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The use of network intralogistics and fulfillment for the functioning of transport and warehouse complexes

This article examines the peculiarities of the functioning of transport and warehouse complexes, taking into account the changes and challenges that arose as a result of both the spread of the Covid -19 pandemic and the conditions of martial law. The key factors on which the formation of competitive advantages of transport and warehouse complexes in unstable economic systems depends are revealed.

The reasons for the existence of the controversy regarding the interpretation of the concept of intralogistics and fulfillment network in modern challenges and they have been established that network intralogistics is a system concept, where many complex algorithms and components are interconnected and closely interact, and thus, based on practically oriented technical principles - the technological part of intralogistics should be properly integrated with fulfillment processes, which include a system algorithm of actions from the very beginning of receiving an order from the buyer until the purchase is received, that is, the sphere of relations, in which strategic system principles and their implementation with a system concept of interconnection: logistics and service acquire key importance.

intralogistics, fulfillment, transport and logistics support, digital technologies, e-commerce transport and logistics infrastructure, customer service

Introduction. A full recovery of the Ukrainian economy is impossible without the reconstruction and modernization of the logistics infrastructure. And this is an axiom.

In wartime conditions, the activity of transport and warehouse complexes, which include: logistics and fulfillment is a guarantor of the stability of the development of the entire country. Maintaining competitiveness and strength of the advantages of enterprises in this field of activity must be accompanied by the opportunity and desire to carry out all value creation processes that continuously circulate in their supply chains - from the supply of raw materials and goods to the end user's service.

The success of these tasks largely depends on the correct configuration of the logistics system of the warehouse enterprise itself, as well as on the synchronization of its work with other and no less important areas - logistics, transport and customer service. This largely explains the relevance of the study of the potential of using the network intralogistics system in the activity of transport and warehouse complexes, as one of the progressive scientific and applied directions of flow process management.

Analysis of recent researches and publications. Intralogistics is becoming the subject of researches and projects as a form of optimization, automation, integration and management of material and information flows circulating within business units. In particular, the analysis of the latest researches and publications makes it possible to distinguish at least two dominant groups of scientific and applied research of the use of intralogistics.

The first group focuses on prioritizing of the role of innovative, high-tech solutions in logistics, which are the fundamental basis of the fourth industrial revolution. Here, first of all, we are talking about the transformation of production units into smart environments where the entire process can be controlled using a single information system [1–3]. The research of this

group proves the value of intralogistics in the aspect of optimization and end-to-end management of the logistics flow of information within the logistics system of a transport and warehouse enterprise, distribution center or warehouse, as well as the management of physical materials based on modern information technologies, which was called " fulfillment ", due to which it is possible to reduce unnecessary expenses, the amount of inventory is minimized, and the safety of employees is improved. However, the implementation of intralogistics and fulfillment systems can range from basic automation, such as conveyors and packaging machines, to software-driven systems that manage manual and automated processes, providing real-time analysis and communication with other parties.

It should also be noted that in this context intralogistics is mostly narrowed down to the performance of data collection and analysis functions, which enables businesses to increase the efficiency of logistics processes, primarily at the level of warehouse and organization of transport processes.

The second group of researchers focuses on prioritizing the achievement of a high degree of cross-functional synergy of logistics inside the logistics system and outside it, which is conceptually based on fulfillment, management and its modernized version of the "concept of network intralogistics" [6-9].

At the same time, the general trend of world business against the traditional levers of influence on the consumer (prices, quality, elasticity, innovation, speed) is increasing the value of environmental performance and safety of goods, which is definitely of critical importance for basic necessities, especially in the conditions of global challenges caused by the Russian war in Ukraine.

The aim of the article. Therefore, it should be stated that the issue of the application of network intralogistics in the activity of transport and warehouse complexes requires a deep comprehensive study of the peculiarities of their activity from the point of view of identifying key factors on which the formation of competitive advantages of domestic warehouses in unstable military and economic conditions depends.

Network intralogistics combined with fulfillment is a system concept in which many processes and mechanisms interact with each other. Like any other management concept, intralogistics requires a systemic approach, in which the technological component must be balanced, integrated with the "intangible", the sphere of relations, in which strategic transport and logistics approaches and their integration with other functional spheres are of key importance: logistics and finance.

