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Determinants of business continuity in the logistics processes of the armaments industry amid the current economic and military environment

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Abstract. The current economic and military situation in Poland, shaped by experiences of COVID-19 pandemic and armed conflict in Ukraine, call for fresh examination of business continuity in defense enterprises, particularly concerning their logistics processes. The purpose of this research is to analyze the current state of the environment for these enterprises and, based on this analysis, formulate recommendations regarding the ongoing challenge of maintaining operational continuity in logistics processes. Based on a literature review, the article highlights current economic and military landscape. It also addresses issues specific to logistics processes within the defense industry. Observational method was employed to identify factors influencing logistics processes, while scenario planning was used to discern environmental trends. The study focuses on identifying key factors and presenting possible scenarios that will be able to affect the continuity of logistics chains in the defense industry thereby filling the identified research niche. The final conclusions present assumptions related to sustaining efficient cooperation chains and managing materials as key areas pertinent to the identified problem. The research problem was studied within a specific group of enterprises, with the reference period for the conducted research being 2020–2025.
Keywords: defense industry, scenario forecasts, logistics chains, business continuity, materials management

Introduction

The increased demand for all types of military equipment is dictated by current economic and military situation related to the aggression of the Russian Federation in Ukraine. The main objective of the ongoing operations by The Armed Forces of the Republic of Poland is the ability to deter a potential aggressor by demonstrating military superiority through, among other things, resources of the equipment, equipment, and armaments it possesses. In light of the proximity of potential conflict,

it can be assumed that the basic tasks facing organizations of the arms industry will be to ensure continuity of operation of processes of supply, modernization, and overhaul of military equipment at a level capable of meeting the needs of Polish Armed Forces (Trif and Dumitrașcu 2025, p. 17).

Therefore, it should be assumed that to ensure adequate manufacturing capacity and maintain high efficiency of operation of the military equipment production process in the arms industry, it is necessary to organize and sustain logistic processes properly. This is implied by the necessity to provide material facilities that, at the same time, consider the specifics of the production of this type of product and tasks faced by this sector of market in times of crisis and war. The uncertain and changing situation regarding the continuity of supplies of materials necessary for the production of military equipment, through the currently functioning logistics chains, makes it necessary to take into account the situation of their interruption in long-term plans related to the conducted materials management. Providing an appropriate strategy for the implementation of activities within the framework of materials management may therefore constitute one of the important links enabling the continuity of operations of enterprises in the arms industry (Grala 2024, p. 258, Mańkowski *et al.* 2022, p. 93).

The purpose of this article is to analyze current state of the environment of this type of enterprise and, on this basis, to develop possible scenarios on the current issues of maintaining the continuity of operation of logistics processes on background of economic-military situation. The research problem was defined in the following question: What conclusions can be drawn from currently observed factors and trends affecting operation of logistics processes continuity in defense industry enterprises? Based on preliminary analysis of literature on the subject and preliminary observations made, the research hypothesis was formulated as follows: The observed trends in current economic and military situation in the area of logistics processes indicate the need to diversify methods of providing material resources as a determinant of ensuring the continuity of operation of defense industry. The article aims to answer the following research questions:

1. What conditions are observed in current economic and military situation?
2. What is the role of logistics processes in defense industry?
3. What scenarios can be extracted for factors and trends that are taken away and affect operation of logistics processes continuity in defense industry?

Presented problem issues formulated in the specific questions were subjected to theoretical dissertations, observations, and research. The research conclusions, which relate directly to the formulated problem issues, are included in the following sections of the article.

Research Methodology

The first stage of the study used method of analyzing selected source materials, which was aimed at preliminary overview of the problem situation specified in research questions. The source selection process included choosing publications that could answer the research questions. In this step, theoretical research methods were applied, i.e., analysis, which was used to examine sources relating to literature of the subject under study and to answer the research questions regarding current situation regarding of logistics processes of enterprises.

