

The Lead Logistics Provider (LLP) Concept: Case Studies

Zoltán Valentinyi^{#1}, Zita Fodor^{*2}, Csaba Balogh⁺³, Anna Dunay^{*4}

[#]*Doctoral School of Management and Business Administration, Szent István University, H-2100 Gödöllő, Péter K. u. 1. Hungary*

⁺*HAVI Logistics Kft. 2360 Gyál, Bem József utca 30. Hungary*

^{*}*Institute of Business Economics, Leadership and Management, Szent István University, H-2100 Gödöllő, Péter K. u. 1. Hungary*

¹Zoltan.Valentinyi@havi.com

²Fodor.Zita@szie.hu

³Csaba.Balogh@havi.com

⁴Dunay.Anna@szie.hu

Corresponding Author E-mail Address: Dunay.Anna@szie.hu

Abstract— Researches, literature reviews and professional experiences show that traditional logistics services were precisely defined and differentiated in the past 30 years, but Industry 4.0 brings additional service opportunities for leading logistics service providers and for their customers. New circumstances may improve supply chain efficiency by remodelling the solutions and responsibilities of the different cooperating partners. The aim of the paper is to summarize the definitions of the different traditional and more developed logistics service providers and to create and propose a standard definition for the Lead Logistics Providers, based on the LLP studies and key characters of the existing LLP services. Based on a desk research (literature review and document analysis) and using the professional experience of authors, the analysis focuses on the advanced services by looking at the content and service elements of some leading logistics service companies. Conclusion of the research is that leading service providers offer quite wide range of services which is difficult to standardize in terms of creating a standard definition as it's available for 1-2-3 PL logistics service providers. Therefore, the introduction and generic definition is proposed from the time being for the Lead Logistics Providers. In the light of Industry 4.0 the coming years might clarify the content and meaning of additional PL levels, such as 5, 6, or higher PL levels.

Keywords— *logistics service providers, LLP services, trust, innovation, performance*

1. Introduction

Nowadays we can clearly state that logistics plays tensile force in modifying, rationalizing and influencing production and service companies' and

industries' changing trends, daily routines, including its operational, also practical details. The successful use of logistics service providers (LSPs) is based on building long-term relationships with customers [1]. The design of these cross-firm relationships influences the LSPs' success. If it does not designed correctly, the relationship between the LSP and customer may suffer from a lack of specific expertise, unmatched expectations, and poor communications [2], [3]. It can be expected that the more intensive cooperation amongst partners, the higher operational potentials in the field of savings and increasing efficiency [4].

Supply chain risks tend to paralyze most supply chains. Successful companies are able to break the risk spiral by restoring trust within the supply chain through the chain. The benefit goes far beyond cost reduction, reducing market risks and increasing sales and market share, penetrating new markets, and rapidly introducing new products [5], [6].

That trust plays a determining role in the establishment of the strategic relations of the different companies [6]. Trust means the belief that the partner will behave correctly and act according to its commitments. The established system of relationships determines how the industry develops and how individual companies are able to follow and manage this development [7].

Management of a company shall face three important challenges in the process of building partnerships: the definition of the real main activities and the establishment of the company's

activity limits, the introduction of effective leadership and management mechanisms, and building the most appropriate partnerships [8]. When examining the future of co-operation between companies, an increase in co-investment is anticipated by co-operating companies [9], focusing on the following areas for co-operation of resources:

- achieving long-term customer satisfaction versus cost-cutting efforts,
- creation of common databases by cooperating companies for real-time responses in the field of design and implementation,
- development and implementation of a common security policy and system (data security) of the cooperating partners,
- real and system integrations with central databases, the data of which are available to all cooperating partners (production, logistics, sales),
- development of planning systems instead of simple transaction automation, with elaboration of unplanned events and responses to them,
- joint software applications and their joint development,
- the relationship with material and raw material suppliers will continue to be transaction-based, with strategic relationships focused primarily on service providers, especially in the areas of forecasting and planning,
- internet-based deployment of various IT applications with external support systems and organizations [9].

