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CHALLENGES OF INTERNATIONAL LOGISTICS IN THE FACE OF FINANCIAL CRISES

Kamil Rajzer[1]

ABSTRACT

This article explores the challenges international logistics faces during financial crises and underscores the pivotal role of multimodal transport in the global economy. Financial crises disrupt logistics by reducing capital availability, decreasing demand, and causing currency fluctuations, which affect supply, production, and distribution logistics. Multimodal transport involves using multiple transport modes to optimize costs and efficiency in international trade. Despite its benefits, multimodal transport lacks comprehensive international regulation, necessitating adherence to various national and international transport laws. The article highlights the significant impact of recent crises, such as the COVID-19 pandemic and wars, on supply chains, resulting in delays and disruptions. It also discusses the vulnerabilities of the forwarding industry to financial crises, noting the sensitivity of logistics to external shocks like oil price fluctuations and geopolitical tensions. To address these challenges, the article proposes mitigation strategies such as supplier diversification, transport route optimization, and efficient inventory management through Lean Management and Just in Time methodologies. By adopting these strategies, companies can enhance their resilience and maintain operational efficiency in the face of financial uncertainties. This comprehensive analysis aims to provide a deeper understanding of the complexities of international logistics and offer practical solutions to mitigate the adverse effects of financial crises on global supply chains.

Key words: multimodal transport, logistics, crises, forwarding, mitigation, 3M concept, Traveling Salesman Problem..

[1] Rzeszów University of Technology, Poland. E-mail: 170784@stud.prz.edu.pl

1. Introduction

In times of economic volatility and global interconnectedness, international logistics faces significant challenges, especially during financial crises. Logistics encompasses three fundamental areas: supply, production, and distribution. Supply logistics focuses on delivering raw materials, production logistics processes them into finished products, and distribution logistics delivers products to end-users. Financial crises disrupt international logistics processes on multiple levels. Firstly, reduced capital availability and tighter credit conditions hinder financing operational activities, infrastructure investments, and equipment purchases. This can strain financial liquidity, hampering payments to suppliers and causing delays. Secondly, decreased demand affects production planning, inventory management, and distribution processes. Logistics companies must swiftly adjust operations to fluctuating market demands. Thirdly, currency fluctuations and commodity price shift impact import/export costs and profit margins. Companies must manage currency risks and safeguard against exchange rate fluctuations to keep profitability. Logistics corporations must adapt swiftly, adjusting strategies to minimize the impact of financial crises on operations.

2. Role of multimodal transport in the modern economy

In the light of increasingly intense trade between various enterprises from different parts of the world and the increase in globalization, importing raw materials and semi-finished products from abroad is a very common phenomenon. Company departments dealing with trade and orders must look for optimal transport methods to avoid high delivery costs. One of the solutions is the use of multimodal transport.

The definition of multimodal transport, proposed in the 1980 Convention on the International Multimodal Transport of Goods, adopted at the United Nations Conference on Trade and Development, should be understood as *the transport of goods using at least two different modes of transport, from a place located in one country and transported to a second place in another country, where the load was taken care of by a multimodal transport operator*. A similar, but shortened version was provided by the European Commission of Transport Ministers, where multimodal transport means *the transport of cargo from point to point in one vessel with the successive use of several modes of transport*.

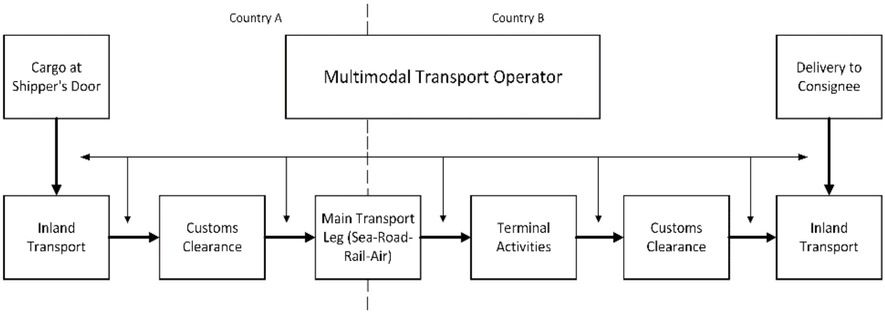

Figure 1. Goods flow in a typical international multimodal transport chain
Source: own work based of Harris, I., Wang, Y., Wang, H., (2015).