To obtain an answer to the detailed question regarding the factors influencing the continuity of logistics processes in the arms industry, the scientific observation method was used, within which this issue was subjected to individual examination and further interpretation. It should be noted that according to M. Krajewski and J. Apanowicz, the method of scientific observation is a process of purposeful and planned observation to gather information about a given phenomenon and fact as fully as possible but without interfering with its object. Observation makes it possible to learn about a phenomenon in its natural course, engaging – which is of great importance – only the researcher. Direct observation concerns the behavior of the people observed in direct contact with them, while indirect observation refers to certain symptoms of specific behaviors, i.e., second-hand observation. (Apanowicz 2000, p. 81, Krajewski 2020, p. 77).

Observations were conducted in a group of enterprises that produced military equipment for The Armed Forces of the Republic of Poland, which are part of a single armament group. The observations were conducted on the territory of the Republic of Poland, covering enterprises located in different regions of the country. The research consisted of identifying and isolating factors affecting the logistics processes of the observed enterprises. Observations of factors (Table 1) were conducted from 2020 to 2024. To identify factors affecting the continuity of logistics processes, the following parameters were taken for observation: factor, description, example of observation, observed consequences and effects. This scope of observations made it possible to capture both current changes and long-term factors influencing behavior in the organization of arms industry logistics resulting from the impact of the COVID-19 pandemic and the Russian aggression in Ukraine.

A scenario method was used to determine trends in the identified (in the observation study) factors, which allowed the results to be presented as hypothetical but realistic scenarios reflecting potential impacts on logistics processes. The scenario method can be defined as a description of a possible set of events that could reasonably occur. The purpose of building scenarios is to stimulate thinking about potential situations, the assumptions associated with those situations, benefits and risks, and the course of action (Marcinkiewicz 2007, p. 80). Adopting scenario approach to observing and analyzing the environment allows enterprises to plan their activities

in increasingly uncertain times, as it will enable them to consider both multivariate environmental factors and strategies (Ralston and Wilson 2006, p. 16). The scenario method shows a dynamic, complex future picture and quantitative forecast (Van der Heijden 2005, pp. 19–21).

Within the framework of the scenario method and in the context of the identified factors, the focus was on determining the following parameters:

- The trend in the future – growth, stabilization, or decrease (regression),
- Probabilities of the occurrence of a given factor – by estimating the occurrence of each factor on a scale from 0 to 100,
- The strength of the impact of the indicated factor by assessing the impact of individual factors on the continuity of logistics processes, the strength of the negative impact from -5 to -1 and the strength of the positive impact from 1 to (Gierszewska and Romanowska 2017, pp. 265–279).

The selection of experts was made using the snowball method. This method consists of a non-random designation of experts based on the fact that an initially selected small number of respondents is surveyed, and each member of this group identifies (recommends) other units to be further investigated. The main advantage of this sampling technique is the fact that it allows reaching units in the absence of a census or when reaching them by a researcher would be very difficult (Szreder 2010, pp. 50–54).

The experts' opinions were collected using a survey questionnaire completed online, in which for each of the factors observed, the probability and impact had to be determined in relation to one of three trends. This part of research was conducted between December 2024 and January 2025 by distributing an online survey sheet to a selected group of fourteen representatives of arms companies. The experts were also asked to further distribute the spreadsheet to the industry representatives they selected.. Thanks to the snowball selection method, a total of thirty-one experts participated in the survey. The probability and impact assessments made by the experts were arithmetically averaged. Results presented in Table 2 include the observed factor, individual trends with assigned probability and impact strength. Within the framework of the question asked, the time spent working in the armaments industry and the experience of logistics processes were verified.

In the final stage, trends were classified and assigned to the appropriate scenarios. Four main scenarios were used in this regard:

1. **Optimistic** – trends having the most significant positive impact on the organization,
2. **Pessimistic** – trends having the most significant negative impact on the organization,
3. **Least likely** – trends having the lowest probability of occurring in the future,

4. **Most likely** – trends have the highest probability of occurring in the future (Gierszewska and Romanowska 2017, p. 69).