Thus, an important factor for the efficient operation and continuous development of companies is a meaningful, high quality and trust-based cooperation with logistics service providers.

2. Literature review

2.1. Traditional Logistics Service provider levels

As a result of globalization and the effects of the previously listed processes, as well as the consolidation and practice of the supply chain management concept, logistics service providers have emerged, the concept of contract logistics has emerged [10]. 3PL providers have taken on a more comprehensive and integrated role in their relationships with their customers. Following this trend, a new image of engagement has emerged in the form of logistics integrators (4PLs) that

combine management and implementation of supply chain logistics [11]. Interestingly, the terms 3PL and 4PL became the first in the literature, and as a result, the definitions of 1PL and 2PL were developed and became established.

1PL (First Party Logistics) is the business model in which a company provides logistics functions alone, with its own assets [12]. 1PL solutions were typical for logistics tasks until the late 1970s; typically, manufacturing companies solved material handling, transportation and storage with their own tools and internal capacities [13].

2PL (Second Party Logistics) is a construction in which certain basic logistics functions (warehousing, transportation) are performed by logistics service providers, but the complexity of these operations does not reach the 3PL level and there is no partnership with the service provider. A typical example of 2PL is when a manufacturing company uses an external service provider for a certain logistics task (e.g., shipping) [12]. 2PL spread in the 1980s with the growth of the number of international companies and the emergence of new corporate governance approaches (e.g. LEAN). 2PL has already allowed companies to focus on their core activities. With this solution, the assets are already owned by the service provider [13]. We can talk about the outsourcing of logistics services in the case of commissioning a service provider that takes over 3PL and more. Logistics can affect many or all elements of a company's product manufacturing and service chain, so the effects of outsourcing are diverse, requiring a wide range of strategic decisions, and great care must be taken to implement and widely accept them.

3PL providers have emerged since the early 1990s and their numbers have grown rapidly. This is also evidenced by a report by Armstrong & Associates that in 2017, 90% of "US Fortune 500" companies in the United States used 3PL, compared to only 46% in 2001 [14]. 3PL providers typically provide customized services and already take on the role of supply chain integrator through related services. With the advent of 3PL service providers, logistics costs have typically been reduced by 10% and delivery times have also been shortened by about 30%. The 3PL solution also freed up significant corporate capital on the part of the principals (manufacturers) and further helped them to focus on their core business [13].

2.2. Advanced services and higher levels of service providers

In 1996, the term 4PL (Fourth Party Logistics) was first used by Accenture (at that time, Andersen Consulting). Supply Chain Management theories are emerging, in which supply chains are already competing with each other, and the greatest efficiency gains can be achieved if processes are optimized for the entire supply chain. The 4PL provider plays an integrator role, service providers do not have to use its own resources, nor does it always have them. The coordinating and globally thinking 4PL service provider already thinks in a system beyond the level of each logistics service provider [12].

4PL (Fourth Party Logistics System Provider) service providers act as supply chain coordinators and integrators. They design, manage and control supply chain processes using the resources and capabilities of their own and other companies in the supply chain. 4PL providers must have the experience, know-how, and IT (Information Technology) support to enable this integrator feature. Although in principle, 4PL companies may work without devices, as virtual companies, in practice, 3PL providers position themselves mostly in the role of supply chain integrator [13]. Due to the high degree of interdependence and dependence of supply chain participants in this business model, it is essential that there is a longer-term partnership between 4PL, the key players in the chain (producers, customers) and the 3PL companies performing logistics functions [15].

The future of LSPs would be determined by the interaction of the service provider and those using these services [16]. It may cover IT investments, but quality-focused approach of the employees and an advanced level of trust in business environment. Another researches stated that future of LSPs would be determined by the interaction of the service provider and those using these services [17], [18]. LSPs are required to continuously sustain a more and more competitive cost structure (i.e. efficiency) and develop capabilities to improve their services (i.e. innovation); hence, the evaluation of these key success factors is considered a key issue [19]. It is necessary to identify the management success factors supporting the fundamental competitiveness of logistics enterprises, as it is an essential development step

for the companies involved [20], not only at large companies, but SMEs, too [21].

