AN ANALYSIS OF THE LOGISTICS MARKET AND THIRD-PARTY LOGISTICS PROVIDERS

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Received: June 21, 2023
Received revised: September 4, 2023
Accepted for publishing: September 5, 2023

Abstract

Over the past 15 years, there have been many shocks that have significantly affected international trade and supply chains. All these shocks affect the operations of businesses, especially those operating on the international stage. Logistics companies such as Third-party logistics (3PL) are an important link in the smooth transportation of goods from the point of production or sale to the point of consumption, offering numerous related activities in addition to the predominant transportation services. The purpose of this article is to examine and present the latest findings on the role of 3PL in global supply chains, to investigate the services provided by 3PL, and to analyse and compare the activities of the largest global 3PL operators. The analysis is based on the secondary statistical data available for 3PL logistics market. Main findings show that global logistics industry is continuously growing. Among all services provided by the 3PLs, the most outsourced are transportation, especially domestic transportation, warehousing, customs brokerage and freight forwarding. The limitation of this research lies in the fact that the analysis is based on the secondary data, and therefore the suggestion for the further research is to run primary research on services of 3PLs. This work contributes to the valorisation of 3PL and logistics services as one of the most important factors of the competitiveness of global supply chains.

Keywords: logistics industry, Third-party logistics (3PL), international trade, global supply chains

1. INTRODUCTION

The global business world involves many activities, parties, and risks, and therefore it is often difficult for a company to manage all these aspects by itself. International logistics is an important element of international business. Given the complexity of supply chains and all the necessary logistical elements that need to be fulfilled for the supply chain to run smoothly, many companies tend to eliminate ancillary activities by transferring them to specialized companies. The transfer of a company's logistics activities to a specialized company is referred to as "3PL" services, also known as Third-party logistics. Logistics companies such as 3PL providers are an important link in the smooth transportation of goods from the point of production or sale to the point of consumption, offering numerous related activities in addition to the predominant transportation services.

Over the past 15 years, there have been many shocks that have affected international trade and international supply chains. All these shocks affect the operations of businesses, especially those operating on the international stage. The Covid-19 pandemic and the growth of e-commerce have made supply chains even more complex and demanding, posing significant challenges to all logistics activities. Logistics and 3PL service providers gained prominence during the outbreak of the Covid-19 pandemic. As a result, e-commerce grew, and most companies could not handle the complex logistics requirements and high demand. Even the specialized 3PL providers faced the challenge of meeting the demands of businesses on one side and customers on the other. More and more international companies operate without internal logistics departments. In this way, they are able to pool financial and human resources to develop their main business activities and flexibly combine services as business requirements change. The 3PL market is a growth market, and outsourcing 3PL services is beneficial in most cases for companies operating in international markets within complex supply chains. Therefore, the main objective of this article is to examine and present the latest evidence on the role of 3PL in global supply chains. The aim of this article is to examine the services provided by 3PL and to analyse and compare the activities of the largest global 3PL providers.

The research questions that arise in this research are: Who are 3PLs and what is their role in international business? Who are the leading 3PL companies and why do they hold this position? What are the main services they provide and what are the main challenges they face in their business. Finally, what are the most required and used technologies in the 3PL business? The analysis is based on secondary statistical data available for the 3PL logistics market. The main research method used in this paper is a literature review and secondary data analysis. Although the secondary data provides a clear insight into the 3PL business, it does not include information on individual companies or regions. Therefore, it would be beneficial for further research to analyse the primary data obtained from the survey in a specific region or the case study of a specific company.

This paper consists of four main parts. After the Introduction, the second part, the literature review, presents the existing literature on third-party logistics providers (3PLs) and their role in international business and supply chains. The third part contains an analysis of the global logistics market and the main 3PL companies operating in this market. The fourth part contains concluding remarks, limitations of the research and suggestions for further research.

2. LITERATURE REVIEW

Topics in third party logistics or 3PLs are increasing in the academic literature. According to Qureshi's (2022) bibliometric analysis of articles published annually in the Scopus database on the topic of 3PLs from 2001 to 2022, the number of publications more than doubled in the second decade compared to the first decade from 2001 to 2010, peaking in 2020. Moreover, the Scopus database index contains 2057 articles related to the keywords “3PL”, “outsourcing" and “logistics service provider" (Qureshi, 2022). Although the topics of logistics market and third-party providers have been present in academic literature for decades, there is still no standard definition to describe third-party providers in logistics. According to the Council of supply chain management professionals, 3PL is a “firm that provides multiple logistics services for use by customers which include services integrated or bundled together by the provider” (Midgley & Bak, 2022, p. 1739). Terms contract logistics and logistics outsourcing are sometimes used as synonyms in the literature. Different definitions attempt to emphasize different aspects of outsourcing contracts (Selviaridis & Spring, 2007). The general idea behind third-party logistics is that a company (e.g., a manufacturing company) allows a specialised company to assign it one or more logistics functions, such as transportation, warehousing, distribution, etc. (Waters, 2003; Murphy & Knemeyer, 2018). 3PLs offer services carried out for a shipper, at the very least managing and carrying out transportation and warehousing. Due to a lack of time, resources, expertise, or understanding, companies frequently employ the services of 3PLs (Berglund et al., 1999). 3PLs are the most common type of logistics provider used today, coordinating freight forwarders, logistics intermediaries and other service providers (Pavlić Skender, Host & Nuhanović, 2016).

