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THE IMPACT OF GLOBAL INSTABILITY ON ELECTRONIC COMMERCE LOGISTICS AND FULFILLMENT MODELS

Abstract: Global instability represents one of the key characteristics of the contemporary business environment, as it has a comprehensive impact on business operations and leads to significant changes in operating conditions. This instability manifests through economic crises, increased uncertainty, geopolitical conflicts and tensions, as well as frequent disruptions in global supply chains, which further complicate the planning and execution of business activities. Under such circumstances, electronic commerce stands out as a sector that is particularly exposed to these negative effects due to its strong dependence on logistics systems. The aim of this paper is to analyze the impact of global instability on logistics processes in electronic commerce, as well as on fulfillment models. The study is based on an analysis of contemporary academic literature in the fields of logistics and electronic commerce, as well as industry reports. The results indicate the growing importance of flexible and digitally supported logistics solutions, whose implementation becomes one of the key factors in maintaining competitiveness under conditions of increased uncertainty. Particular importance is placed on improved inventory management and the application of modern information technologies in the planning and coordination of logistics activities.

Keywords: Instability; Electronic commerce; Logistics; Supply chain; Fulfillment models

1. INTRODUCTION

The contemporary business environment today is anything but stable. The past few years have clearly demonstrated how quickly global flows can be disrupted and how deeply connected modern economies truly are. During and after the pandemic, geopolitical tensions have continued to intensify, making uncertainty an almost everyday framework of business operations. According to a World Bank report (2026), the global economy is facing increasing risks alongside slowed growth, which further complicates the functioning of international trade and supply chains.

In such circumstances, electronic commerce becomes particularly sensitive to environmental changes, because although it appears to rely primarily on online platforms, its core still depends on physical processes, especially logistics. Disruptions in supply chains, delivery delays, rapidly increasing costs, and nearly unmanageable inventory planning have become a reality that companies face on a daily basis. At the same time, these challenges are no longer temporary,

but represent a structural feature of the modern business environment, requiring companies to rethink traditional approaches to logistics and operations.

The aim of this paper is to analyze how global instability affects logistics processes in electronic commerce, as well as order fulfillment models. The focus is on examining supply chain disruptions, inventory management, and cost pressures, as well as the ways in which companies respond to these challenges and adapt their logistics strategies. In this context, the paper is structured as follows: the next section discusses the concept of global instability and the characteristics of the modern business environment; this is followed by an analysis of electronic commerce logistics and order fulfillment model; subsequently, the effects of instability and potential company responses are examined; and finally, key observations and conclusions are presented.

2. GLOBAL INSTABILITY AND THE CONTEMPORARY BUSINESS ENVIRONMENT

In recent years, the global business environment has no longer been characterized by stability, but rather by a series of consecutive disruptions that have significantly altered the functioning of international trade. The COVID-19 pandemic represents one of the most significant shocks of the 21st century, causing border closures, production interruptions, and disruptions in global supply chains. Although not the first major disturbance, it intensified existing vulnerabilities and marked the beginning of a period of prolonged instability, followed by events such as the Russia-Ukraine War, the energy crisis in Europe, and disruptions in key maritime routes, including the Suez Canal blockage and subsequent issues in the Red Sea. These events indicate that disruptions in the global economy and business are no longer exceptions, but rather a part of contemporary business operations. According to estimates by World Bank (2026), global economic growth has slowed approximately 2-3% annually.

Under such conditions, global instability is not reflected solely through macroeconomic indicators, but also through concrete operational challenges faced by companies. The rerouting of shipping lines, increasingly frequent delivery delays, insufficient container availability, and sharp increases in transportation costs have become the new reality. Data from United Nations Conference on Trade and Development (2024) indicate that container shipping prices in global maritime transport have, on certain routes, increased by more than three times compared to the same period in the previous year. The same source highlights that rising transportation cost have a direct impact on product prices; consequently, companies face more complex inventory management, higher operational costs, and reduced delivery reliability.