2.3. Lead Logistics Service Provider concept and definition

When defining 4PL, many already mention the term Lead Logistics Provider, typically linking it to the service provider's supply chain consulting tasks and role [12]. The "Council of Supply Chain Management Professionals" also already uses the term Lead Logistics Service Provider, and also mentions that 4PL providers often do not have their own assets. Examining the difference between 3PL and 4PL, he distinguishes four elements [22].

- The 4PL organization is often a separate business, which can be a joint venture between the service provider and the primary principal, or even other partners.
- The 4PL organization appears as a one-man manager between the customer and the logistics providers.
- Ideally, all elements of the principal's supply chain are managed by the 4PL provider.
- A 4PL organization can even be created by a larger 3PL provider, building on the existing organization.

After defining 1, 2, 3 and 4PL, it is logical to define next PL levels up to 10PL [23] as in Table 1.

An online logistics interpretation dictionary defines 4PL and 5PL as follows: in 4PL concept, the manufacturer does not just outsource logistics tasks. In this case, the service provider is an active part of the customer's business activities, i.e. its tasks are not limited to the implementation of the tasks, but it also constantly monitors and monitors the logistics processes. The short-term, cost-oriented approach is being replaced by a long-term partnership, where the quality of services is a priority and where the sharing of risks and benefits is also part of the concept [24].

Table 1: Definition of different logistic models
(Source: own compilation)

Logistic model	Definition
1PL	Shipper
2PL	Traditional Transportation Provider
3PL	Integrated Logistics Service Provider
4PL	High Level Logistics/IT Consulting
5PL	Consulting for the High Level Logistics/IT Consultants

6PL	Artificial Intelligence Driven Supply Chain Management
7PL	Autonomous Competitor Created to Test Alternative Supply Chain Strategies
8PL	Super Committee Created to Analyze Competitor's Results
9PL	Crowd Sourced Managed Logistics Strategy
10PL	Supply Chain Becomes Self Aware and Runs Itself

In most cases, there is a strong collaboration between the client and the service provider, where the client has a level of professional knowledge that enables the provider to measure, evaluate and intervene as needed.

The 5PL concept is already about the supply chain network. The service provider guarantees the organization of the supply network and organizes it efficiently, develops and, if necessary, transforms it, in constant consultation with the customer. The 5PL service provider typically offers and develops digital, "e-business" solutions for the network.

According to our approach and the lessons learned from the literature review, the exact distinctive content of the 6-10 PL definitions at the top levels is already quite difficult to interpret in addition to the currently known and widespread practical experience, as the functions defined at each level can actually be interchanged. It is not always a condition of the function described at the preceding level. However, it is clear from level 5 onwards that the fundamental difference is:

- T development and applications,
- consulting, i.e. knowledge outsourcing,
- investigation of alternatives and supply chain simulations,
- automation.

If we want to compare everything we have learned about 4-10 PLs with 1-2 PLs and 3PLs, we can say that:

- 1-2 PL: outsourcing of certain tasks,
- 3 PL: outsourcing of several logistics tasks to one service provider,
- 4-10 PL: Business Processing Outsourcing (BPO).

If we analyze the 4-10 PLs further, we can see another significant difference between the 4 PLs

and the 5 PLs, as the 5 PLs no longer only use advanced IT solutions, but are also part of the consulting. This is a significant step forward from the level at which the client decides the scope of tasks to be outsourced and defines the expected parameters.

The basic condition for such operation and cooperation is trust, which can and can be obtained by a service provider with a long-term and satisfactory cooperation. Of course, there may be special circumstances for the development of such cooperation, such as a difficult or even catastrophic business situation or circumstance, but this can be dispensed with in this case, as it falls more into the category of crisis management.

