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#### The situation, levels and evaluation of logistics service providers in digitalization environment

#### La situación, niveles y evaluación de los proveedores de servicios logísticos en in entoro de digitalización

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**Abstract**

Today, as a result of globalization, especially the significant cooperation of economic organizations, market competition is becoming more and more global, companies' competitive strategies go beyond the opportunities provided by the market within national borders, and they expand their production processes, strategies, and relationship systems. Nowadays, the recognition that supply chains, even supply networks and networks compete in the economy is becoming more and more accepted. Excellent individual performance is in vain if the company's business partners, suppliers, subcontractors, intermediaries of its products or services, and other related actors in the supply (sales) chain do not perform adequately. As a result of the increasing competition, both the micro and macro environment of companies has changed. The assessment of business performance does not only depend on the internal company activity and its results. Nowadays, the recognition that supply chains, even supply networks and networks compete in the economy is becoming more and more accepted. Excellent individual performance is in vain if the company's business partners, suppliers, subcontractors, intermediaries of its products or services, and other related actors in the supply (sales) chain do not perform adequately. For this reason, it is important to evaluate and choose the right service provider.

**Keywords:** evaluation, selection, logistics service provider, industry 4.0, digitalization

# Introduction

The evaluation and selection of a logistics service provider is an essential task for businesses seeking to optimize their supply chain operations.Organizations often rely on the expertise and capabilities of logistics service providers to streamline their processes, reduce costs, and improve overall supply chain performance. To ensure the successful evaluation and selection of a logistics service provider, several factors must be taken into account. These factors include price, quality, reliability, and delivery time. The price of the logistics service is an important criterion, as it directly impacts the cost-efficiency of supply chain operations. The quality of the service provided by a logistics service provider is another crucial factor to consider. It ensures that the provider can meet the required standards and deliver goods or services that meet customer expectations. Reliability is another key criterion in evaluating logistics service providers. It refers to the ability of the provider to consistently deliver services on time and without errors or disruptions. This is crucial for maintaining customer satisfaction and minimizing potential disruptions in the supply chain. Delivery time is also a critical criterion in the evaluation and selection of a logistics service provider. It refers to the provider's ability to deliver goods or services within the agreed-upon timeframe. Considering these factors, the evaluation and selection process of a logistics service provider involves assessing various activities and criteria [3].These activities and criteria are often centralized in logistics centers, which play a significant role in the overall supply chain management process. Logistics service providers are compared based on their activities and criteria, which need to be evaluated thoroughly [3]. This evaluation process is responsible for ensuring that the selected logistics service provider aligns with the specific needs and objectives of the organization. Furthermore, it is essential to consider the efficiency of resource allocation and performance evaluation in each phase of the innovation process [7]. By assessing the quality of transport services using a system of indicators ranked according to their importance, organizations can optimize the provision of logistics services [7]. Constant monitoring of environmental factors, competitors, and available resources is necessary to ensure the highest quality control of logistics services [7]. In addition, customer satisfaction plays a vital role in evaluating and selecting logistics service providers. The evaluation of logistics service providers involves assessing various dimensions of the quality of their services from a customer satisfaction perspective.[1] These dimensions include the reporting and requisition procedure, capability of staff, quality of information, management of order discrepancies, product availability, service accuracy, timeliness, and product delivery condition [1]. The customer satisfaction aspect of logistics service evaluation emphasizes the importance of handling customer feedback and enhancing overall customer satisfaction. The evaluation and selection of a logistics service provider is a meticulous process that involves assessing various activities and criteria centralized in logistics centers [3]. These activities and criteria are evaluated to ensure that the selected logistics service provider is capable of delivering goods or services within the agreed-upon timeframe, meeting customer expectations, and maintaining a high level of quality [3]. The evaluation and selection of a logistics service provider is a meticulous process that involves assessing various activities and criteria centralized in logistics centers [3].