The use of the scenario method allowed for the presentation of research results, while also enabling the formulation of recommendations regarding actions that should be taken by the arms industry companies in order to minimize disruptions and ensure the continuity of logistics processes (Daniluk and Wyligała 2021, pp. 103–109). Figure 1 shows the process used in the ongoing research on the determinants of logistics processes in the defense industry.

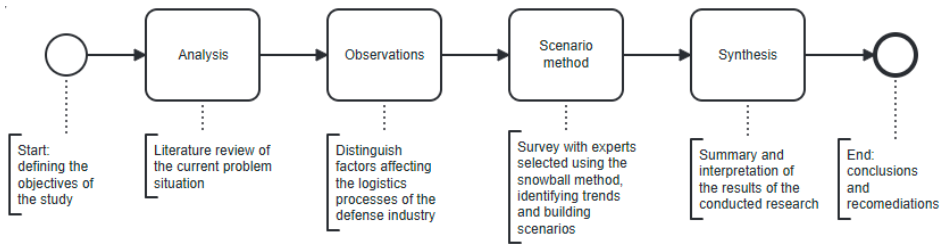

Fig. 1. Outlines the research methodology applied in the present study
Source: own study

In conclusion, a synthesis was applied, which consisted of a compilation of the previously analyzed elements identified during the research on the determinants of continuity of operation of logistics processes. Based on the analyses and examples previously conducted, the final part of the work also presents conclusions from the research conducted on factors, trends, and scenarios in the business continuity operation of logistics processes in defense industry enterprises.

Literature study

The current economic and military situation

The current international security environment, conditioned by the COVID-19 pandemic and Russian aggression in Ukraine, is increasingly complex and unstable. This contributes to increased uncertainty in political, military, economic, and social actions on a local, national, European, and global economic scale (Urak *et al.* 2024, p. 507). The pandemic has significantly impacted Polish companies' logistics processes, disrupted traditional supply chains, and hit global trade. The pandemic highlighted

weaknesses in the management of supply chains that had never witnessed such disruption. The pandemic outbreak resulted in the suspension of imports of many key components (Grzelakowski 2022, pp. 11–13, Kauf 2022, p. 3). Top-performing companies implemented supply chain management strategies that were dynamically developed and characterized by rapid response to changing customer demands. The most effective logistics managers take swift action to reduce the likelihood of disruptions, minimize the impact of events, and build and maintain competitive advantages for enterprises (Gąsowska 2024, p. 13).

The role played by the Russian aggression in Ukraine, in terms of its ability to maintain state security, poses a current challenge to Poland's economic policy. Aggressive policies, as well as military actions, combined with ongoing disinformation, force the Polish authorities to exercise great caution in all actions taken in the international arena. The current situation significantly impacts the strategy and main directions of logistics chain transformation throughout the region. Today, in the context of the aggression in Ukraine, the supply of weapons, ammunition, and highly specialized military equipment has become the most important (Dyduch and Góra 2024, chap. 18.4).

Moreover, the NATO perspective assumes that supply chain security is fundamental to deterrence and defense against Russia. The alliance is implementing a comprehensive, multinational strategy to identify vulnerabilities, diversify sources, strengthen logistics, and integrate new technologies. Lessons from Ukraine have reinforced the need for adaptability, civil-military cooperation, and collective resilience to ensure that NATO and its partners can sustain military operations under the most challenging conditions (Trif and Dumitrașcu 2025, chap. IV, *Defence-Critical Supply Chain Security Roadmap* 2024).