In addition, the 5 PL service provider typically brings a new approach, broader knowledge and experience to the collaboration and supports all this with advanced technological solutions, with the necessary redesign and reallocation of the usual business processes and responsibilities.

Companies that provide such a service can be called Lead Logistics Providers (LLPs) as they take (and get) a leading role in shaping and operating the entire supply chain.

3. Methodology

In order to achieve the goal of the researchers, a thorough literature survey was carried out. The collection of literature sources was made using various databases of Scopus, Web of Science, ScienceDirect, Google Scholar and other search tools and using company websites and internet sources providing professional information. Thus, research method is represented by desk research.

In addition, based on the almost 3 decades long professional experience of one of co-authors, a case analysis was conducted to explore the main characteristics of logistics providers, based on which authors created the model about the role of innovation and IT solutions in advanced logistics providers.

4. Case studies – evaluation of logistics providers

According to our approach and experience, therefore, currently the definitions of 6-7-8-9-10 PL are not really justified, especially because the

leading logistics providers who develop and offer new and advanced service models to their customers use the 6-10 PL offer varying solutions within. However, even the description of 6-10 PL solutions is not sufficiently detailed and accepted.

If the definition of 6-10 PL is accepted, it could also show a certain development path for service providers and service models, but this cannot be said yet. It is right to move on from the 4 PL to the 5 PL concept, but as the next widely feasible step in development is not clear, we use a more general term for this level for the time being, the "Lead Logistics Provider".

However, there is another question: why and on what basis do certain companies call themselves Leading Logistics Service Providers? These types of companies are at the forefront, meaning they are leaders in innovation and the application of the most advanced IT solutions. The use of such innovative solutions and advanced IT systems, of course, is costly, as they are typically solutions that are not yet widespread and are typically designed to solve complex tasks.

The advantages of these solutions are the following:

- suitable for managing large and complex supply systems,
- significant efficiency gains and cost reductions can be achieved,
- centralized management and information / data provision.

From the advantages of the concept, we can practically deduce the potential disadvantages or risks, which are the loss of direct control and contact for individual actors (1) and the high degree of vulnerability (2).

Examining the literature and the websites of some major logistics providers, it can be stated that the definitions of 5 PL and Lead Logistics Provider are not yet clear, there is no generally accepted, exact definition, and the interpretation of these categories is still quite variable today and confused.

Below, there are five specific corporate examples related to the description of LLP concept. By selecting the examples, we want to show how some well known and large, internationally present logistics providers interpret the LLP concept and services. The selection of the analyzed logistics providers is arbitrary, i.e. not representative, but

these well-known international companies are at the forefront of wide-ranging, advanced and even customized logistics services and innovation, as well as significant service revenues and they identify themselves as Lead Logistics providers. In addition, these companies are present in virtually every country in the world with their services.

GEFCO works in partnership with the client organization as a Lead Logistics Service Provider (LLP) and optimizes logistics costs through its 4PL service model and provides long-term efficiency to its customers with dedicated specialist teams, while ensuring complete control over the supply chain [25].

DHL, as a Lead Logistics Service Provider (LLP), strives to manage the entire supply chain in order to meet changing business and customer needs. All this is achieved through continuous development and cost reduction, using LEAN methods, optimizing the entire logistics network.

The operation of a successful Lead Logistics Service Provider (LLP) is based on effective partnerships with its customers in order to create business value, with a wide range of professional knowledge and experience, which includes:

- network analysis and design
- consulting
- business planning
- change management
- project management
- Control Tower and network management services
- inventory planning and management
- deliveries and recycling activities (reverse logistics) [26].

PENSKE specialists work with their customers in all areas of the supply chain within the framework of the Lead Logistics Service (LLP).

- optimizing transport tasks,
- coordinating suppliers
- in the technological integration of the supply chain
- synchronize deliveries and deliveries
- in the modelling and management of the distribution network [27].

CEVA Logistics, as a Leading Logistics Service Provider (LLP), manages the entire supply chain, from start to finish, using its own and external

resources and ensuring transparency for its customers in order to be controllable [28].