Results. The conducted studies in the field of logistics features of supply chains of goods at transport and warehouse complexes indicate the traditional characteristic features of the market in which these goods are sold:

- 1) all-season;
- 2) dynamism;
- 3) high competition;
- 4) constant struggle for leadership;
- 5) reducing the life cycle of goods,
- 6) emergence of new rules and requirements.

In particular, the successful operation of transport and warehouse complexes depends not only on compliance with corporate rules, tax and customs legislation, but also especially on consumer rights protection legislation. Extremely important aspects of doing business in this market are quality control and compliance with consumer rights, which have a significant impact on the financial performance of entrepreneurs.

In order to maintain their positions in this market, companies constantly transform their brand portfolio, expand their assortment, and introduce new products to the market.

Promotion and sales strategy, product availability and pricing, and a wide range of products are critical for players in this market. There is an opinion that the logistics solutions developed for the category of goods storage in warehouses are the most revolutionary.

Price consulting firm Waterhouse Coopers, companies in the consumer goods retail and logistics sector typically manage their planning, warehousing, supply and distribution functions at a regional level while support and strategic procurement functions are managed at a global level. They outsource about 7% of procurement planning and order processing, 30% of manufacturing operations, and 10–55% of direct supply work.

The Ukrainian sector of transport and warehouse complexes, according to research by experts the main trend here (in the last few years) before the war is the shift of consumer needs to cheaper goods of everyday demand, which are produced in Ukraine [1]. This is a consequence of a decrease in the purchasing power of the population. Among the trends, you can also observe: the slowdown in the growth rate of the industry; intense struggle for market share among manufacturers; change in retail formats (increasing the share of network retail); acceleration of growth rates, introduction of novelties in case of shortening of the life cycle of goods.

At the same time, the analysis of the peculiarities of the sector of transport and warehouse complexes makes it possible to assert that despite the fact that this market is protected from sharp economic fluctuations in consumer demand, including those caused by war (Fig. 1). At the same time, any drastic changes have a significant impact on the organization of logistics in this field and the challenges that all participants in the supply chain of the final product must go through.

Analyzing the segments of the sector of transport and warehouse complexes that show the highest consumer interest, it should be stated that the growth mainly occurs in those brands that are particularly well positioned in the global Internet network (due to their high presence in e-commerce).

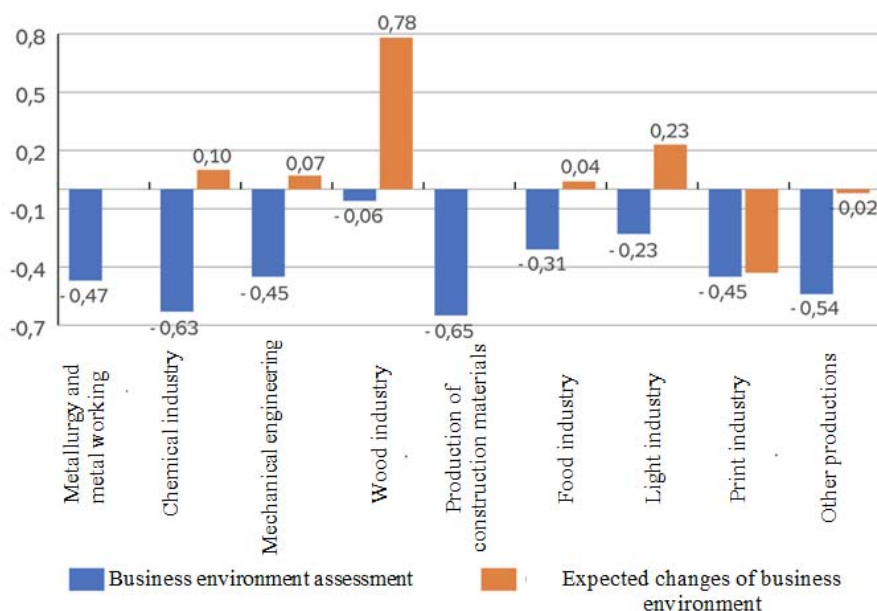


Figure 1 - Reaction of various branches of industry to military operations in Ukraine

Source: monthly survey of enterprises "Ukrainian business during the war". Institute of Economic Research and Policy Consulting, 2022

For many people in countries with curfew, online ordering has become the only alternative after the closure of many retail establishments [7]. Consumers are also concerned about their health, which means that brands related to household and personal hygiene are

sold in larger volumes.

