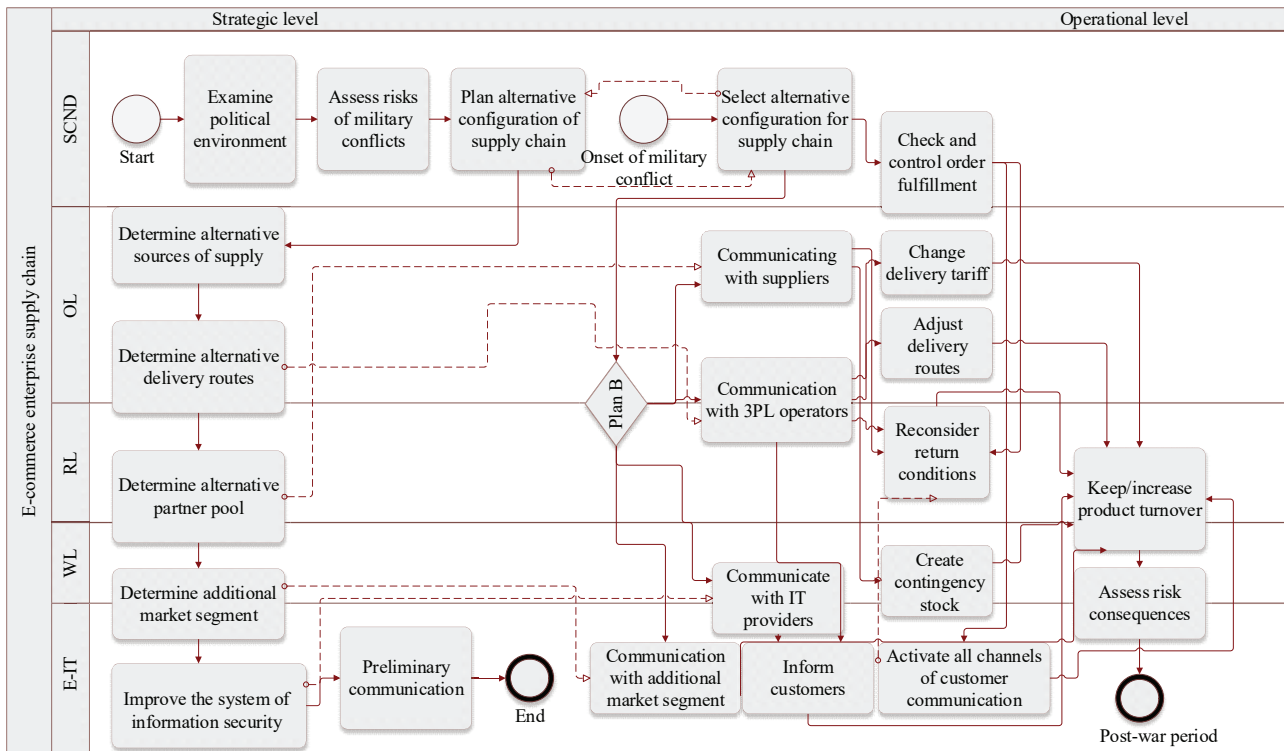


Fig. 5. Block diagram of business processes of the risk management system related to military conflicts for the e-commerce enterprise

6. Discussion of results of building a risk management system related to military conflicts in the supply chain of an e-commerce enterprise

In order to confirm the relatively greater vulnerability of e-commerce enterprises to the risks of military conflicts among political risks, an analysis of their impact on SC was carried out (Table 1). The main forms of manifestation of 5 groups of threats associated with the onset of military conflicts in 5 functional areas of logistics of e-commerce enterprises have been established. In this way, the range of probable negative consequences for the SC of e-commerce enterprises is outlined.

Ranking the risks of military conflicts by the expert method (Table 2, Fig. 1, 2) made it possible to determine the 5 most significant according to the assessment of representatives of 4 groups of participants in SC e-commerce enterprises: Internet companies, suppliers, 3PL providers, and online buyers. Experts' assessment is based on their experience under the conditions of military and armed confrontations. In particular, their assessments of the dynamics of e-commerce, the commodity structure, the duration and reliability of delivery, the level of logistics costs, etc. were taken into consideration. The allocation of the 1st place to the risks of deterioration of information relations confirms the importance of service in e-commerce, maintaining communications between all participants in the SC.