Companies are increasingly encouraged to use one-stop logistics services provided by 3PLs to increase the efficiency of their supply chains so they can focus on their core competencies (Vaidyanathan, 2005, Choi, Wallace & Wang, 2016). With the increasing complexity of business units and company processes in international trade, it is becoming more and more difficult to manage all operations by oneself (Pavlić Skender, Host & Nuhanović, 2016). The primary goal of using 3PLs is to facilitate the organization of the shipment and/or delivery of goods for companies involved in international purchasing and sales. 3PLs take care of a wide range of activities, from delivery of goods, warehousing, assembly, loading/unloading, labelling, packing/repacking, and distribution of goods (Batarlienė & Jarašūnienė, 2017). Transportation, warehousing, packaging, inventory management, order fulfilment and quality information system are the main logistics tasks that 3PLs can perform. As logistics service providers, 3PLs take care for the goods during delivery between different parties and other related transformation operations (Schramm, 2012). According to Hickson et al. (2008) 3PLs perform multiple physical logistics functions on behalf of the customer and focus more on freight movement than supply chain management and efficiency, although they may or may not own physical assets and their resources are primarily knowledge-based.

Companies outsource certain operational tasks to third-party logistics providers - 3PLs to reduce costs and increase revenue (Pavlić Skender, Mirković & Prudky, 2017). Furthermore, to prevent the occurrence of mistransactions, financial institutions typically need to use professional logistics service providers (3PLs) to monitor the commodity transactions of upstream and downstream companies in the supply chain to prevent potential collusion between those companies from causing risks to the financial system (Wen et al., 2019). Designing and implementing a supply chain that aligns with the company's business strategies is one of the most difficult tasks in a company's global expansion (Pavlić Skender, Mirković & Dobrilovich, 2019). The role of 3PLs is essentially to manage the logistics of supply chains to ensure the smooth flow of goods and information between companies within a supply chain, from raw material supply through production and consumption to recycling.

It is a common 3PL practice not to outsource individual logistics activities, but to outsource multiple activities from a strategic company perspective. 3PL providers today exhibit characteristics such as integrated or multimodal logistics service providers, contract-based service providers, and consulting service providers (Tezuka, 2011). While integrated service providers usually offer complete logistics services and own assets such as transport vehicles and warehouse facilities, consulting service providers more often do not own assets but offer consulting services to companies to optimize supply chain logistics.

The 3PL industry is incredibly complicated, and 3PL providers must always maintain a pricing structure that is increasingly competitive and build skills to improve their services (Marchet et al., 2017). Considering the ever-changing environment, especially after the Covid-19 pandemic, 3PL companies have to train their managers and hire skilled labour to manage the complexity and changes in relationships in modern global supply chains. Moreover, management and relationship skills are important for 3PL and freight forwarding managers (Midgley & Bak, 2022). To complement logistics business and satisfy customer service expectations, 3PLs are increasingly expected to be inventive, and frequently provide new solutions and more sophisticated and better value-added logistics services (Large, Kramer & Hartmann, 2011). To speed up the shipping process once customers have placed an order, many retailers, especially those operations in online business choose to stock their products in 3PL distribution facilities (Zhang, Nault & Tu, 2015). Modern 3PL companies try to influence the market behaviour of other companies and create a suitable structure for value creation in logistics processes (Deepen et al., 2008; Kmiecik, 2022). 3PLs are a crucial component of the majority of businesses that are expanding and becoming more significant. The competencies, capabilities, and logistics expertise are what make 3PLs valuable. According to Zacharia, Sanders, and Nix (2011), the function of 3PLs has changed from that of a provider of logistics services to that of an orchestrator within the supply chain. According to Bitran, Gurumurthi and Sam (2006), orchestration refers to the control of supply chains by a group of actors, or "hub" company, whose responsibility it is to provide the required services and take over a section of the supply chain. Thus, the reasons to outsource 3PLs are not only to minimise costs or improve access to a broader range of resources, but also to benefit from 3PL relationships. The importance of the study of 3PLs and their role in international business is clearly emphasised, therefore the rest of this paper analyses the business of 3PLs using available data sources.

3. METODOLOGHY AND DATA

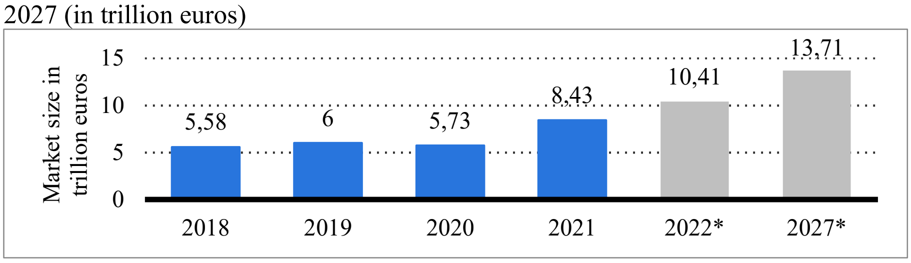
The analysis of the main theoretical and empirical findings on third-party logistics providers is based on the review of the available literature. The literature is drawn from the Proquest (2023) database. In addition to the literature review, the analysis is also based on the review of secondary statistical data on the global logistics market, the third-party logistics market, the most successful global 3PL providers, their services, the technology they use, and the challenges they face in international business. The statistical data comes from Statista's 2023 database and was gathered from various sources such as Research and Markets, Armstrong & Associates, and Inbound Logistics. To analyse the literature and data and achieve the research objectives, the method of analysis, synthesis, induction, deduction, and comparison is used.