HAVI Logistics also defines itself as a Leading Logistics Service Provider and provides its services in more than 100 countries around the world. The main focus is on supply chain management and optimization using innovative solutions. All of this is envisioned and implemented by HAVI in a strong partnership with its partners.

In addition to basic services, they help their clients with business analytics (analytics),

integrated business planning, sourcing & tendering, packaging material development and database management.

Basic services are coupled with a large number of other Value Added Services, such as promotional packaging (co-packing), selective waste collection and processing, and other services, which are described in detail in later chapters [29]. The company examples with competencies and services described by the companies as it is summarized in Table 2.

Table 2: Competences and services of leading logistics service providers (LLPs) (Source: own compilation)

<i>Competences and services</i>	Leading Logistics service Providers (LLPs)				
	GEFCO	DHL	Penske	CEVA	Havi Logistics
Partnership	X	X			X
Professional knowledge	X	X	X	X	X
Advanced techniques (e.g. Lean)		X			X
Cost optimization	X	X	X	X	X
Supplier organization		X	X		X
Supply chain control & management	X	X	X	X	X
Long-term cooperation	X				X
Continuous development	X	X			X
Flexibility		X			X
Consultation, advice		X			
Network analysis & planning			X		X
Project management					
Technological integration			X		
Transparency				X	X

The views expressed above are not entirely consistent. However, the LLP concept applies to all of the selected companies, even though its elements are worded differently. In terms of competencies and services, there are overlaps and identities from which the main elements and features of the LLP concept can be deduced.

It is important to emphasize that the main criteria for achieving the goals and their achievement are the same for all companies, and the optimization of costs is stated uniformly as the main goal. In addition, important and new criteria are formulated

along the lines of “supply chain control and management” and “expertise”. According to our approach, the need to control and manage the supply chain is particularly important. This is not only novel, but also even an important and basic requirement for achieving and implementing LLP, so it cannot be circumvented.

Based on the definitions described and the summarized results shown in Table 2, we conclude that the following common features can be discovered in many places in the LLP concept:

- partnerships,

- complete supply chain approach and pursuit of optimization,
- use of own and external resources,
- planning,
- consulting,
- innovation,
- application of advanced IT solutions.

Taking into account these seven characteristics, considering the capabilities of the Leading Logistics Service Provider, we conclude that the LLP:

- is able to recognize the current and future real needs of customers and be able to respond to them,
- is able to "fight" to be able to actually provide it as a Lead Logistics Service Provider,
- its corporate culture is open and honest,
- its operation is increasingly determined by tasks rather than hierarchy,
- improves its processes with continuous innovations and improvements,
- is able to react quickly to changes.

The Lead Logistics Service Provider (LLP) organizes, operates, and supervises the entire supply chain, integrating the service it provides to the client, taking into account the performance of

the entire chain. The members of the supply chain are production companies and service providers and in most cases their delivery and performance are mixed, a combination of products and services.

A Lead Logistics Service Provider (LLP) is a logistics company with the expertise to synchronize and optimize material flows within the supply chain (Synchronized Material Flow - SMF) [30]. This also means that these companies have a high level of expertise in transportation services, warehousing solutions, IT applications and design, among other logistics tasks and capabilities [30], and also confirms the accuracy described above about Leading Logistics Providers.

However, in our definition, in addition to the functional elements, trust-based partnerships are also considered important. The difference between the Leading Logistics Providers and other Logistics Providers is analyzed by this approach from five perspectives, as illustrated in Table 3.

Table 3: Main differences between Logistics Service Providers and Lead Logistics Providers (Source: own compilation)

Item / Description	Logistics Service Provider	Lead Logistics Provider
Scope of Services	logistics managed model including transportation, warehousing, inventory management and freight forwarding	full supply chain services, including resource management, information central system and logistics synchronization
Characteristics of Services	logistics specialty services focus on transportation and warehousing operation	managing internal and external logistics to synchronize material flow
Facilities and warehouses	possession of facilities and warehouses	outsourcing
Fleet	possession of fleet	outsourcing
IT technology service	not applicable	develop and provide IT

We can supplement what has been said so far with the need for business relations to be fair, for appropriate means to resolve conflicts, for business relations to be settled in a generally ethical context, with mutual consideration and reconciliation of interests. In summary, the relatively high standard of business ethics can be a very significant factor because it strengthens trust.