The description of the causal relationships between the threats of military conflicts and the volume of trade turnover of e-commerce enterprises using a cyclic causality diagram (Fig. 3) makes it possible to demonstrate a deterrent and reinforcing effect on the parameters of their SC. Mostly, this effect is negative, but there may be a positive impact on the effectiveness of e-commerce.

It is proposed to manage the risks of the supply chain enterprise of the e-commerce enterprise according to the algorithm (Fig. 4), which includes the levels of strategic and operational management and the result is the development of a "Plan B" in case of the occurrence of these risks.

The process of construction of an e-commerce system for managing the risks of military conflicts in SC at the enterprise should be clearly regulated and formalized. In the study, a flowchart was built using business process modeling notation tools (Business Process Modeling Notation, BPMN) Microsoft Visio (Fig. 5). This model demonstrates the composition and sequence of processes at the strategic and operational level in managing the risks of military conflicts in the SC of the e-commerce enterprise.

Unlike studies [9, 16, 17], which focus on the application of general approaches to risk management in the activities of an e-commerce enterprise, the proposed approach to managing the risks of military conflicts is relevant under conditions of political instability. The allocation of military conflicts to a separate group of e-commerce factors in [29, 30] also does not provide practical recommendations for the formation and functioning of the risk management subsystem in the SC of an e-commerce enterprise, as provided for in this research.

Due to the establishment of the main causal consequences of the links between the threats of military conflicts and the parameters of supply chains, e-commerce enterprises can form a set of preventive measures. In particular, by drawing up an action plan in the case of a military conflict, an e-commerce company can prepare and develop new consumer segments, markets, and sources of supply. This will maintain the achieved level of scale and results of activities.

However, the current study has certain limitations, primarily related to the complexity of forecasting scenarios for

the development of events under conditions of political instability. The scale of the negative consequences of military confrontations is mostly unpredictable: migration flows, damage and destruction, economic sanctions, etc. In addition, given the limited access to factual data on the state of e-commerce in the period of aggravation of political confrontations, it is difficult to link the scale of consequences with the threats of military conflicts. These data are also inconsistent in time dimension, given the short time frame for the recovery of SC in e-commerce and longer periods of statistical reporting.

The disadvantage of the study is the limited operational access to factual data on the volume and structural changes in e-commerce. In this regard, it is difficult to predict quantitative indicators of the activity of an e-commerce enterprise under conditions of military conflicts and its adoption of appropriate adaptive management decisions.

Given the dynamics of e-commerce and the instability of the political environment, there are great prospects for studying the possibilities of introducing a risk management subsystem for military conflicts in supply chain risk management systems of e-commerce enterprises. An in-depth analysis of the political environment in the regions related to the SC of an e-commerce enterprise will not only protect it from the negative consequences of armed confrontation but should become an indispensable element of its risk management system. Approaches to the diversification of modeling of supply chains in accordance with multivariate scenarios of the development of events can be the key to the successful functioning of e-commerce enterprises.

7. Conclusions

1. The analysis of the risks of military conflicts in the system of political risks confirmed the hypothesis that the impact of e-commerce to political risks is indirect and relatively low but the high probability of their escalation into military conflicts causes an instant reaction from e-commerce since it has a direct impact on the already established mechanism of functioning of supply chains of e-commerce enterprises. Five groups of risks caused by military conflicts are identified: infrastructural, contractual, economic and financial, social, reputational.

2. The onset of military conflicts poses a threat to e-commerce enterprises due to the deterioration of information relations, increased logistics costs, late execution of orders, destruction of SC and a decrease in the number of

consumers. This study proposed an approach to the analysis of cause-and-effect relationships between threats posed by military conflicts and possible disruptions in the functioning of SC e-commerce. In particular, it has been demonstrated that, having a predominantly negative impact on the volume of trade turnover of e-commerce enterprises, individual processes in society can have a stimulating effect on their activities. First of all, this is due to migration processes and possible difficult access to offline stores. The application of the expert method and the analysis of empirical data of e-commerce SC participants in politically unstable regions demonstrated the short duration of the negative effect of military conflicts on its scale and dynamics. This testifies to the flexibility of SC of e-commerce enterprises and their ability to recover quickly.