These disruptions have revealed the limitations of traditional approaches, which for decades were based on maximizing efficiency and minimizing costs. For example, models such as Just-in-Time, which rely on low inventory levels and fast, efficient delivery, have proven to be highly vulnerable to supply chain disruptions. As a result, an increasing number of companies are shifting their focus from efficiency toward resilience. According to analyses by the World Economic Forum (2026), more than 70% of companies have identified the need to enhance supply chain flexibility, while a growing number of firms are working on supplier diversification as a strategy to reduce dependence on individual markets. In addition, digitalization and the application of advanced technologies are becoming key tools for adapting to new business conditions. Companies are increasingly investing in real-time tracking systems, data analytics, and the automation of logistics processes. According to data from the Organization for Economic Co-operation and Development (2025), supply chain automation can reduce operational costs by up to 20%. However, even with the implementation of advanced technologies, global instability and its effects on business cannot be eliminated - only mitigated.

The importance of these changes is particularly evident in logistics, which represents one of the most sensitive functions in modern business operations. Logistics is directly affected by all the mentioned disruptions, as it depends on the functioning of transportation costs can lead to a 1-2% rise in import prices globally. This impact is even more pronounced in electronic commerce, where speed and delivery reliability are key determinants of competitiveness. Therefore, understanding the nature of global instability and its impact on the business environment serves as a foundation for further analysis of logistics processes and order fulfillment models in electronic commerce.

Consequently, resilience is no longer viewed as a complementary objective, but as a core requirement for maintaining business continuity in an increasingly volatile global environment.

3. LOGISTICS IN ELECTRONIC COMMERCE AND FULFILLMENT MODELS

The development of electronic commerce has led to significant changes in the organization of logistics processes, as well as in consumer expectations. Unlike traditional retail, where goods are distributed in large quantities to brick-and-

mortar stores, electronic commerce involves large numbers of individual orders that need to be delivered to end customers. This business model increases the complexity of logistics operations and imposes the need for greater speed, flexibility and reliability of delivery.

When it comes to the need for greater speed, according to the DHL report (2025), more than 70% of consumers state that delivery speed is one of the key factors influencing their online purchasing decisions, and more than 50% want delivery to be faster. Shipment tracking also has a significant impact. Under such conditions, logistics processes become one of the key elements of competitive advantage.

3.1. Electronic Commerce logistics

Logistics in electronic commerce include a series of interconnected operational processes that enable the fulfillment of online orders. Unlike traditional logistics systems, where goods are distributed to predefined retail locations, electronic commerce introduces a shift, not only must it respond to a large number of individual customer demands, but this response often needs to occur in real time.

This shift increases operational complexity, as logistics systems must handle fragmented order structures, higher frequency of shipments, and stricter delivery deadlines, all while maintaining efficiency and cost control. This major transformation creates the need for a different approach to warehouse organization, a higher level of automation, and more intensive use of information technologies throughout the entire logistics system of a company. According to reports, digitalization and automation represent key factors in improving the efficiency of electronic commerce logistics, as they enable companies to process orders faster and manage their resources more effectively.

As previously mentioned, there is a strong pressure on delivery speed in electronic commerce. Deliveries that previously took several days are now increasingly expected within 24 hours, and more recently, same day delivery is becoming common, especially in developed countries. According to Statista report (2023), more than 40% of customers expect delivery within two days, while an increasing number of customers are willing to pay for express delivery options. Slightly different findings are presented by McKinsey & Company in their report (2023) indicating that as many as 90% of customers expect delivery within 2-3 days, mostly free of charge. These expectations further complicate the organization of logistics processes and require continuous optimization of warehousing and distribution operations.

A particular challenge is last-mile delivery, which refers to the final stage of delivering products to the end customer. This segment is considered the most expensive and, at the same time, the most complex part of the entire delivery process. According to Lim & Jin (2018), last-mile delivery costs can account for up to 50% of total logistics costs in electronic commerce, a finding also supported by McKinsey (2023), which highlights this segment as one of the main sources of operational inefficiency.

Due to these challenges, companies are increasingly exploring alternative delivery solutions, such as micro-fulfillment centers, urban distribution hubs, and decentralized delivery networks, in order to improve efficiency and reduce delivery times.