4. GLOBAL LOGISTICS MARKET AND 3PLS

Logistics is one of the factors that affects the development of economic sectors key to the development of the country, including the efficiency of international trade (Górecka, Pavlić Skender & Zaninović 2022). Through B2B, B2C, or C2C supply chain networks between various participants in the transportation, storage, and delivery of goods, the logistics industry facilitates trade-related operations (Placek 2023). The global logistics industry is incredibly dynamic. Technological adaptation and development of the industry is advancing rapidly, especially with the Covid-19 pandemic. The global logistics industry has grown rapidly over the past five years (Figure 1) and will continue to grow in the coming period. This part of the paper analyses the available statistical data on the logistics industry and the size of the logistics market, as well as on the 3PL industry, the major 3PL companies, and the 3PL services offered.

The analysis is based on secondary statistical data from the Statista database (2023). Figure 1 shows data on the size of the global logistics industry from 2018 to 2021, with forecasts through 2027. The data show that the global logistics industry continues to grow, despite the Covid-19 pandemic and other global political and economic issues that currently exist. According to the latest available data, even during the pandemic, the logistics market grew from €5.73 trillion in 2020 to €8.43 trillion in 2021, and the industry is expected to continue to grow at that rate over the coming period through 2027. The logistics market follows international trade, so the growth of trade stimulates the logistics industry. With the growth of e-commerce, logistics companies are needed even more and face the challenge of providing adequate logistics services. The logistics industry is expected to become even more efficient thanks to innovative logistics solutions.

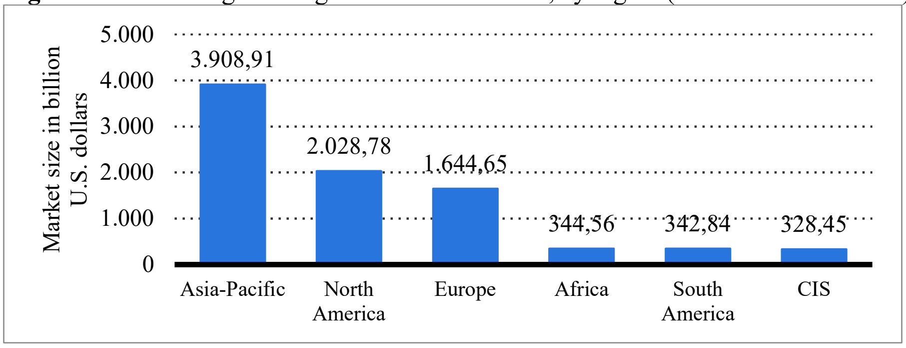
Figure 1 Size of the global logistics industry from 2018 to 2021, with forecasts until 2027 (in trillion euros)



Source: Research and Markets, 2022 in Statista 2023

The size of the global logistics market in 2020, by region is presented in Figure 2. The Asia-Pacific region has the largest logistics market in the world, with an estimated value of US$3.9 trillion. The region's importance in delivering most of the world's required trade goods could be an important factor explaining why it holds the top spot in the logistics sector. The majority of companies now have all their facilities operated in Asian countries, as it has been extremely cost-effective for Western companies to move all manufacturing of goods to less developed countries in Asia. The relocation of industrial production to Asian countries has greatly boosted the growth of the logistics industry. However, the largest companies are headquartered outside of Asia when looking at the distribution of the largest logistics companies by country of origin (Figure 4). In addition, the world's largest ports are located in the Asia-Pacific region.

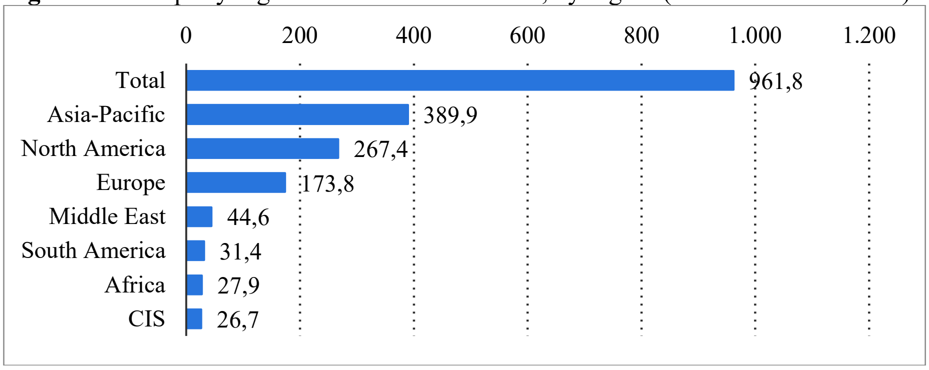
Figure 2 Size of the global logistics market in 2020, by region (in billion U.S. dollars)