The results of the conducted research clearly emphasize the positive importance of adopting strategies that increase the resilience of supply chains in a sustainable and purposeful manner (Gürpinar *et al.* 2023, p. 143). In summary, the current economic and military challenges resulting from the COVID-19 pandemic and the Russian aggression in Ukraine, as well as other unstable and difficult to predict factors, have led to significant disruptions in supply chains. In order to limit the impact of global geopolitical tensions and raw material shortages, it is necessary to adopt increased attention to ensuring logistical resilience, through diversification of supply sources and adoption of a close supply strategy. Maintaining the continuity of logistics processes will therefore also affect the production and repair capacities of the Polish arms industry, the uninterrupted functioning of which is crucial for ensuring the security and autonomy of the state (Dymyt *et al.* 2024, p. 186, Gądek-Hawlena and Heliosz 2023, p. 192)

Importance of logistics processes in the field of military equipment production in the defense industry

Given the current economic and military situation, the arms industry's ability to independently and continuously produce military equipment is of great importance. It is one of the key elements ensuring the independence and autonomy of the state in the international arena. It is, therefore, essential that the organizations of the Polish armaments industry, regardless of their form of ownership, be capable of realizing the long-term needs of the Polish Armed Forces, including by ensuring the continuity of operation of the manufacturing and repair processes (Kalbarczyk 2020, p. 52, Staniewska 2023, p. 137) It requires ensuring balance in terms of diversified development of the domestic economy, as well as maintaining free market principles of obtaining the best possible economic indicators for the implemented projects (Tomaszewski 2018, p. 19).

Arms production is characterized by a high level of technological advancement and specialization. It requires a rigorous approach to quality, reliability and resistance of products to difficult external conditions. This process includes complex stages of research and prototyping. The specificity of the industry is associated with limitations in the scope of potential recipients and the need to incur significant financial outlays to start production. All these factors make the arms industry exceptionally demanding in terms of technology, finances and organization (Bartniak 2020, p. 84).

Logistic processes in the arms industry play a key role in ensuring effective and efficient production and delivery of defense products, therefore their proper functioning is extremely important for achieving the strategic and operational goals of defense companies. Within the framework of these processes, several basic tasks can be distinguished, which are essential for ensuring the continuity and efficiency of production and maintaining competitiveness in the market.

Among the most essential tasks of logistics processes in the defense industry are:

- providing material facilities, which includes purchasing and cooperating with suppliers of raw materials, components, and other necessary materials,
- internal and external transportation, which refers to the movement of materials, semi-finished and finished products within the production facility,
- materials management, which includes the management of inventory, storage and distribution of materials, as well as product sales, which concerns the sale and distribution of finished defense products.

These tasks are closely intertwined and require a coordinated approach to ensure that the arms industry operates efficiently and meets market requirements, including military and defense requirements. Therefore, logistics processes in the defense industry should be treated as an integral part of companies' business strategy, and

their optimization and development should be a priority for success in the market (Mroczko 2016, p. 35, Krupnik and Gręzicki 2017, p. 112). Figure 2 shows the tasks of logistics processes in an armaments company.

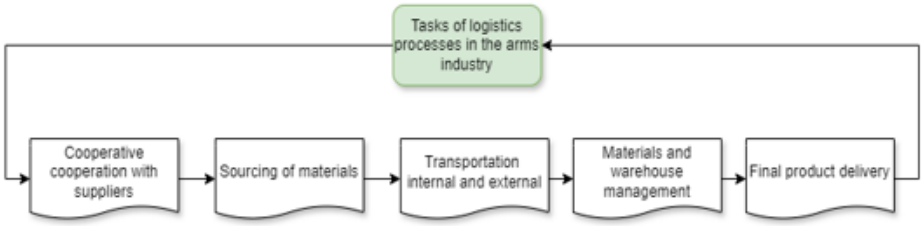

Fig.2 . Tasks of logistics processes in an armaments company

Source: own compilation based on (Dyczkowska 2014, Krupnik and Gręzicki 2017)

The tasks of logistics processes in the defense industry include the procurement of raw materials, semifinished products, auxiliary and consumable materials, as well as the transportation of finished goods to warehouses and the end user. Key in the implementation of the logistics processes of armaments companies is the consideration of the requirements related to the characteristics to be offered by a particular military equipment. Logistics chains management considers the industry's specifics, including the high technological level, stringent quality requirements, and limited number of customers.