The growth of electronic commerce additionally burdens logistics systems through the continuous increase in shipment volumes. According to the Pitney Bowes report (2024), the global number of parcel shipments exceed 160 billion annually, with constant year-over-year growth. More recent estimates suggest that this trend will continue, with the number of shipments expected to surpass 200 billion globally (Pitney Bowes, 2024) in coming years, further increasing pressure on logistics infrastructure and distribution capacities. Such growth dynamics require continuous improvement of logistics processes, particularly in warehousing, sorting and last mile delivery.

The complexity of delivery is not the only challenge companies face today. A specific feature of electronic commerce logistics is the exceptionally high level of product returns. Compared to traditional retail, where returns are less frequent, online sales experience significantly higher return rates. In certain sectors, such as the fashion industry, return rates can exceed 30%, which further complicates already complex logistics processes and increases transport costs (Statista, 2023). High return rates significantly complicate logistics processes, as they require the development of efficient reverse logistics systems, including product inspection, repackaging, and reintegration into inventory, which further increases operational costs and general complexity.

The way companies respond to all these challenges largely depends on the choice of order fulfillment model. Different approaches to organizing logistics processes determine the level of efficiency and the ability to adapt to modern market conditions. For this reason, the following section will analyze the main order fulfillment models in electronic commerce and their key characteristics.

3.2. Order Fulfillment Models in Electronic Commerce

Order fulfillment models in electronic commerce refer to the ways in which companies organize the storage, processing and delivery of products to end customers. The selection of an appropriate model represents one of the key strategic decisions, as it directly affects costs, delivery speed, flexibility and overall customer experience. It is important to emphasize that there is no universal solution, instead, companies choose models in accordance with their specific needs.

One possible approach is the in-house fulfillment model, in which a company independently manages warehousing, inventory and distribution. The biggest advantage of this model lies in the higher level of control, however, it requires significant investments, which can be a limitation, especially for smaller companies. As domestic (Serbian) authors point out, efficient management of logistics processes represents the basis of competitiveness in modern distribution systems (Lovreta, 2011).

On the other hand, an increasing number of companies choosing logistics outsourcing, i.e., engaging third-party logistics providers (3PL). In this model, an external company takes over part of the entire process of storage, order processing, and delivery. According to OECD analyses (2025), logistics outsourcing enables companies to focus on their core activities, while logistics providers ensure greater efficiency and flexibility in fulfillment operations. A specific model that has gained importance with the development of digital platforms is dropshipping. In this case, the company does not hold its own inventory, instead, orders are directly forwarded to the supplier, who delivers the products to the end consumer. This model significantly reduces initial business cost and eliminates the need for warehousing, but at the same time introduces challenges related to quality control and delivery time.

In addition to the before mentioned models, the omnichannel approach is becoming increasingly important. This approach involves the integration of online and offline sales channels. Within this model, companies combine different fulfillment methods, such as home delivery, in-store pickup (click & collect), or shipping from nearest warehouse. Such an approach enables greater flexibility and better resource utilization, but requires a high level of coordination and system integration.

According to DHL report (2025), flexible delivery options and the possibility of choosing the method of product collection significantly influence customer satisfaction and loyalty. In practice, many companies use a combination of different fulfillment models in order to optimize costs and improve service quality. The choice of an appropriate model depends on numerous factors, including company size, their budget and product type, while customer expectations also play a crucial role in decision-making process. The ability to adapt these models is becoming key success factor, which will be further discussed in the following section.

4. THE IMPACT OF GLOBAL INSTABILITY ON LOGISTICS

Unlike the previous chapters, which examined general trends and characteristics of logistics, this section focuses on the concrete consequences that global disruptions have on the functioning of logistics systems. These impacts are most clearly observed through supply chain disruptions, challenges in inventory management, and rising logistics costs. In addition, global instability not only disrupts operational processes but also fundamentally reshapes strategic decision-making in logistics, forcing companies to reconsider traditional models and adopt more resilient and adaptive approaches.