Source: Statista, 2023a

The size of the 3PL logistics market in 2020, by region is presented in Figure 3. The largest size of the 3PL logistics market (measured in billions of USD) is in the Asia-Pacific region, driven primarily by China, the leading country in manufacturing, supply chain engagement, and shipping and logistics activities. After China, the second largest 3PL logistics market is in North America, primarily in the United States. The European region ranks third in terms of 3PL logistics market size. The 3PL market has witnessed significant growth in recent years owing to increasing globalization and e-commerce and the resultant rise in demand for logistics and supply chain management services. Moreover, the 3PL industry is expected to grow further owing to technological developments.

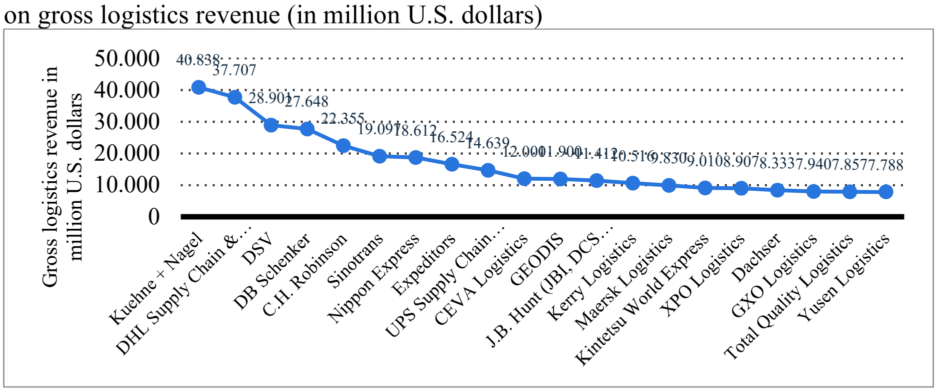
Figure 3 Third-party logistics market size in 2020, by region (in billion U.S. dollars)



Source: Armstrong & Associates, 2021 in Statista 2023

Figure 4 shows the rank of the world’s leading 3PLs in 2021, based on their gross logistics revenue. The world's leading 3PL companies operate globally. The top three 3PL companies are Kuehne + Nagel, DHL Supply Chain and Global Forwarding, and DSV, all three of which were founded and headquartered in Europe. Kuehne + Nagel started as a shipping company and today offers various logistics and supply chain management solutions. DHL is a leader in freight forwarding and supply chain management. DSV is a Danish company that recently acquired and merged with Panalpina World Transport in 2019. Most leading 3PLs have acquired and merged with other freight forwarding and logistics companies. Although European companies rank first based on gross logistics revenue, the top 20 in third-party logistics include also developing Asian companies (Figure 4).

Figure 4 The world's leading 20 third-party logistics (3PLs) providers in 2021, based on gross logistics revenue (in million U.S. dollars)

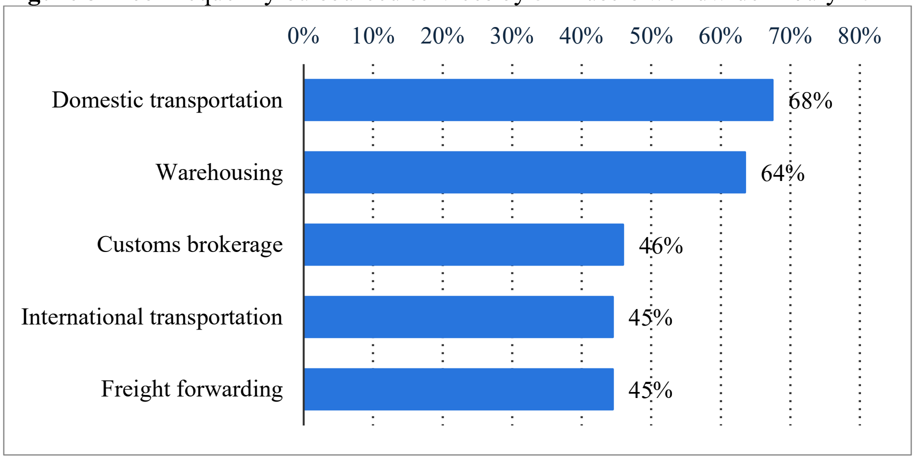


Source: Armstrong & Associates, 2022 in Statista 2023

Looking at the websites of the aforementioned global 3PLs, one finds that they offer a wide range of services, starting with transportation services, within which they offer transportation in all modes of transport: sea, air, rail, road transport, regardless of whether it is transport with only one mode of transport or, more often in practice, multimodal transport, services that also refer to LTL, LCL, FCL, FTL services, groupage or general cargo shipments. In addition to transportation services, they also offer warehousing and distribution services, inventory management, project logistics, customs brokerage, cargo insurance, e-commerce, integrated logistics, supply chain management/network design and supply chain services, reverse logistics, temperature-controlled logistics, and numerous others that can be seen on their web pages. They operate in various market segments and industries such as: Automotive, Chemical, Aerospace, Consumer Goods, Healthcare, High Tech, Industrial, Perishables, Energy, Retail/Fashion, Sports and Events, and many others.