The Nielsen company in Ukraine has recently held an event dedicated to electronic commerce (eCommerce), in which it presented a service for monitoring online sales in the field of everyday goods and determined that by the end of 2020, online sales in Ukraine occupied about 1% of the market. According to other sources, the statistics of Internet sales of goods before the quarantine and the war amounted to 3% [8]. In the conditions of quarantine and as of now, the model of purchasing goods from transport and warehouse complexes in the online format has taken a prominent place, surpassing all possible forecasts. Therefore, online stores, marketplaces, B2B portals, mobile applications are not just additional solutions for strategic business planning, but real opportunities for its growth and development, which should not be neglected.

According to the recommendations of logistics experts, it can also be concluded that Covid-19 and the war have led to serious cross-industry challenges, pointing to the importance of effective inventory management in the supply chain. A major influence is the change in consumer behavior which has shifted attention from traditional goods to pharmaceutical products and health care products. Logistics operators must be ready to increase the volume of supplies from manufacturers, both directly through retail networks, transport and warehouse complexes and electronic trade provide goods for sale [9].

Therefore, on the one hand, the mentioned challenges determine the inevitability of the use of modern Industry 4.0 digital technologies in intralogistics - the Internet of Things, robotization, analytics, big data, etc., which are aimed at increasing the productivity of logistics processes, increasing the level of their coherence, visualization, predictability both internally and outside the enterprise and on the other hand - the understanding that, based on the systemic approach of fulfillment, logistics achieves its goal only in close interaction and coordination with the needs and reactions of end users. The absence of systemic thinking and understanding of the symbiosis of logistics and fulfillment, those advantages that arise due to specialization in the service sector can be leveled, "scattered" in other areas, in particular in sales. As the scientists note, "it is possible to achieve a very high level of cost control in the field of production and to practically minimize the time spent, the volume of stocks due to a high level of specialization and the use of modern logistics tools, but it is extremely difficult to achieve the same results in the field of product sales. As a rule, it is in the field of distribution that the entire achieved positive effect of "total cost savings" in production is "dispersed".

For that reason we agree with the authors [1], logistics support based on the following three elements is more important today than ever: 1) customer satisfaction; 2) integrated logistics and fulfillment actions; 3) achievement of financial goals.

In general, logistics and fulfillment support is aimed at improvement of service and information dissemination. Therefore, some customers see the traditional "value" for logistics, such as a short service period, availability and timeliness of delivery. Customers, mainly within logistics support are increasing the demands on logistics itself by requesting operational tasks with added value, such as packaging, bar coding and information systems. In particular, one of the important intralogistics solutions at transport and warehouse complexes is targeting the practical implementation and efficiency of intra-logistics (internal logistics) and fulfillment. Fulfillment is a technique that business leaders use to deliver their messages to their own potential customers. For manufacturers, this is similar to conventional marketing, except that they are selling goods and services to their customers, as well as messages, programs, and policies to their employees.

At the same time, most enterprises still have a low level of logistics organization, when the responsibility for the performance of logistics functions is divided between several functional divisions - sales, marketing, supply, financial departments, etc. This leads to the impossibility of optimizing the entire logistics process and ensuring the implementation of

the general logistics strategy of the enterprise [9].

Therefore, the main task of network intralogistics and fulfillment, which definitely play an important role in modern transport and logistics solutions of enterprises, is the simultaneous achievement of minimizing inventory, speeding up operations, speed of response to changes in consumer behavior and reducing costs – those are financial and logistical goals due to combined and improved use of technology, labor and equipment on the one hand, and on the other – achieving mutual coordination of logistics solutions within the logistics system with other functional areas, primarily with the field of fulfillment, which will contribute to the joint overcoming of time, space, assortment, quantitative and other barriers to the path of movement of goods from sources of raw materials to end consumers, avoidance of processes and actions that do not have value, reduction of reaction time to changes in market demand.