4.1. Supply Chain Disruptions and Transportation Challenges

In conditions of global instability, disruptions in supply chains are most evident in the reduced predictability of transportation costs. Instead of stable and pre-defined routes, as was previously the case, companies are now facing frequent changes in planned transportation routes. In practice, this means that logistics plans are increasingly losing reliability, and companies and their partners are forced to find alternative solutions in a short period of time. Additionally, frequent changes in transportation routes make coordination between different stages of the logistics process more difficult.

Moreover, increased congestion in ports, delays at border crossing, and shortages of transport capacity further intensify these challenges, leading to longer delivery times and decreased service reliability. As a result, companies are increasingly exposed to operational risks that can directly affect customer satisfaction and overall business performance.

In addition to these challenges, recent disruptions in key maritime corridors have further intensified transport uncertainty. For example, due to security risks in the Red Sea, a significant share of global shipping traffic has been redirected around the Cape of Good Hope, increasing transit times by 10 to 15 days on average and significantly raising

transport costs. Furthermore, global container shipping volatility remains a major issue, making long-term logistics planning increasingly difficult for companies operating in international markets.

In such conditions, logistics systems are transforming and shifting from static planning to dynamic management, where decisions regarding routes, delivery times, and transport modes are made in real time. This approach largely relies on modern IT solutions such as ERP (Enterprise Resource Planning), WMS (Warehouse Management System), and TMS (Transport Management System). The integration of these technologies enables greater visibility across the supply chain, allowing companies to monitor disruptions, anticipate potential risks, and respond more effectively to unexpected changes.

4.2. Inventory Management

Changes in transportation flows, and overall reduced reliability of deliveries, directly affect the way companies manage their inventories. In conditions where delivery times are unpredictable, companies are forced to adjust their inventory management strategies in order to ensure business continuity.

Since companies need to maintain higher inventory levels to mitigate the risk of delays or supply disruptions, issues arise such as increased storage costs and greater capital engagement. Higher inventory levels also lead to space management challenges, increased risk of inventory obsolescence, and reduced business flexibility. These problems, are especially pronounced in electronic commerce, where inventory turnover is crucial for efficiency. As a solution, companies are shifting from centralized warehousing to a decentralized approach. In decentralized systems, goods are positioned closer to end customers to reduce delivery times. However, decentralization also introduces additional complexity in inventory coordination and control, requiring more advanced planning systems and higher levels of synchronization across different locations. Companies must carefully balance the trade-off between service speed and cost efficiency in order to optimize their overall logistics performance.

Furthermore, the growing importance of real-time data analytics allows firms to better forecast demand patterns, reduce uncertainty, and improve inventory allocation decisions, thereby minimizing the negative effects of instability.

4.3. Cost Pressures

The result of all these changes is that costs have become unstable and difficult to predict. When standard routes and planned flows become unreliable, companies are forced to choose more expensive options, significantly increasing overall logistics costs. Additional pressure on costs arises from multiple locations, a higher number of warehouses, and greater coordination requirements are just some of the factors contributing to rising costs. Cost pressures are particularly evident in last-mile delivery phase, where companies must meet customer expectations for faster delivery in order to remain competitive.

In addition, increasing labor costs, higher fuel prices and the need for investment in digital infrastructure further amplify financial pressures on logistics operations. These factors make cost management significantly more complex, specially in highly competitive markets.

A significant challenge is long-term cost planning, as fluctuations in transportation and logistics service prices make it difficult to create reliable financial plans. In recent years, this uncertainty has been further intensified. Geopolitical tensions and sanctions, especially regarding Europe's supply of oil and gas, have led to increased price volatility, directly affecting transportation and distribution costs. Additionally, disruptions in key transport routes, such as the blockage of the Suez Canal or issues in maritime routes through the Red Sea, have resulted in longer transport routes and increased operational costs. In such situations, logistics companies are often forced to use alternative routes, which are longer and more expensive, further complicating cost control.

Moreover, fluctuations in fuel prices have had a direct and immediate impact on transportation costs, particularly in road and maritime transport. Since fuel represents a significant share of logistics expenses, even small increases in fuel prices can affect overall cost structures. Consequently, companies are increasingly focusing on cost optimization strategies, including route optimization, strategic partnerships, and the use of advanced technologies, in order to mitigate the negative financial impact of global instability and maintain long-term sustainability.