The most commonly outsourced services by 3PL users globally in 2021 are presented in Figure 5. The most frequently outsourced service is domestic transportation (68%), followed by warehousing services, which is outsourced at 64%. The least outsourced services are customs brokerage (46%), international transportation and freight forwarding with a share of 45%.

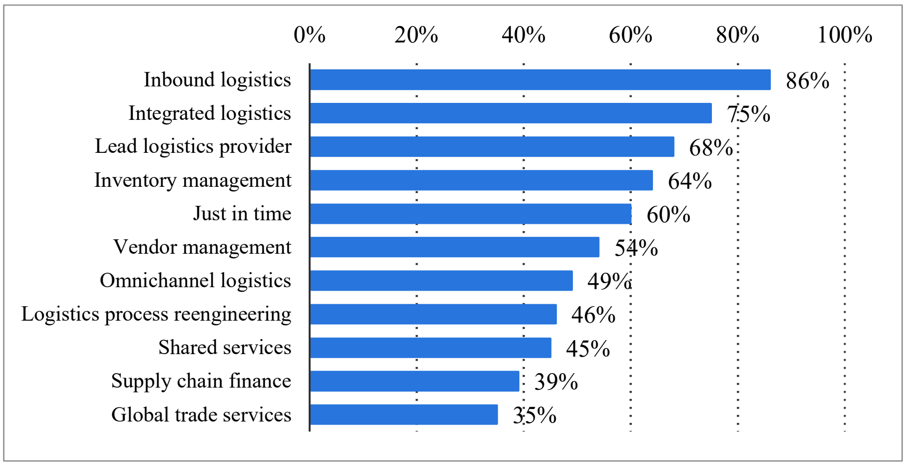
Figure 5 Most frequently outsourced services by 3PL users worldwide in July 2021



Source: Statista 2023b

The results of the survey conducted by Inbound Logistics (2022a) and presented in Statista (2023) regarding logistics services offered by Third-party logistics providers, challenges faced by providers of third-party logistics services and technology services offered by providers are presented in figures 6, 7 and 8. The figures 6 illustrate the logistics services offered by 3PLs worldwide in 2022. In the survey, 86% of 3PL providers surveyed indicated that their company offers inbound logistics services (Figure 6). This makes it the most common logistics service offered. Integrated logistics comes next, with 75% of 3PL providers surveyed indicating that their company offers integrated logistics services. This is followed by Lead logistics provider services, Inventory management, Just in time and Vendor management. Below 50% of logistics service offered is omnichannel logistics, which is typically important for e-commerce. The 3PL service least offered by respondents is global trade services.

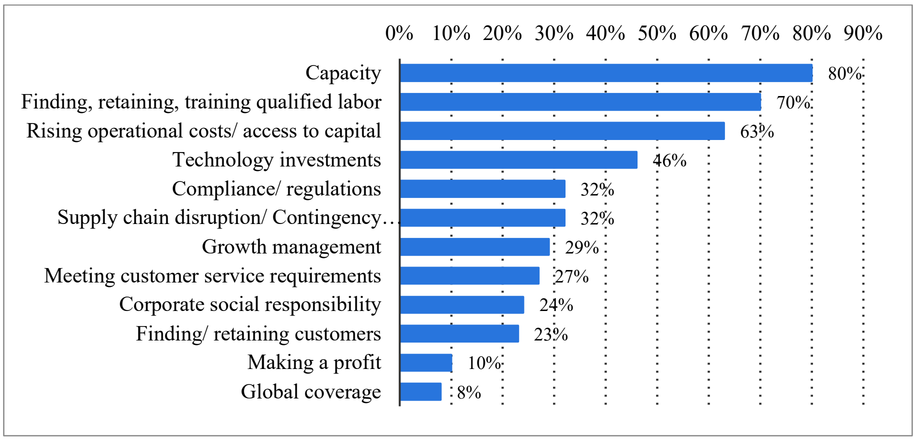
Figure 6 Logistics services offered by third-party logistics providers worldwide in 2022



Source: Inbound Logistics, 2022a in Statista 2023

The logistical challenges facing 3PLs in 2022 are shown in Figure 7. According to the Inbound Logistics (2022a) survey, 80% of respondents stated that among all the challenges facing 3PLs is the capacity problem. Second is the problem of finding, retaining, and training a skilled workforce. 70% of respondents stated they are grappling with this problem. Third is the problem of rising operating costs or access to capital, as stated by 63% of respondents. In part, these challenges can be attributed to the Covid-19 pandemic and e-commerce, where demand for capacity was high. The labour problem is seen in all industries, not just logistics. In the EU, for example, there is a major shortage of truck drivers. Finally, the Covid-19 pandemic and inflation, partly supply and partly demand driven, have led to rising operating costs.