3. The necessity of strengthening the supply chain management systems of e-commerce enterprises by analyzing the risks of military conflicts and developing a system of preventive measures has been justified. The proposed algorithm for the construction of a risk management system for military conflicts at an e-commerce enterprise includes processes of the strategic and operational level. The composition and sequence of processes in the system of risk management of military conflicts in e-commerce should be clearly defined and formalized. It is determined that the risk management of military conflicts of an e-commerce enterprise should be based on the comprehensive application of the following methods: equalization, preservation, reduction, and transfer.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

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References

- Stepchenkov, Ya. (2021). Myr perehruzhen ryskamy. Logistics in Ukraine: lohistyka zapasiv, rubrykatsiia. Available at: <https://logistics-ukraine.com/2021/06/23/мир-перегружен-рисками/#more-3232>
- Retail e-commerce sales worldwide from 2014 to 2025 (2022). Available at: <https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/>
- Loesche, D. (2018). Mobile E-commerce is up and Poised for Further Growth. Available at: <https://www.statista.com/chart/13139/estimated-worldwide-mobile-e-commerce-sales/>
- Statistics (2022). Available at: <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>
- Demchuk, D. V. (2012). Poniattia i vydy politychnykh ryzykiv. Aktualni problemy polityky, 46, 248–255. Available at <http://dspace.onua.edu.ua/bitstream/handle/11300/1318/Demchuk.pdf?sequence=1>
- Country Risk Index. Fitch Solutions (2020). Available at: https://www.fitchsolutions.com/sites/default/files/2021-04/FS_RI_Methodology_Country_Risk.pdf
- Giannakis, M., Papadopoulos, T. (2016). Supply chain sustainability: A risk management approach. International Journal of Production Economics, 171, 455–470. doi: <https://doi.org/10.1016/j.ijpe.2015.06.032>