The first stage of the development towards LLP is characterized by the creation and development of the basic conditions, which required and required significant time. It is enough to mention the development of trust between each company and

the actors of the supply chain as an example. This, and the long-term survival of this trust, requires time and positive experience in cooperation.

After the formation and existence of the basic conditions, the actors of the supply chain can move and in time will necessarily move to the next level, where the goal is no longer the foundations of cooperation, but the further development of it and the supply chain itself.

Innovation and the development of IT systems and solutions play a key role in achieving these goals. This developmental process and the relationships within it are illustrated in Figure 1.

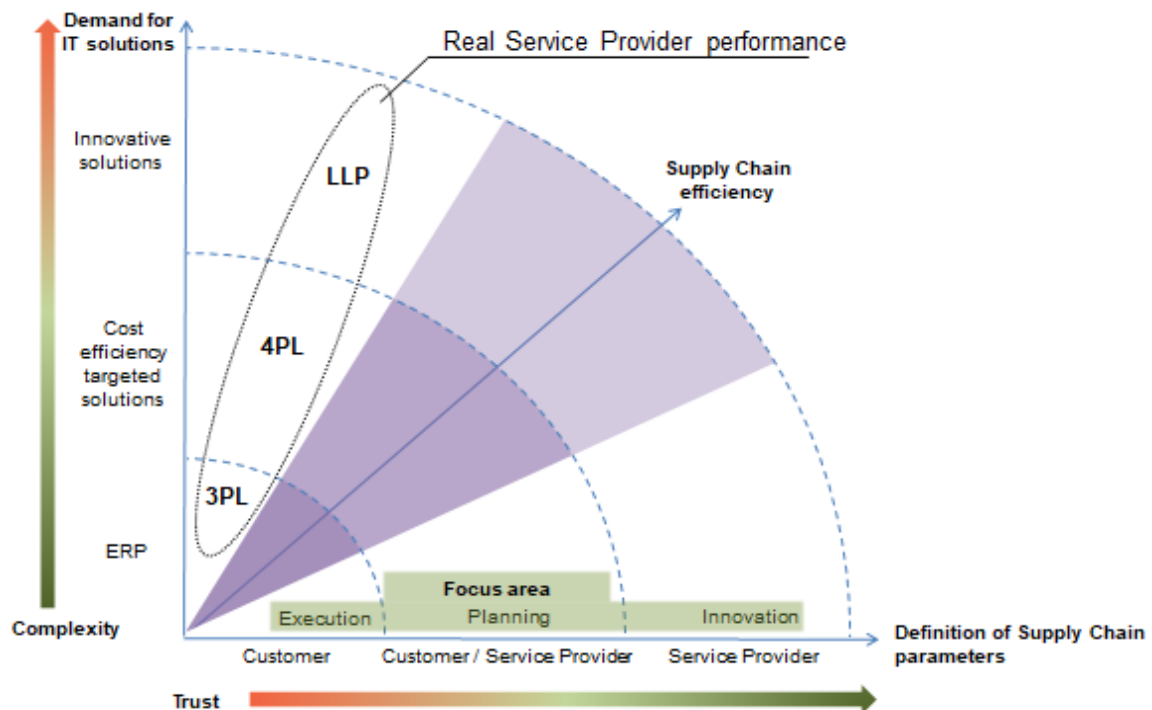


Figure 1: The role of innovation and IT solutions in advanced logistics providers (Source: own compilation)

Figure 1 shows in detail the development phase from 3PL to LLP, which is based on trust and which is constantly growing among the partners as we move towards the LLP concept.