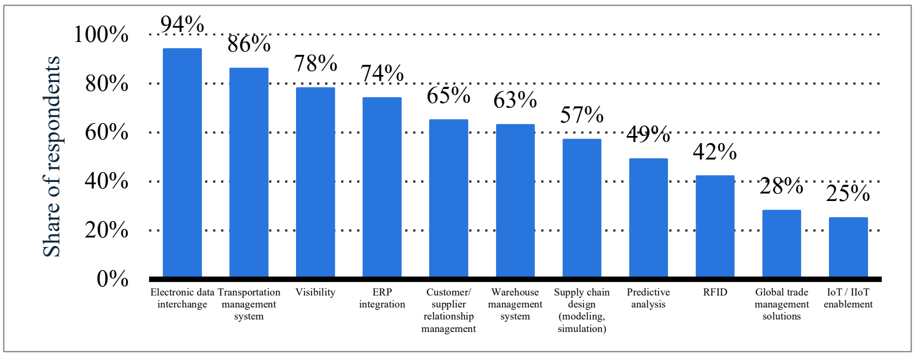
Figure 7 Top challenges faced by providers of third-party logistics services worldwide in 2022



Source: Inbound Logistics, 2022b in Statista 2023

Figure 8 shows the technology services offered by 3PLs worldwide in 2021. In the survey, 94% of 3PLs surveyed indicated their company offers electronic data interchange (EDI) services, making it the most common technology service offered. The transportation management system (TMS) is in second place, namely 86% of 3PLs surveyed stated their company offers transportation management system service. Visibility and enterprise resource planning (ERP) integration services are in second and fourth place, while the Internet of Things (IoT) and Industrial Internet of Things (IIoT) are in the last place. Only 25% of 3PLs surveyed indicated their company offers IoT and IIoT services.

Figure 8 Technology services offered by third-party logistics providers worldwide in 2022



Source: Inbound Logistics, 2022c in Statista 2023

All presented data shows how important not only the 3PLs are, but the entire logistics market. Despite the various challenges that companies face in the international market, it is extremely important to have the right partner, or rather, a link in the global chain that enables the smooth fulfilment of contractual obligations at the right time, in good quality and at minimal cost. And this is what makes the difference between supply chains: the quality of service, measured not only by cost, but also by reliability in meeting the "7Rs" in logistics. Both small and large companies benefit from using 3PL services when, due to lack of experience, time, capacity or knowledge, they are unable to take care of the logistical aspects involved in fulfilling obligations related to the safe, fast and efficient delivery of goods themselves. Although the cost of a logistics intermediary's services is often the primary consideration when making a decision, it should not be the only criterion. In addition to cost, other factors should also be taken into account, such as: the range of services they offer to their customers, the capacity they have in terms of infrastructure, locations, network of logistics centres or branches covering different regions, the technology they have, but also the previous experience of other users in terms of quality of service execution, communication and trust (Pavlić Skender, Host, Nuhanović 2016).

Good relationships between links in the chain, especially between the shippers and 3PLs, are critical to successful business. Research presented in the Third-Party

Logistics Study (Langley & NNT data 2023) shows that both shippers and 3PLs generally view their relationships successful. 83% of shipper respondents agree with this statement, in contrast to 3PL, where 99% of 3PL respondents also agree that their relationships are successful. However, although the percentage of satisfaction is high on both sides, shipper satisfaction is still 7% lower than in 2022, when 90% agreed with the statement. The reasons for the lower satisfaction are due to the challenges they faced, which were reflected in their relationships with 3PL. Nevertheless, 71% of shippers agreed with the statement that using 3PL services has helped improve customer service and claimed that 3PLs have provided new and innovative solutions that have improved logistics efficiency and reduced logistics costs.

Therefore, it is understandable that the demand for 3PL services and the overall logistics market is expected to continue to grow. Logistics activities are the area most often outsourced to logistics intermediaries. These specialize in these areas so that participants in global supply chains can focus on their core business and leave the logistics issues to them.

5. CONCLUSION

Although the importance of logistics intermediaries such as 3PLs has been researched for decades, the topic of their role in everyday business is still relevant. Without their knowledge, expertise and dedication, many companies would not be able to succeed in the market. This is especially true for companies that operate in the global scene, buying and selling, importing, or exporting all over the world. Doing business in the international market requires a good knowledge of numerous processes. The international environment is complex and intertwined with numerous legal, economic, political, financial, and other challenges. This was particularly evident during the pandemic caused by COVID-19, when the already complex processes were complicated by numerous constraints in terms of both capacity and human capability to carry out the processes of shipping and delivering goods between the various players in the international markets. In such a complex environment, logistics operators such as 3PLs are a great help. The main 3PL companies such as Kuhne+Nagel, DHL and DSV have held their position for a long time. These are the companies headquartered in Europe that have bought up and merged with other freight forwarding and logistics companies. Considering the size of the Asian market and the fact that most of the world's production is concentrated in Asia, among the main 3PL companies are Asian companies. Most of these 3PL companies provide various and comprehensive logistics services and have different departments specializing in specific services beyond transportation and warehousing activities. The main challenges they face are capacity issues, a shortage of skilled labour, and rising operating costs. They employ advanced technological solutions. With their knowledge, experience, capabilities, and capacities, they enable their partners to achieve their business goals. Although the market has been shaken by both the pandemic and political reasons, it shows that the market for 3PLs is continuously growing and that their role in the international market will constantly increase. And the data on the global logistics market, of which 3PLs are a part, is growing. The services required still fall into the segments of transportation, warehousing, inventory management, project logistics, order fulfilment, and the implementation of information and communication solutions to efficiently manage the supply chain.