Figure 1 illustrates the international transport process where goods are moved from one country to another. It also shows the involvement of multimodal transport operator during the journey. Its aim is to transfer goods in a continuous flow through the entire transport chain.

The branches of transport include road, rail, air or inland transport as well as short-sea and long-sea shipping. Cargo transport may take place within one country or abroad.

Advantages of multimodal transport are:
1) more efficient use of transport,
2) reducing fuel use,
3) minimizing road wear,
4) reducing barriers related to customs clearance,
5) reducing exhaust emissions.

Multimodal transport is essential for the development of trade on a global scale, which also affects global supply chains. However, this type of transport is not regulated at the international level. The transport of goods by various means of transport at the international level is regulated by the regulations of individual countries and national conventions to regulate the transport of one means of transport, i.e. unimodal transport. For specific logistics industries, legal regulations are as follows:
1) for road transport: Convention on the Contract for the International Carriage of Goods by Road (CMR), done at Geneva on 19th of May 1956,
2) also for road transport: Customs Convention concerning the international transport of goods using TIR carnets (TIR Convention), done at Geneva on 14th of November 1975,

3) for dangerous goods: the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), done at Geneva on 30th of September 1957,
4) for rail transport: Convention on Transport of Goods by RAIL (CIM), done at Bern on 25th of October 1952,
5) for air transport: Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be used for such Carriage (ATP), done at Geneva on 1st of September 1970,
6) for sea transport: International Convention for the Unification of Certain Rules Relating to Bills of Lading, done at Brussels on 25th of August 1924.

All these international agreements require operators to be familiar with transport law in order not to expose the entity they work for to financial penalties. These documents certify the transport performance in the event of crossing the border and inspection by customs services.

3. Impact of the financial crisis on Logistics

The impact of the financial crisis on logistics poses a major challenge in logistics management. A serious threat is disruptions in supply chains, which may extend production processes or completely prevent the production of goods. The best example we experienced was the recent COVID-19 pandemic.

In March, because of social pressure caused by the SARS-CoV-2 virus, the population began to buy products in stores, so the supply did not keep up with demand and there was a shortage of such everyday goods as toilet paper, canned food, rice, products with a long shelf life. Also, everyone used masks, but the main demand was in hospitals. There were tries to import this good en masse from China, but such great demand could not keep up with the supply.

In 2022, the Russian-Ukrainian war broke out. Crowds of people began to flee Ukraine to save their lives. This resulted in huge queues at the borders: mainly Polish-Ukrainian, but also others. Such congestion also causes significant delays in production, etc. Also noteworthy are the farmers' protests in European countries, which caused delays at the borders and within countries.

Such unforeseen situations overload supply chains. If the method is multimodal transport and inconvenient situations occur, the consequence of supply disruptions is fluctuations and the need to adapt them.

The logistics industry that is particularly vulnerable to financial crises is forwarding trade. Forwarding trade is a service consisting in organizing the movement of cargo using appropriately selected roads, means and methods of transport. Freight is often transported by road from ports to destinations. Therefore, any delay in sea transport or problems at the borders will cause the stability of this industry to shake. If a forwarder provides a transport service for a manufacturing company, the delay will only worsen the situation and, consequently, reduce demand and increase the price of the product.

Forwarding trade, which focuses mainly on the transport of goods, is very sensitive to the financial crisis. If the price of oil increases significantly (as we see during the war in Ukraine and the crises in the Middle East), costs in this area will increase. This affects the increase in prices of all products – especially food. They are joined by companies with foreign supply chains. This may result in longer delivery times, more storage or higher product prices.