Another important factor contributing to cost pressures is the growing need for investment in technological infrastructure, including automation systems, tracking technologies, and data analytics tools. While these investments improve efficiency in the long run, they represent an additional financial burden in the short term, especially for smaller companies. In this context, managing logistics cost is no longer limited to cost reduction, but increasingly involves balancing short-term financial constraints with long-term strategic investments. This shift highlights the growing importance of adaptability and resource allocation decisions, which directly influence the ability of companies to respond to instability and maintain competitiveness.

These challenges further emphasize the need for companies to continuously adapt their order fulfillment models and strategies, which will be analyzed in the following section.

5. ADAPTATION OF ORDER FULFILLMENT MODEL TO GLOBAL INSTABILITY

Disruptions in transportation, unpredictability of delivery times, and rising costs force companies to continuously reassess how they organize their logistics processes, with flexibility and adaptability emerging as key factors for survival. In real-world conditions, this means that companies increasingly rely on combined fulfillment models rather than a single approach. Such hybrid models often integrate in-house logistics capabilities with outsourced services, allowing companies to balance control, cost efficiency and responsiveness in highly volatile market conditions. Recent research shows that electronic commerce continues to grow, with global market value increasing from approximately \$4.25 trillion in 2020 to as much as \$7 trillion in 2025, further intensifying pressure on logistics and operational models (Vučenović, Macura, & Pavličević, 2026). This rapid expansion of electronic commerce not only increases the volume of orders but also raises customer expectations in terms of delivery speed, service quality, placing additional strain on existing fulfillment systems.

For example, when order volumes increase, part of the activities is outsourced to logistics providers, ensuring continuity of delivery without overburdening internal resources. According to a DHL report (2025), flexible delivery options and adaptability of logistics systems are among the key factors influencing customer satisfaction in electronic commerce, further confirming the importance of such approaches. In this context, third-party logistics (3PL) providers play a crucial role by offering scalable solutions that enable companies to quickly adjust their operational capacity in response to fluctuating demand.

Companies are increasingly relying on modern IT solutions, such as ERP (Enterprise Resource Planning), WMS (Warehouse Management System) and TMS (Transportation Management System), which enable real-time tracking of goods flows and faster operational decision-making. Thanks to these systems, companies can respond promptly to disruption, reroute goods, adjust delivery paths and optimize inventory allocation, thereby reducing the negative impact of instability on business operations. Furthermore, the adoption of advanced technologies such as artificial intelligence, predictive analytics, and automation enhances decision-making processes and enables more accurate demand forecasting, which is essential in uncertain environments.

Adapting order fulfillment models is not a one-time decision, but a continuous process. Companies that successfully integrate flexibility, digitalization, and cooperation with logistics partners have a greater ability to maintain operational stability and preserve their competitive position, even in conditions of pronounced global instability. Ultimately, those companies that proactively invest in resilient and adaptive fulfillment strategies are better positioned to not only withstand external shocks but also leverage them as opportunities for long-term growth and competitive advantage.

6. CONSLUSION

The analysis of the impact of global instability on logistics processes and order fulfillment models in electronic commerce shows that contemporary business conditions are increasingly characterized by uncertainty and constant change. In such an environment, traditional and rigid fulfillment models are no longer sufficient. Companies are increasingly shifting toward more flexible and adaptive approaches that enable faster responses to changes and better management of uncertainty. The use of hybrid fulfillment models, integration of different distribution channels and collaboration with logistics service providers have become essential elements of modern logistics strategies.

At the same time, digitalization plays a central role in enabling these adjustments. The application of advanced IT systems and data-driven decision-making allows companies to monitor operations in real time, optimize logistics processes, and respond more effectively to disruptions. These capabilities are becoming a key determinant of competitiveness in the electronic commerce sector. Overall, the ability to continuously adapt order fulfillment models, rather than rely on a single optimal solution, emerges as a critical success factor. Companies that successfully combine flexibility, technological support, and strategic coordination of logistics activities are better positioned to maintain stability and achieve long-term growth in conditions of global instability.

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