Own Research

Trends and scenarios in the logistics processes of the defense industry

This part of the article presents the observed factors and identified trends that shape the logistics processes of the defense industry in the context of changing economic and military conditions (Table 1). Conducted research observed the factors influencing logistics processes in defense industry enterprises. Within the framework of the observations, these factors affected the effectiveness, efficiency, or reliability of supply chains and production processes in the defense industry.

Table 1. Factors observed in the environment of the logistics processes of the defense industry in 2020-2024

No.	Factor	Description	Example of observation	Consequences and effects
	1	*2*	*3*	*4*
1.	**Geopolitical tensions**	International relations are becoming more conflictual	Tensions rise between the US and China	Restrictions on access to certain raw materials and technologies. Increased production costs, delays in deliveries
2.	**New wars and armed conflicts**	Outbreak of new armed conflicts	Russia – Ukraine, Israel – Hamas conflict escalates	Increased demand for missile defense systems and drones, disruptions in material supply chain
3.	**The occurrence of a pandemic**	A global health threat	Pandemic COVID-19	Delivery delays, increased production costs
4.	**Limitation of availability of raw materials and supplies**	Difficulties in obtaining the necessary raw materials refer to the lack of access to previously used raw materials and materials	Lack of access to electronic components, semiconductors	Delays in production and increases in operating costs
5.	**New regulatory changes**	Changes and new regulations in legislation, both domestic and international	Introduction of new environmental regulations	Increased processing time for material orders in military equipment production related to adjustment to new standards
6.	**New economic sanctions**	New or additional restrictions imposed on the economy of one or more countries by other countries or communities	Sanctions on Russia after invasion of Ukraine	Restricting access to cooperation with the Russian defense industry

No.	Factor	Description	Example of observation	Consequences and effects
	1	*2*	*3*	*4*
7.	**Cyber-attacks on supply chains**	A type of cyber-attack that target supply chains, which are networks of companies and organizations that work together to deliver products or services to customers	Phishing attack on email inboxes of arms company employees	Interruption of orders, financial losses
8.	**Natural disasters**	Threats, events, and processes in the environment that cause significant damage or loss to the environment, economy, and society	Hurricanes, floods, droughts	Delay in delivery of materials
9.	**Development of new technologies**	Dynamic technological progress resulting in access to new technical solutions not used before	Development of 3D printing technology	Increase the efficiency and quality of production and accelerate the delivery of materials
10	**Staff shortages**	Lack of sufficiently skilled workforce	Difficulties in recruiting IT specialists for defense projects	Extended delivery times are explicitly related to processing orders on time

Source: own compilation based on observations

Based on the previously conducted observations, the selected list of factors was assessed by experts in the context of the trend, the probability of their occurrence in the next 5 years and the strength of their impact on the arms industry enterprises (Table 2).

Table 2. Forecast of trends in logistics processes of military equipment production of the defense industry in the next 5 years