The overall goal is to continuously improve supply chain efficiency and reduce costs. To achieve this goal, supply chain professionals with a good knowledge and understanding of the supply chain are increasingly taking over supply chain planning and management by defining supply chain parameters. This is done in regular consultation and

agreement with the client, as the proposed changes may need to be implemented several times between the client's previous activities, including the takeover of certain tasks by the service provider.

Approaching the complete planning and management of the supply chain, the complexity of the service provider's tasks also increases, which need to be managed with the introduction of innovative solutions and modern, task-oriented IT solutions.

5. Conclusions

Based on all this, after studying and critically interpreting the opinions learned, we propose the following definition for the definition of LLP (Lead Logistics Provider). The Lead Logistics Provider function is the result of a logistics service provider development that is characterized by a high-level professional and partnership relationship of trust with the customer established during the years of cooperation.

Based on this, the customer submits to the professional recommendations of the service provider (LLP) in terms of supply chain planning, management and operation tasks and empowers the service provider to continuously optimize individual and comprehensive supply chain processes with innovative developments using state-of-the-art and efficient IT solutions.

Based on the criteria of LLP in our approach the naming and definition of 4PL or 5PL cannot be considered as a Leading Logistics Service Provider. At the same time, it is indisputable that the Lead Logistics Service Provider was a 3PL or 4PL service provider at an earlier stage of its operation, or even provides services that meet the definition of 3PL or 4PL in serving certain customers.

According to literature and the case studies of the described logistics service providers, the definition and differentiation of the Leading Logistics Service Providers has a place and a right to exist in the logistics service provider market.

The dominant and precise list of services, provided by the different LLPs is not defined, yet. The number of Lead Logistics Providers will hopefully also grow in the future, but to introduce innovative supply chain management solutions by increasing responsibility and functional portfolio of the LLPs will always require real strategic partnership, based on well-deserved trust.

The next step of the research should be the application of the desk research results and the conceptual model about the role of innovation and IT solutions in advanced logistics providers. Thus, future research should be related to the practical experiences of the desk research results presented by this paper, through an empirical research conducted among the players of the supply chain.

References

- [1] Aguezzoul, A., Pires, S., "3PL performance evaluation and selection: A MCDM method", Supply Chain Forum, Vol. 17, No. 2, pp. 87-94, 2016.
- [2] Meixell M., Norbis M., "A Review of the Transportation Mode Choice and Carrier Selection Literature", The International Journal of Logistics Management, Vol. 19, No. 2, pp. 183-211, 2008.
- [3] Aguezzoul A., "Third-party logistics selection problem: A literature review on criteria and methods", Omega, Vol 49, pp. 69-78, 2014.
- [4] Leitner R., Meizer F., Prochazka M. Sihn W., "Structural concepts for horizontal cooperation to increase efficiency in logistics", CIRP Journal of Manufacturing Science and Technology Vol 4. pp 332-337, 2011.
- [5] Bier, T., Lange, A., Glock, C.H., "Methods for mitigating disruptions in complex supply chain structures: a systematic literature review", International Journal of Production Research, Vol. 58, No. 6, pp. 1835-1856, 2019.
- [6] Nadarajah, G., "Factors Influencing Third Party Logistics Performance in Malaysia: The Role of Trust as a Mediator", International Journal of Supply Chain Management, Vol. 4, No. 4, pp 108-114, 2015.
- [7] Kumar, R.L., Park, S., "A Portfolio Approach to Supply Chain Risk Management", Decision Sciences, Vol. 50, No. 2, pp. 210-244, 2018.
- [8] Skjott-Larsen T., Schary P. B., Mikkola J. H., Kotzab H., "Managing the Global Supply Chain", Copenhagen Business School Press, Denmark, 2007.
- [9] Cohen S., Roussel J., "Strategic Supply Chain Management - The 5 disciplines for top performance", 2nd Edition, McGraw-Hill, USA, 2005.
- [10] Xu Yang, "Status of Third-Party Logistics-A Comprehensive Review", Journal of Logistics Management, Vol. 3, No. 1, pp.17-20, 2014.
- [11] Ho, D., Kumar A., Shiwakoti N., "A Literature Review of Supply Chain Collaboration Mechanisms and Their Impact on Performance", Engineering Management Journal, Vol. 31, No. 1, pp. 47-68, 2019.
- [12] iThinkLogistics, <https://ithinklogistics.com/blog/logistics-and->