# Literature review

The physical realizations of supply networks are logistics networks, which are created by connecting the sites of industrial, commercial and service companies involved in the supply-distribution process, as nodes of the logistics network, and the material flow connections between them through transport networks. Logistics networks have been present for a long time and play a decisive role in economic life and operations, but their presence has become truly spectacular in recent decades. The organizations that appear along the logistics chains are the logistics service providers, according to the literature, these can be defined as organizations that perform various tasks and services for other companies, thus acting in the interaction between the customer and the end user. Simply put, logistics service providers are companies whose main field of expertise is the provision of logistics services and solutions. In addition to basic logistics activities, logistics service providers now perform complex tasks and activities at the local, national and global level. The growth of the offered service portfolio was justified by the increasingly complicated form of operation of supply chains. The offered services developed and evolved together with the appearance and development of the supply chain trend. One of the visible antecedents of this was that the production companies in the XX. from the middle of the 20th century onwards, they increasingly began to outsource their logistics tasks beyond international transport and forwarding, as evidenced by the 2009 study on logistics outsourcing by KPMG Consulting Ltd. [12]. In the 1970s, there was an increasing effort to reduce costs and use services representing a higher level, which encouraged companies to establish long-term strategic relationships with logistics providers. Since the 1980s, the scope of activities of logistics service providers has also become more and more complex - for example, packaging, replenishment, stock management, labeling, system support - which justified the creation of increasingly complex logistics networks. Support for this can also be found in the 2003 edition of the previous study. Parallel to all of this, globalization trends - the birth of multinational companies, the development of supply chains covering the entire world, the creation of global markets, and so on - began to become more and more decisive, which were already organically dependent on the operation of logistics networks. This can also be found in the book Logistics Systems I published by the Institute of Logistics of University of Miskolc [4]. In the 21st century, due to the ever-increasing market competition, globalization, and networked relationships, it has become indispensable for companies to have a future orientation and to create a forward-looking strategy [10]. The market trend towards globalization has further emphasized the importance of logistics in supply chain integration.Logistics outsourcing and third-party logistics (3PL) have emerged as key strategies for businesses to achieve supply chain effectiveness. Those companies can survive and belong to the leading edge, which, in response to new challenges, do not regret investing in continuous innovation and development [11]. Based on practical knowledge, it can be stated that logistics processes have a strategic role, so their performance, or in other words, their quality, must be given sufficient emphasis. The question of choosing the right service provider should be detailed here. Third-party logistics providers have become a fundamental approach for firms to provide better customer services, lower costs, and gain competitive advantage. The demand for 3PL providers has been on the rise, with approximately 60% of Fortune 500 companies in the United States turning to these providers for assistance. This shift towards outsourcing logistics services can be attributed to the increased complexity of global supply chains. With international supply chains becoming more complex, logistics service providers have adapted their role to meet the evolving needs of businesses.

# An Integral Player in Modern Supply Chains

The emergence of globalization and the increasing complexity of supply chains have necessitated the involvement of logistics service providers. These entities play a vital role in facilitating the efficient and seamless movement of goods from suppliers to consumers. This essay will critically examine the characteristics, functions, and challenges faced by logistics service providers, while also exploring their significant contributions to contemporary supply chain management [2].

## Definition and Key Characteristics:

A logistics service provider (LSP) refers to a specialized organization that offers a range of services aimed at optimizing and managing the flow of goods, information, and resources within supply chains. Key characteristics of LSPs include expertise in transportation management, warehousing, inventory management, and generally, all aspects of supply chain operations. These providers cater to a wide array of industries, ranging from retail to manufacturing, and are well-versed in the intricacies of local and international trade regulations [9].

## Core Functions:

* Transportation Management:

One of the primary functions of an LSP is managing transportation activities, such as freight forwarding, carrier selection, route optimization, and customs compliance. By leveraging their expertise and extensive networks, LSPs ensure that goods move efficiently, not only nationally but also across borders, minimizing delays and reducing costs.

* Warehousing and Distribution:

LSPs often operate warehouses, strategically located to facilitate timely and cost-effective distribution. These facilities enable effective inventory management, order fulfillment, and value-added services like packaging, labeling, and quality control. By efficiently managing warehousing operations, LSPs enhance the overall efficiency of the supply chain [6].

* Information Technology Integration:

In an era of digital transformation, LSPs employ advanced information systems to track shipments, manage inventory, and analyze data. Integration with various stakeholders, such as suppliers, carriers, and customers, allows for real-time tracking of goods, facilitating accurate forecasting, and proactive decision-making.

## Contributions to Supply Chain Management:

LSPs make significant contributions to the overall efficiency and effectiveness of supply chains. By specializing in logistics functions, they allow businesses to focus on their core competencies while benefiting from the expertise of these providers. The involvement of LSPs reduces transportation costs, improves delivery speed, optimizes inventory levels, and enhances customer satisfaction, ultimately boosting the competitiveness of the businesses they serve.

## Challenges Faced by LSPs:

* Global Supply Chain Complexity:

LSPs operate in a global marketplace characterized by diverse regulatory frameworks, cultural differences, and infrastructural limitations. Managing end-to-end supply chains that span multiple countries and regions poses significant challenges that LSPs must navigate effectively to ensure seamless operations [8].

* Technological Advancements:

While integrating advanced information systems brings efficiency gains, keeping pace with rapidly evolving technologies can prove challenging for LSPs. Investing in technology infrastructure, training employees, and ensuring data security are critical factors for success in an increasingly digitized logistics landscape [8].