No.	Factor	Trend	Probability *[0-100]*	The power of influence *[from -5 to 5]*
	1	*2*	*3*	*4*
1.	Rising geopolitical tensions	Growth	69.5	-1.46
		Stabilization	23.1	0.15
		Decrease	7.5	0.15
2.	New wars and armed conflicts	Growth	63.5	-1.31
		Stabilization	23.2	-0.38
		Decrease	13.3	1.62
3.	The occurrence of a pandemic	Growth	40.5	-2.46
		Stabilization	34.8	0.46
		Decrease	24.7	1.31
4.	Limitation of availability of raw materials and supplies	Growth	50.2	-3.15
		Stabilization	24.8	0.46
		Decrease	25	1.62
5.	New regulatory changes	Growth	53	-1
		Stabilization	32	0.46
		Decrease	15	1.46
6.	New economic sanctions	Growth	42.1	-2
		Stabilization	31.8	0.54
		Decrease	26.1	1.31
7.	Cyber-attacks on supply chains	Growth	74.5	-1.85
		Stabilization	20.5	-0.62
		Decrease	5	0.31
8.	Natural disasters	Growth	44.3	-2.15
		Stabilization	38.2	0.46
		Decrease	17.5	1.15
9.	Development of new technologies	Growth	70	3.23
		Stabilization	27.2	1.69
		Decrease	2.8	-0.23

No.	Factor	Trend	Probability *[0-100]*	The power of influence *[from -5 to 5]*
	1	*2*	*3*	*4*
10.	Staff shortages	Growth	57.6	-2
		Stabilization	21.1	0.15
		Decrease	21.3	0.85

Source: own compilation based on observations and surveys with defense industry experts

Based on the analysis, individual scenarios were prepared – optimistic, pessimistic, most likely, least likely – according to the research assumptions of the variants.

The optimistic scenario (Table 3) assumes the inclusion of trends with the most significant positive impact on the organization, isolating assessed values from +1 to +5. Based on the analysis, this scenario assumes a decrease in areas of new wars and armed conflicts, the occurrence of pandemics, reduced availability of raw materials and materials, new economic sanctions, and new regulatory changes while increasing the development of new technologies and possible cyber-attacks on supply chains. This pattern of trends could significantly improve operating conditions for the arms industry, although, as noted earlier, it could also reduce demand for their operations. Decreased conflicts and pandemics will contribute to more excellent geopolitical and economic stability. Improved availability of raw materials and supplies and stabilization of the regulatory environment can reduce operating costs and facilitate strategic planning. At the same time, the development of new technologies creates opportunities to make organizations more innovative and competitive. Thus, this option creates favorable conditions for the growth and prosperity of the organization.

Table 3. Optimistic scenario

No.	Factor	Trend	Probability *[0-100]*	The power of influence *[from -5 to 5]*
	1	*2*	*3*	*4*
1.	New wars and armed conflicts	Decrease	13.3	1.62
2.	The occurrence of a pandemic	Decrease	24.7	1.31
3.	Limitation of availability of raw materials and supplies	Decrease	25	1.62
4.	New regulatory changes	Decrease	15	1.46
5	New economic sanctions	Decrease	26.1	1.31
6.	Natural disasters	Decrease	17.5	1.15

7.	Development of new technologies	Growth	70	3.23

Source: own compilation based on observations and surveys with defense industry experts

The pessimistic option considers the trends with the most significant negative impact on defense industry companies, isolating assessed values from -5 to -1 (Table 4). The analysis predicts an increase in all key factors, such as geopolitical tensions, armed conflicts, pandemics, restrictions on the availability of raw materials, regulatory changes, economic sanctions, cyber-attacks, natural disasters, and personnel shortages. Such a scenario can significantly worsen the operating conditions of an organization. Increasing geopolitical tensions and conflicts can destabilize global markets, while pandemics and natural disasters can disrupt supply chains. Reduced raw material availability and cyber-attacks will increase operating costs and business risks. New regulations may impose additional burdens, and staff shortages may limit growth opportunities. This pattern of trends can significantly increase operational, financial, and strategic risks, forcing organizations to develop comprehensive risk management strategies and adapt to adverse market conditions.