To summarise, the causes of financial crises may be terrorist attacks, wars, extreme natural phenomena, pandemics, strikes, cybercrime, human errors.

4. Challenges and risks of international Logistics

The financial crisis is caused by uncertainty in the markets, fluctuations in demand and difficulties in forecasting it. Raw material prices and currency stability are also uncertain. In times of financial crises, banks may restrict lending, which can make it more difficult to finance logistics operations, infrastructure investments, and payments to suppliers and supply chain partners. In times of financial uncertainty, there is a greater risk of customer or business partner insolvency, which can lead to payment delays, financial losses and loss of trust and company reputation.

The challenge for modern economies is geopolitical war at the highest levels. The influence of governments on the economy - government subsidies and state protection practices lead to the disruption of free and fair trade. Accusations of unfair trade practices work similarly. A good example is the trade war between the United States and China. Unilateral trade actions by one country can have wide-ranging and unpredictable consequences for the global economy and supply chains.

Changes in customs and trade regulations are also a major challenge. Such actions may cause complications, additional costs and delays. Currently, tariffs are mentioned as a protectionist instrument to protect the domestic market. If production is based on parts from abroad, the import of a given raw material automatically increases the price of the good through customs duties. Such challenges may result in companies losing their reputation and, as the number of customers decreases, financial losses, which may cause difficulties in re-establishing contacts in the future.

Currency exchange rate fluctuations can affect import and export costs, profit margins and the value of a company's assets and liabilities, which poses a significant risk for companies operating in international markets. Changes in government policy, including trade regulations, taxes, and political stability, may affect the functioning of international supply chains, generating uncertainty and risk for companies. Technical problems, IT system failures, or natural disasters may lead to disruptions in logistics operations, which in turn may negatively affect the efficiency and profitability of the company's operations.

5. Mitigation strategies

To reduce the burden on logistics during financial crises, companies should diversify their suppliers and diversify supply sources. Thanks to this, in the case of problems with one supplier or region, the company can quickly switch to alternative sources of supply. A good action is to optimize transport routes or reduce costs wherever possible. Examples of methods used to optimize routes in logistics are Dijkstra's Algorithm, A* Algorithm, Ant Algorithm, Genetic and Evolutionary Algorithms. However, the most common method used for route optimization is the Traveling Salesman Problem. It involves finding the shortest route between x-number of cities, visiting each of them only once and returning to the starting city.

Companies can manage their inventories more efficiently thanks to Just in time or lean methods, as well as various inventory control systems. Lean Management is one of the most widely used process improvement methodologies in enterprises. This concept focuses on the elimination of waste - MUDA - i.e. activity that engages the company's resources without creating any value. Additionally, irregularity – MURA and excessive overload – MURI are also added to this, creating the 3M concept, which improves logistic quality management in enterprises.

Following "Supply Chain Management", in which companies plan, control and monitor planning processes to ensure smoothness, efficiency and optimization of the entire supply chain, can influence the efficiency of the entire process from supply logistics to distribution logistics.

6. Conclusions

International logistics faces serious challenges in times of financial crises. These crises affect it on many levels, limiting the availability of capital, lowering demand and causing currency fluctuations. Logistics companies must adapt to these changes to minimize their negative impact.

Multimodal transport, using various means of transport (road, rail, air, sea), plays an important role in the modern economy. It offers benefits such as greater efficiency, lower fuel consumption and emissions, but requires compliance with numerous legal regulations. Financial crises are disrupting supply chains, posing a significant challenge for logistics companies. The forwarding industry, whose activity involves organizing cargo transport, is particularly vulnerable. Fluctuations in fuel prices, delays in maritime transport and problems at borders negatively affect its functioning. The main challenges and threats to international logistics include market uncertainty, demand fluctuations, raw material price instability, changes in customs and trade regulations, as well as currency fluctuations. Companies can mitigate these problems by diversifying suppliers, optimizing transportation routes, managing inventory more efficiently and implementing the principles of "Supply Chain Management".

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