Having a reliable partner to monitor and enable the achievement of goals is critical for all companies that buy and sell in the international market. Therefore, the contribution of this work lies in the valorisation of the role of 3PL in the international market and determining the services that can help their partners. This research offers valuable suggestions for practitioners in the field. From the scientific point of view, these research shows the importance of the logistics industry and 3PLs in global economy as well as the vulnerability of the industry due to the challenges the 3PL industry is dealing with. There is much more space for the further research to explore the possibilities to face the challenges that might last for a longer period of time.

This study relies heavily on the aggregate secondary data, and although the secondary data provide clear insight into the 3PL business, they do not include data on individual companies or regions. This is also the major limitation of this study. For future research, it is suggested that both qualitative and quantitative research be conducted on the quality of services and the impact on business performance, both among companies using 3PL services and among 3PLs themselves on the challenges they face and predictions on the direction of global logistics process development. For further research, it would be beneficial to analyse the primary data obtained from the survey in a specific region or the case study of a specific company to avoid limitations of the aggregated information.

Acknowledgment

This paper was funded under the project line ZIP UNIRI of the University of Rijeka, for the project ZIP-UNIRI-2023-2.

6. REFERENCES

Armstrong & Associates (2021). Third-party logistics market size in 2020, by region (in billion U.S. dollars) In Statista (2023). [available at: https://www.statista.com/statistics/254875/third-party-logistics-revenue-size-by-region/, access May 12, 2023]

Armstrong & Associates (2022). The world's leading 20 third-party logistics (3PLs) providers in 2021, based on gross logistics revenue (in million U.S. dollars) In Statista (2023). [available at: https://www.statista.com/statistics/250879/leading-third-party-logistics-providers-worldwide-based-on-revenue/, access May 12, 2023]

Batarlienė, N. & Jarašūnienė, A. (2017). “3PL” Service Improvement Opportunities in Transport Companies. *Procedia Engineering*, 187, p. 67–76. https://doi.org/10.1016/j.proeng.2017.04.351

Berglund, M., van Laarhoven P., Sharman, G. & Wandel, S. (1999). Third-Party Logistics: Is There a Future? *The International Journal of Logistics Management*, 10(1), p. 59-70, [available at:

http://www.emeraldinsight.com/doi/abs/10.1108/09574099910805932, access August 29, 2023]

Bitran, G. R., Gurumurthi, S., & Sam, S. L. (2006). Emerging Trends in Supply Chain Governance. *SSRN Electronic Journal*. [available at: https://doi.org/10.2139/ssrn.882086, access June 9, 2023]

Choi, T. M., Wallace, S. W. & Wang, Y. (2016). Risk management and coordination in service supply chains: information, logistics and outsourcing. *Journal of the Operational Research Society*, 67(2), p. 159–164. https://doi.org/10.1057/jors.2015.115

Deepen, J.M., Goldsby, T.J. & Knemeyer, A.M. (2008). Beyond expectations: an examination of logistics outsourcing goal achievement and goal exceedance. *Journal of Business Logistics*, 29(2), p. 75-105.
https://doi.org/10.1002/j.2158-1592.2008.tb00088.x

Górecka, A. K., Pavlić Skender, H. & Zaninović, P. A. (2022). Assessing the Effects of Logistics Performance on Energy Trade. *Energies*, 15(1), p. 1-18. https://doi:10.3390/en1501019

Hickson, A., Wirth, B. & Morales, G. (2008). Supply Chain Intermediaries Study, University of Manitoba Transport Institute, [available at: https://vdocuments.mx/supply-chain-intermediaries-study-university-of-chain-intermediaries-study-.html?page=19, access August 29, 2023]

Inbound Logistics. (2022a). Logistics services offered by third-party logistics providers worldwide in 2022 In Statista (2023). [available at: https://www.statista.com/statistics/896273/logistics-services-offered-by-3pl-providers-worldwide/, access May 12, 2023]

Inbound Logistics. (2022b). Top challenges faced by providers of third-party logistics services worldwide in 2022 In Statista (2023). [available at: https://www.statista.com/statistics/896520/top-challenges-faced-by-3pl-providers-worldwide/, access May 12, 2023]

Inbound Logistics. (2022c). Technology services offered by third-party logistics providers worldwide in 2022 In Statista (2023). [available at: https://www.statista.com/statistics/896296/technology-services-offered-by-3pl-providers-worldwide/, access May 12, 2023]

Kmiecik, M. (2022). Logistics Coordination Based on Inventory Management and Transportation Planning by Third-Party Logistics (3PL). *Sustainability*, 14(13), p. 1-19. https://doi.org/10.3390/su14138134

Langley Jr., C. J. & NNT DATA. (2023). 2023 27th Annual Third-Party Logistics Study: The State of Logistics Outsourcing [available at: https://us.nttdata.com/en/-/media/nttdataamerica/files/gated-asset/3pl-2023-final.pdf, access June 15, 2023]