There is no contradiction between the "material", the technological sphere of application of intralogistics, and the "intangible", the sphere of relations, in which strategic logistics approaches and their integration with other functional spheres: fulfillment and finance are important. There is an understanding of the importance of their combination in order to find the optimal management solution

In particular, implementing such view in an applied study of the features of the application of network intralogistics systems in transport and warehouse complexes, the results of the analysis of the changes observed in the market of transport and warehouse complexes in wartime conditions should be cited. The obtained results make it possible to highlight key challenges in the organization of logistics and fulfillment and actual tools for their mitigation (Fig. 1).

Figure 1 – Key challenges in the organization of logistics and fulfillment at transport and warehouse complexes

Branch	Key challenges	Field of activity	Counter instruments
Logistics	Increase of risks in inventory management	Supply, production, sales	Digital technologies
	Change of way counterparties interact – increase of importance of online contacts	Mostly between spheres of activity	Digital technologies
	Increase of risks in human resource management	Supply, production, sales	Remote technologies (WFH - Work From Home)
	Increase of requirements for the availability and speed of product delivery	Sales	Short supply chains of digital technologies
	Delays in transportation processes	Sales	
	Increase of online shopping	Sales	Internet trade
	Increase of requirements for quality/ environmental performance	Production	Green technologies
Fulfillment	Increase of online shopping (absence of physical shelves, closing of stores)	Sales	Internet technologies Social networks Digital marketing E-mail - commerce Customer Relationship Management
	Increase of demand	Production, sales	
	Demands to present the brand in the social network	Sales	
	Increase of importance of the D2C strategy (Direct To Consumer)	Sales	

Source: [1-3]

Therefore, the analysis of changes in the organization of logistics and fulfillment in the market of transport and warehouse complexes indicates a number of important from the point of view of the system of application of network intralogistics systems in the researched market, actual tools for countering or significantly mitigating the key challenges faced by transport and warehouse enterprises as a result of the spread quarantine measures and the connection with the brutal war in Ukraine.

This, in turn, makes it possible to form complex logistics support for the market of transport and warehouse complexes (Fig. 2), which is based on a system of selecting the most relevant network intralogistics and fulfillment tools for this market, which includes:

- digital technologies and the construction of short supply chains with the aim of obtaining positive effects in the field of inventory management, reducing risks in human resource management, in the field of transportation and increasing the ability to adapt to the growing influence of online communications and online purchases ;
- green technologies, their purpose is to ensure the safety and environmental performance of processes and final products for final consumers;
- internet marketing, social network marketing, digital and e-mail marketing with the aim of implementation of a customer-oriented strategy, and in particular the D2C strategy, which in the conditions of growing demand and the online format of purchases plays a decisive role, ensuring the critical loyalty and commitment of customers in the Internet.

Therefore, the complementarity of logistics and fulfillment tools within the network intralogistics application system constitutes a modern platform for building effective logistics systems and their supply chains, oriented on a high degree of customer satisfaction and loyalty.