- its-types-difference-between-1pl-2pl-3pl-and-4pl/ Last access (26.06.2019)
- [13] BeamBerlin, <https://beamberlin.com/logistics-101-1pl-2pl-3pl-4pl-5pl/> Last access (03.08.2019)
- [14] Modern Materials Handling, https://www.mmh.com/article/2017_top_50_us_global_third_party_logistics_providers, Last access (10.07.2019)
- [15] Ashok, R., Rajesh R., “*An Analysis of Third-Party Logistics Market in the United Arab Emirates*”, International Journal of Supply Chain Management, Vol. 9, No. 1, pp. 888-901, 2020.
- [16] Oláh, J., Bai, A., Karmazin, Gy., Balogh, P., Popp, J., “*The Role Played by Trust and Its Effect on the Competiveness of Logistics Service Providers in Hungary*”, Sustainability, Vol. 9, No.12, p. 2303, 2017.
- [17] Mehmman, J., Teuteberg, F., “*Understanding the 4PL approach within an agricultural supply chain using matrix model and cross-case analysis*”, International Journal of Logistics Research and Applications, Vol. 19, No. 5, pp. 1-18. 2015.
- [18] Oláh, J., Sadaf, R., Mate, D., Popp, J., “*The influence of the management success factors of logistics service providers on firms' competitiveness*”, Polish Journal of Management Studies. Vol. 17, No.1. pp. 175-193, 2018.
- [19] Marchet G., Melacini, M., Sassi, C., Tappia, E., “*Assessing efficiency and innovation in the 3PL industry: an empirical analysis*”, International Journal of Logistics Research and Applications, Vol. 20, No. 1, pp. 53-72, 2016.
- [20] Jazairy A., Lenhardt J., von Haartman R., “*Improving logistics performance in cross-border 3PL relationships*”, International Journal of Logistics Research and Applications, Vol. 20, No. 5, pp. 491-513, 2017.
- [21] Szegedi, Z., Illés, B. Cs., “*Logistics and Supply Chain Management for Hungarian Mid-Size Companies: Effect on Competitiveness*” Proceedings of the 10th International Conference of the Society for Global Business and Economic Development, School of Business, Montclair State University, Kyoto, Japan, pp. 2518-2530, 2007.
- [22] Cerasis, <https://cerasis.com/3pl-vs-4pl/> Last access (22.02.2020)
- [23] Narasimhan G., <http://logisticsupplychain.blogspot.de/2013/09/outsourcing-1-to-10-pl.html> Last access (06.24.2019)
- [24] Inbound Logistics, www.inboundlogistics.com/cms/logistics-glossary/ Last access (12.08.2019)
- [25] GEFCO, <http://www.gefco.net/en/solutions/strategic-expert/lead-logistics-provider-4pl> Last access (10.07.2019)
- [26] DHL, <https://www.dhl.de/en/logistik/lead-logistics-provider.html> Last access (10.07.2019)
- [27] PENSKE, <https://www.penskelogistics.com/solutions/supply-chain-management/lead-logistics-provider/> Last access (10.07.2019)
- [28] CEVA, <http://www.cevalogistics.com/contract-logistics/lead-logistics-provider> Last access (10.07.2019)
- [29] HAVI, www.havi.com Last access (20.07.2019)
- [30] Huang J-D., Hu H. M., “*Evaluation of Lead Logistics Provider Using the SMART Process: A Case Study in a Taiwan Automotive Industry*”, Operations and Supply Chain Management Vol. 6, No. 1, pp. 26-35, 2013.