Table 4. Pessimistic scenario

No.	**Factor**	**Trend**	**Probability** *[0-100]*	**The power of influence** *[from -5 to 5]*
	1	*2*	*3*	*4*
1.	Rising geopolitical tensions	Growth	69.5	-1.46
2.	New wars and armed conflicts	Growth	63.5	-1.31
3.	The occurrence of a pandemic	Growth	40.5	-2.46
4.	Limitation of availability of raw materials and supplies	Growth	50.2	-3.15
5.	New regulatory changes	Growth	53	-1
6.	New economic sanctions	Growth	42.1	-2
7.	Cyber-attacks on supply chains	Growth	74.5	-1.85
8.	Natural disasters	Growth	44.3	-2.15
9.	Staff shortages	Growth	57.6	-2

Source: own compilation based on observations and surveys with defense industry experts

The least likely variant assumes consideration of trends with assigned probability values from 0 to 49. Based on the analysis, this variant predicts stabilization or decrease in most factors studied, with a slight upward trend in some areas (Table 5). The analysis shows stabilization or regression in geopolitical tensions and stabilization or decrease in the area of new wars and armed conflicts. In case of pandemics,

a possibility of stabilization or decrease in their occurrence in the future is seen. In this scenario, the availability of raw materials and supplies, regulatory changes, and cyber-attacks on supply chains tend to stabilize or decrease. Similarly, new economic sanctions and natural disasters may increase, stabilize, or decrease. The development of new technologies and labor shortages are predicted to be stable or decline. However, it is worth noting that this scenario, as the least likely, contradicts many current trends and forecasts. Contemporary research points to growing threats from climate change, cyber security, and geopolitical instability. While such a scenario may seem desirable from a predictability and risk management perspective, its low probability suggests that organizations should be prepared for more dynamic and unpredictable changes in the business environment.

Table 5. Least likely scenario

No.	**Factor**	**Trend**	**Probability** *[0-100]*	**The power of influence** *[from -5 to 5]*
	1	*2*	*3*	*4*
1.	Rising geopolitical tensions	Stabilization	23.1	0.15
		Decrease	7.5	0.15
2.	New wars and armed conflicts	Stabilization	23.2	-0.38
		Decrease	13.3	1.62
3.	The occurrence of a pandemic	Growth	40.5	-2.46
		Stabilization	34.8	0.46
		Decrease	24.7	1.31
4.	Limitation of availability of raw materials and supplies	Stabilization	24.8	0.46
		Decrease	26	1.62
5.	New regulatory changes	Stabilization	32	0.46
		Decrease	15	1.46
6.	New economic sanctions	Growth	42.1	-2
		Stabilization	31.8	0.54
		Decrease	26.1	1.31
7.	Cyber-attacks on supply chains	Stabilization	20.5	-0.62
		Decrease	5	0.31
8.	Natural disasters	Growth	44.3	-2.15
		Stabilization	38.2	0.46
		Decrease	17.5	1.15
9.	Development of new technologies	Stabilization	27.2	1.69
		Decrease	2.8	-0.23

No.	Factor	Trend	Probability *[0-100]*	The power of influence *[from -5 to 5]*
	1	*2*	*3*	*4*
10.	Staff shortages	Stabilization	21.1	0.15
		Decrease	21.3	0.85

Source: own compilation based on observations and surveys with defense industry experts

The most probable variant assumes the inclusion of trends with assigned probability values from 50 to 100 (Table 6). Based on the analysis, this variant assumes that the following factors will show an upward trend: an increase in geopolitical tensions, new wars, and armed conflicts, reduced availability of raw materials and materials, new regulatory changes, cyber-attacks on supply chains, the development of new technologies and staff shortages. The probable scenario presents dynamic changes in the business environment, characterized by growth in key risk areas. Organizations will face the challenge of effectively managing growing geopolitical, technological, and resource risks while taking advantage of opportunities associated with technological advances. According to the experts' assessment, this option presents a scenario of dynamic changes in the business environment characterized by growth in key areas of operation of the defense industry's logistics processes.