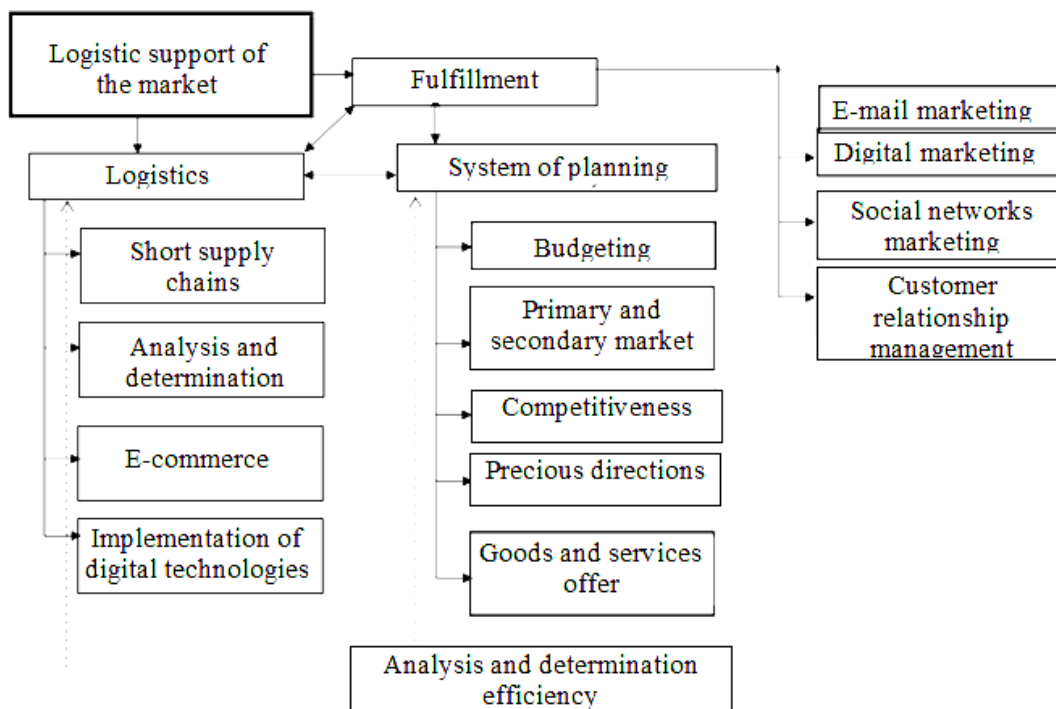


Figure 2 – Complex logistics support of transport and warehouse complexes
 Source: own research

Conclusions. The analysis of changes in the organization of logistics and fulfillment in the market of transport and warehouse complexes indicates a number of important from the point of view of the system of application of network intralogistics systems in the researched

market of actual tools of resistance or significantly mitigating the key challenges faced by enterprises as a result of the declaration of martial law in Ukraine. These include: digital technologies and the construction of short supply chains; green technologies; Internet marketing, social networks, digital and e-mail marketing, Customer Relationship Management.

Thus, the complementarity of logistics and fulfillment concepts forms a modern platform for building effective logistics systems and their supply chains, oriented to a high degree of customer satisfaction and loyalty.

The study of applied aspects of the implementation of the logistics approach to the management of logistics systems at transport and warehouse complexes requires further investigations.

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Використання мережевої інтралогістики та фулфілменту для функціонування транспортно–складських комплексів

Одним із найперспективніших ринків, який є захищеним від циклічних змін, які відбуваються в економіці та демонструє приріст в умовах воєнного часу є діяльність транспортно–складських комплексів, до яких відносяться: логістика і фулфілмент. Збереження конкурентоздатності і підсилення переваг підприємств цієї сфери діяльності великою мірою зумовлюється здатністю оптимізувати всі процеси створення вартості, які безперервно циркулюють у їхніх ланцюгах поставок – від постачання сировини та товарів до сервісного обслуговування кінцевого споживача.

У статті досліджено особливості функціонування транспортно-складських комплексів із врахуванням змін та викликів, що виникли внаслідок поширення пандемії Covid -19 та в умовах воєнного стану. Виявлено ключові фактори, від яких залежить формування конкурентних переваг транспортно-складських комплексів у нестабільних економічних системах.

Обґрунтовано підстави існування контрарерсії щодо трактування концепції мережевої інтралогістики та фулфілменту за сучасних викликів та встановлено, що мережева інтралогістика є системною концепцією, в якій багато процесів і механізмів взаємодіють один з одним, а отже засновуючись на системному підході технологічна складова інтралогістики обов'язково має бути врівноважена, інтегрована із процесами фулфілменту, що включають комплекс операцій з моменту оформлення замовлення покупцем і до моменту отримання покупки.

Взаємодоповнення логістичних та фулфілментних інструментів в рамках системи застосування мережевої інтралогістики складає сучасну платформу побудови ефективних логістичних систем та їх ланцюгів поставок, зорієнтованих на високий ступінь задоволеності і лояльності клієнтів.

інтралогістика, фулфілмент, транспортно логістична інфраструктура, транспортно-логістичне забезпечення, діджитал-технології, інтернет-торгівля, обслуговування споживачів

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