Large, R.O., Kramer, N. & Hartmann, R. C. (2011). Customer-Specific Adaptation by Providers and their Perception of 3PL-Relationship Success. *International Journal* *of Physical Distribution and Logistics Management*, 41(9), p. 822–838. https://doi.org/10.1108/09600031111175807

Marchet, G., Melacini, M., Sassi, C. & Tappia, E. (2017). Assessing efficiency and innovation in the 3PL industry: an empirical analysis. *International Journal of Logistics Research and Applications*, 20(1), p. 53-72. https://doi.org/10.1080/13675567.2016.1226789

Midgley, J. & Bak, O. (2022). A preliminary investigation into senior management skills: the context of third-party logistics (3PLs) providers. *Benchmarking: An International Journal,* 29(6), p. 1737-1756. https://doi.org/10.1108/BIJ-02-2021-0072

Murphy, P. R. & Knemeyer, A. M. (2018). *Contemporary Logistics*, 12th Edition, United Kingdom: Pearson

Pavlić Skender, H. Host, A. & Nuhanović, M. (2016). The role of logistics service providers in international trade, *16th international scientific conference Business Logistics in Modern Management*, Segetlija, Z., Mesarić, J., Dujak, D., Karić, M., Vojvodić, K., Potočan, V., Rosi, B., Jereb, B., Trauzettel, V., Cyplik, P. (ed.) Faculty of Economics in Osijek, Osijek, 13 October 2016, p. 21-37.

Pavlić Skender, H., Mirković, P. A. & Prudky, I. (2017). The role of the 4PL Model in a contemporary supply chain. *Scientific Journal of Maritime Research,* 31(2), p. 96-101. https://doi.org/10.31217/p.31.2.3

Pavlić Skender, H., Mirković, P. A. & Dobrilovich, A. (2019). The interaction between gross domestic product and income of global third-party logistics providers (3PL), *6th SWS International Scientific Conference on Social Sciences ISCSS 2019,* 6(2), p. 305-316. 10.5593/SWS.ISCSS.2019.2/S04.038

Placek, M. (2023). Logistics industry worldwide - statistics & facts [available at: https://www.statista.com/topics/5691/logistics-industry-worldwide/, access May 12, 2023]

Proquest. (2023). Third party logistics [available at: https://www.proquest.com/results/F18FF9720F94255PQ/1?accountid=208035, access April 20 - May 12, 2023]

Qureshi, M.R.N.M. (2022). A Bibliometric Analysis of Third-Party Logistics Services Providers (3PLSP) Selection for Supply Chain Strategic Advantage. *Sustainability*, 14, p. 1-25. https://doi.org/10.3390/ su141911836

Research and Markets. (2022). Size of the global logistics industry from 2018 to 2021, with forecasts until 2027 (in trillion euros) In Statista (2023). [available at: https://www.statista.com/statistics/943517/logistics-industry-global-cagr/, access May 12, 2023]

Schramm, H.-J. (2012). *Freight forwarder's intermediary role in multimodal transport chains - a social network approach*, Heilderberg: Physica – Verlag.

Statista. (2023a). Size of the global logistics market in 2020, by region (in billion U.S. dollars) [available at: https://www.statista.com/statistics/1069868/total-global-logistics-market-size-region/, access May 12, 2023]

Statista. (2023b). Most frequently outsourced services by 3PL users worldwide in July 2021 [available at: https://www.statista.com/statistics/660142/transportation-and-logistics-most-outsourced-services/, access May 12, 2023]

Selviaridis, K. & Spring, M. (2007). Third party logistics: a literature review and research agenda. *The International Journal of Logistics Management*, 18(1), p. 125-150. https://doi.org/10.1108/09574090710748207

Tezuka, K. (2011). Rationale for utilizing 3PL in supply chain management: A shippers' economic perspective. *IATSS Research,* 35(1), p. 24-29. https://doi.org/10.1016/j.iatssr.2011.07.001

Vaidyanathan, G. (2005). A framework for evaluating third-party logistics. *Communications of the ACM*, 48(1), p. 89–94. https://doi.org/10.1145/1039539.1039544

Waters, D. (2003). *Logistics – An Introduction to Supply Chain Management*, New York: Palgrave Macmillan.

Wen, Z., Liao, H., Kazimieras Zavadskas, E. & AlBarakati A. (2019). Selection third-party logistics service providers in supply chain finance by a hesitant fuzzy linguistic combined compromise solution method. *Economic Research-Ekonomska Istraživanja*, 32(1), p. 4033-4058. https://doi.org/10.1080/1331677X.2019.1678502

Zacharia, Z. G., Sanders, N. R., & Nix, N. W. (2011). The Emerging Role of the Third-Party Logistics Provider (3PL) as an Orchestrator. *Journal of Business Logistics*, 32(1), p. 40–54. https://doi.org/10.1111/j.2158-1592.2011.01004.x

Zhang, J., Nault, B. R., & Tu, Y. (2015). A dynamic pricing strategy for a 3PL provider with heterogeneous customers. *International Journal of Production Economics*, 169, p. 31–43. https://doi.org/10.1016/j.ijpe.2015.07.017