Table 6. Most likely scenario

No.	Factor	Trend	Probability *[0-100]*	The power of influence *[from -5 to 5].*
	1	2	3	4
1.	Rising geopolitical tensions	Growth	69.5	-1.46
2.	New wars and armed conflicts	Growth	63.5	-1.31
3.	Limitation of availability of raw materials and supplies	Growth	50.2	-3.15
4.	New regulatory changes	Growth	53	-1
5.	Cyber-attacks on supply chains	Growth	74.5	-1.85
6.	Development of new technologies	Growth	70	3.23
7.	Staff shortages	Growth	57.6	-2

Source: own compilation based on observations and surveys with defense industry experts

Based on the study, it can be concluded that the continuity of operation of logistic processes of military equipment production is conditioned by dynamic changes in the environment, the proximity of the armed conflict, cooperation with domestic and foreign cooperators, and the organization of internal processes of armaments enterprises.

Conclusions

The main result of the research is the identification of factors and trends that affect the continuity of the operation of logistics processes in defense industry enterprises, especially in the context of instability caused by the COVID-19 pandemic and the armed conflict in Ukraine. The analysis of these elements, conducted using the observation and scenario method with expert opinion, indicates the complexity of the environment and the need to adapt logistics strategies. Key factors identified for 2020–2024 include geopolitical tensions, new armed conflicts, the occurrence of pandemics, reduced availability of raw materials, regulatory changes, economic sanctions, cyber-attacks, natural disasters, the development of new technologies and personnel shortages. The identified trends, especially in the most likely scenario, indicate an increase in threats, such as geopolitical tensions, restrictions on access to raw materials or cyber-attacks, but also opportunities related to the development of new technologies.

Regarding the first research problem – it has been established that the current situation is characterized by increased complexity and instability, resulting from the COVID-19 pandemic and the Russian aggression against Ukraine. The COVID-19 pandemic disrupted traditional supply chains and highlighted their vulnerabilities, leading, among other things, to the suspension of imports of vital components. The conflict in Ukraine further exacerbated problems with supply chains in Europe, generating increased demand for military equipment and components, and affected economic sanctions policies. Together, these factors have led to significant disruptions, underscoring the need to increase logistical resilience through diversification of supply sources and close sourcing strategies.

In terms of the second research problem – it was determined that logistics processes play an important role in ensuring the production and delivery of military equipment in the defense industry. Among the most important tasks are the provision of material facilities through purchasing and cooperation with suppliers, internal transportation of materials and semi-finished products, material management including inventory management and storage, and disposal of the product, i.e., sales and distribution of finished military equipment.

Solving the third research problem – it was found that based on the identified factors and expert assessments, it is possible to construct four main scenarios. The

optimistic scenario assumes a decrease in negative phenomena (e.g., conflicts, pandemics, raw material constraints) with an increase in the development of new technologies. The pessimistic scenario assumes an increase in all the negative factors analyzed, which would significantly worsen the operating conditions for arms industry enterprises. The least likely scenario assumes stabilization or decreases in most factors. In contrast, the most probable scenario, predicts an increase in geopolitical tensions, continued wars and armed conflicts, reduced availability of raw materials and supplies, new regulatory changes, increased cyber-attacks on supply chains, the development of innovative technologies and worsening labor shortages. The latter scenario points to the need for companies to prepare for dynamic changes and manage growing risks while taking advantage of technological opportunities.

Based on literature review and the results of the study, the hypothesis is confirmed, which specifies, the observed trends in the current economic-military situation in the area of logistics processes indicate, the need to diversify methods of providing material resources as a determining factor in ensuring the continuity of operations of the defense industry. In particular, the most likely scenario, indicating an increase in restrictions on the availability of raw materials and supplies, and the conclusions regarding the need to ensure stable supply chains and sufficient material reserves, directly support this thesis. The uncertainty and volatility of the situation regarding the continuity of supply of materials necessary for the production of military equipment forces the risk of extension or interruption of logistics chains to be included in strategic plans, making the diversification of supply methods an essential element of business continuity strategies.

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