8. Sofyalıoğlu, Ç., Kartal, B. (2012). The Selection of Global Supply Chain Risk Management Strategies by Using Fuzzy Analytical Hierarchy Process – A Case from Turkey. *Procedia - Social and Behavioral Sciences*, 58, 1448–1457. doi: <https://doi.org/10.1016/j.sbspro.2012.09.1131>
9. Shakeri, E., Vizvari, B., Nazerian, R. (2016). The Impacts of Economic Sanctions on Supply Chain Management: Empirical Analysis of Iranian Supply Chains. *Global Joint Conference on Industrial Engineering and Its Application Areas*, 53–63.
10. Danese, P., Romano, P., Formentini, M. (2013). The impact of supply chain integration on responsiveness: The moderating effect of using an international supplier network. *Transportation Research Part E: Logistics and Transportation Review*, 49 (1), 125–140. doi: <https://doi.org/10.1016/j.tre.2012.08.002>
11. Wheeler, C., McDonald, F., Greaves, I. (Eds.) (2003). *Internationalization*. Academy of International Business, UK Chapter. doi: <https://doi.org/10.1057/9780230514638>
12. Zhou, L., Wang, J., Li, F., Xu, Y., Zhao, J., Su, J. (2022). Risk Aversion of B2C Cross-Border e-Commerce Supply Chain. *Sustainability*, 14 (13), 8088. doi: <https://doi.org/10.3390/su14138088>
13. Embracing the e-commerce revolution in Asia and the Pacific (2018). Available at: <https://www.adb.org/sites/default/files/publication/430401/embracing-e-commerce-revolution.pdf>
14. Bode, C., Wagner, S. M. (2015). Structural drivers of upstream supply chain complexity and the frequency of supply chain disruptions. *Journal of Operations Management*, 36 (1), 215–228. doi: <https://doi.org/10.1016/j.jom.2014.12.004>
15. Dutta, P., Suryawanshi, P., Gujarathi, P., Dutta, A. (2019). Managing risk for e-commerce supply chains: an empirical study. *IFAC-PapersOnLine*, 52 (13), 349–354. doi: <https://doi.org/10.1016/j.ifacol.2019.11.143>
16. Elzarka, S. M. (2013). Supply chain risk management: the lessons learned from the Egyptian revolution 2011. *International Journal of Logistics Research and Applications*, 16 (6), 482–492. doi: <https://doi.org/10.1080/13675567.2013.846307>
17. Ho, W., Zheng, T., Yildiz, H., Talluri, S. (2015). Supply chain risk management: a literature review. *International Journal of Production Research*, 53 (16), 5031–5069. doi: <https://doi.org/10.1080/00207543.2015.1030467>
18. Zennaro, I., Finco, S., Calzavara, M., Persona, A. (2022). Implementing E-Commerce from Logistic Perspective: Literature Review and Methodological Framework. *Sustainability*, 14 (2), 911. <https://doi.org/10.3390/su14020911>
19. Erceg, A., Kilic, Z. (2018). Interconnection Of E-Commerce And Logistics: Examples From Croatia And Turkey. 18th international scientific conference Business Logistics in Modern Management. Osijek, 265–283.
20. Ocicka, B., Raźniewska, M. (2016). In Search of Excellence in E-Customer Logistics Service. *International Journal of Management and Economics*, 49 (1), 135–155. doi: <http://doi.org/10.1515/ijme-2016-0007>
21. Yu, Y., Wang, X., Zhong, R. Y., Huang, G. Q. (2016). E-commerce Logistics in Supply Chain Management: Practice Perspective. *Procedia CIRP*, 52, 179–185. doi: <https://doi.org/10.1016/j.procir.2016.08.002>
22. Boysen, N., de Koster, R., Weidinger, F. (2019). Warehousing in the e-commerce era: A survey. *European Journal of Operational Research*, 277 (2), 396–411. doi: <https://doi.org/10.1016/j.ejor.2018.08.023>
23. Wollenburg, J., Hübner, A., Kuhn, H., Trautrim, A. (2018). From bricks-and-mortar to bricks-and-clicks. *International Journal of Physical Distribution & Logistics Management*, 48 (4), 415–438. doi: <https://doi.org/10.1108/ijpdm-10-2016-0290>
24. Garcia, K. (2018). Retailers Brace for Returns This Holiday Season. Available at: <https://www.insiderintelligence.com/content/retailers-brace-for-returns-this-holiday-season>
25. Zhang, J., Onal, S., Das, S. (2020). The dynamic stocking location problem – Dispersing inventory in fulfillment warehouses with explosive storage. *International Journal of Production Economics*, 224, 107550. doi: <https://doi.org/10.1016/j.ijpe.2019.107550>
26. Eriksson, E., Norrman, A., Kembro, J. (2019). Contextual adaptation of omni-channel grocery retailers' online fulfilment centres. *International Journal of Retail & Distribution Management*, 47 (12), 1232–1250. doi: <https://doi.org/10.1108/ijrdm-08-2018-0182>
27. Bozer, Y. A., Aldarondo, F. J. (2018). A simulation-based comparison of two goods-to-person order picking systems in an online retail setting. *International Journal of Production Research*, 56 (11), 3838–3858. doi: <https://doi.org/10.1080/00207543.2018.1424364>
28. Gunasekaran, A., Ngai, E. W. T., Cheng, T. C. E. (2007). Developing an e-logistics system: a case study. *International Journal of Logistics Research and Applications*, 10 (4), 333–349. doi: <https://doi.org/10.1080/13675560701195307>
29. How the Ukraine War Impacts Ecommerce (2022). *Practical Ecommerce*. Available at: <https://www.practicalecommerce.com/how-the-ukraine-war-impacts-ecommerce>
30. The Impact of the Russia-Ukraine Conflict on the Global Economy & Ecommerce Industry (2022). *FATbit technologies*. Available at: <https://www.fatbit.com/fab/impact-of-russia-ukraine-conflict-on-ecommerce-industry>
31. Що відбувається з українським e-commerce під час війни (2022). Available at: <https://promodo.ua/ukrainian-ecommerce-state-during-the-war-research/>
32. Statista. Global Retail E-Commerce Market Size 2014–2023. *Statista*. 2021. Available at: <https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/> Last accessed: 22.06.2021
33. Kryvov'iazuk, I. V., Smerichevskiy, S. F., Kulyk, Yu. M. (2018). *Ryzyk-menedzhment lohistychnoi systemy mashynobudivnykh pidpriemstv*. Kyiv: Kondor, 200.
34. The Global Risks Report 2022 (2022). World Economic Forum. Available at: https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf
35. Country Rank And Value In The UNCTAD B2C E-Commerce Index (2020). Available at: https://tcdata360.worldbank.org/indicators/hec11e54d?country=GRC&indicator=24717&countries=EGY,CYP,SRB&viz=line_chart&years=2016,2020&indicator_s=944&compareBy=income