* Sustainability and Environmental Concerns:

With the growing focus on sustainable business practices, LSPs face pressure to reduce their carbon footprint through eco-friendly transportation options, green warehouse operations, and better supply chain visibility. Balancing sustainability efforts with cost-effectiveness remains a significant challenge for LSPs [7].

# Levels

The models of logistics services are constantly changing thanks to the development of digital technology. In this section, I describe how the options offered by service providers in the logistics sector have changed, developed and expanded. This is how I explain what the terms 1PL, 2PL, 3PL, 4PL and 5PL mean [5].

* 1st Party Logistics:A 1PL, also known as First-Party Logistics, is a description of a company that manages its own logistics operations. A 1PL is responsible for managing all aspects of the logistics process, including transportation, warehousing, and distribution. The primary characteristic of a 1PL is that it is a company managing its own logistics activities. This means that the company has its own fleet of vehicles, warehouse infrastructure and logistics staff to manage the supply chain.
* 2nd Party Logistics: The term 2PL or secondary logistics refers to logistics services provided by specialized companies that focus on one or two areas of the supply chain. During the logistics service process at this level, cooperation takes place with external logistics partners who provide services such as transport or storage. 2PL can be characterized as a special logistics service provider that performs specific logistics services in cooperation with external organizations.
* 3rd Party Logistics: In the globalized economy, logistics has become a key, i.e. strategic, element of business success. As businesses continuously expand their activities, the need for special logistics services becomes more and more important. This is where third-party logistics (3PL) providers can be introduced. A 3PL provider is a third-party company that offers logistics services to businesses. The third-party logistics service provider (3PL) is perhaps the most popular and widespread logistics service model in globalized markets, which represents a supply chain that primarily involves the storage and delivery of various products, but other additional services are also available.
* 4th Party Logistics: A 4PL provider is a type of logistics provider that acts as an integrator, managing the entire supply chain on behalf of its customers. In other words, a 4PL provider is a supply chain management partner who takes over the management of logistics operations on behalf of the customer or company. However, 4PL logistics focuses on integrating all segments of the supply chain, while TPL logistics focuses only on moving goods.
* 5th Party Logistics: The 5PL (Fifth Party Logistics) service provider is a relatively new concept in the logistics industry, which offers its customers the most complex supply chain solutions. Compared to traditional logistics providers, 5PL providers take a more "strategic" approach to logistics management and play a key role in improving the overall efficiency and effectiveness of the supply chain. The most important feature of a 5PL service provider is that it acts as a single point of contact for all logistics-related activities, coordinating and managing the entire supply chain on behalf of its customers.

# Evaluation and selection

Evaluation and selection of a logistics service provider is a critical decision for any organization. The success of the supply chain depends heavily on the efficiency and reliability of the logistics partner. Therefore, it is essential to evaluate potential providers thoroughly before making a selection. The evaluation process should begin with assessing the provider's experience and expertise in handling similar operations. A track record of successful projects indicates their ability to meet deadlines and deliver quality services. Additionally, it is crucial to consider their network coverage, as a wide reach ensures seamless transportation across different regions. Another important factor to consider is the provider's technological capabilities. In today's digital age, advanced systems and software can enhance efficiency and provide real-time tracking information. Therefore, evaluating their IT infrastructure becomes imperative. Cost-effectiveness is also a significant consideration while selecting a logistics service provider. It is essential to compare prices offered by different providers while ensuring that quality standards are not compromised [13]. Furthermore, customer feedback plays an integral role in evaluating potential partners. Reviews from existing clients can provide valuable insights into their performance, reliability, and customer service. In conclusion, selecting the right logistics service provider requires careful evaluation based on experience, network coverage, technological capabilities, cost-effectiveness, and customer feedback. By conducting a thorough assessment of these factors, organizations can make an informed decision that will positively impact their supply chain operations (Figure I:)[15].



Figure I. A complex schema of the principle of the evaluation procedure [14]

After delimiting the range of service providers assigned to the requested service activity, the characteristics of the evaluation must be defined. These characteristics, we call them aspects, may differ depending on the given purpose. These characteristics must be determined by the company or the person responsible for the evaluation in such a way that it fully covers the range of services offered by the logistics service providers, so that the result of the evaluation provides factual information. After reviewing the literature, based on research and personal experience, I determined the following five aspects, the parameters of which represent the digitalization environment. These are the following:

* Delivery Capabilities: One of the most basic parameters for measuring logistics performance is the ability to deliver. This term includes the delivery deadline of the product/service, the punctuality of the delivery, the delivery in the promised quality, the delivery intact, the accuracy of the documents accompanying the goods (invoice, delivery note). In logistics literature, the term capacity refers to the amount of physical space, equipment, or personnel available to transport, store, or deliver goods. Examples include warehouse capacity, transport capacity or vehicle capacity. Capacity is seen as an extremely critical part of supply chain management, so capacity constraints can impact delivery costs.
* Storage and inventory capacity: Another very important aspect regarding the evaluation of the logistics process is the warehousing and inventory performance. In a supply network, the purpose of warehouses is to bridge the differences between the time schedule of production, use and delivery with the help of a defined inventory level. Its main task is to store the goods, that is, to preserve the quality and quantity of the goods for a certain period of time, but it also performs many functions, such as: collection, packaging, distribution, etc. Stock is a so-called passive resource available in warehouses, which has value in an economic sense. Stockpiling is particularly important for companies because it is neither physically possible nor economically advisable to produce everything when it is needed. The term defined in the literature as a buffer can be used to balance the discrepancy between the customer's needs and the manufacturer's possibilities. In corporate practice, inventory plays the role of a so-called buffer.
* Service level and quality: The level of logistics operations and processes describes the quality of the implemented logistics service. In today's economic practice, the primary corporate goal is to achieve the highest level of service at the lowest possible price. The policy used in practice describing the level of service consists of the following steps:
	+ defining the service elements that characterize the desired goal (e.g.: order cycle time, stock availability),
	+ determination of the corresponding performance standards,
	+ measuring the performance of service elements,
	+ detection and analysis of deviations between specified and actual performances,
	+ steps and measures aimed at increasing and improving the level of service.
* Costs: Cost is perhaps the most weighty element of all the consideration categories considered. Practice proves that this is the parameter that determines the outcome of the decision in most cases. In many cases, we are also able to ignore the value limit of the previously specified quality criterion, if a partner or service provider offers a significantly more favorable price. In the medium and long term, excellent pricing is one of the most important success criteria for a logistics service company. As simple as it sounds, it's actually just as complicated. There are many requirements to be met: to stand up in the market, to be favorable to customers, to compete with competing companies, to generate enough profit to be able to operate sustainably and to offer opportunities for innovation.
* Applied technique, technology: The innovative techniques and technologies of service providers operating in the logistics sector became available with the explosive completion of the IT tool system (hardware, software, internet, etc.). The applied technology and technique in relation to the fourth industrial revolution is manifested in the application of tracking systems (tracking and tracing), electronic data exchange (EDI), internet and e-commerce provision, process development and technology development in the logistics service provider sector. There are few sectors in the economy where IT has become an active tool as quickly as in logistics.

It is necessary to assign a set of descriptive parameters to each aspect, which characterizes and details the particularity of the evaluation of each aspect. Regarding the aspects, a very important detail is the definition of the appropriate set of parameters. When solving the task, it is necessary to pay a lot of attention to the definition of the relevant parameter system, because this can greatly influence the final outcome of the solution. Below, I have defined the parameters with which the previously introduced aspects can be characterized.

Parameters characterizing the delivery aspect

* + - By on-time delivery I mean the punctuality of the delivery, which, according to the service user's expectations, must be fulfilled with the greatest accuracy.
		- Accounting and invoicing accuracy is an administrative task related to the completed transactions, in which access to documents must be ensured for both parties.
		- Condition of vehicles is the quality adequacy of the equipment owned by the service provider to carry out the task.
		- Loading and unloading is an indicator expressed in terms of time and quality of service (product protection, equipment used, appropriate quantity) of the given service task.

Parameters characterizing storage and stocking aspects

* + - The characteristics of the order processing process are the execution of the order process of the service used, the associated relationship management.
		- Accuracy of order fulfillment are the characteristics expressing the user's expectations (time, place, quantity, quality).
		- On-time storage as a measure of conformity expressed in time as an offered service.
		- On-time pick-up as a degree of conformity of the offered service expressed in time.
		- Appropriate regulation of stocking is to ensure a transparent, orderly, traceable process on the part of the service provider.

Parameters characterizing service level and quality aspects

* + - Availability of tools and resources is the sufficient availability of human and material resources required for each process.
		- Problem-solving ability reacting in case of ad-hoc errors and disturbances.
		- The quality of the transport and warehousing service is the degree of the feeling of quality created in the customers during each process, which can be influenced by the specific capabilities of the service provider.
		- Financial stability of the company Financial stability can be defined as a state in which the company's financial background is strong enough to withstand shocks and the effects of financial imbalances.
		- Market reputation Corporate reputation is based on the company's character and philosophy. Good reputation is a valuable resource for any company. Reputation is trust in a company or brand, which adds a huge emotional surplus to the evaluation of a product or service. The elements of a favorable reputation are mutually reinforcing factors: authenticity, trustworthiness, reliability, responsibility.
		- Ability to operate on a global scale is a capability that establishes the possibility of transitioning to global operation.

Parameters characteristic of costs

* + - The (specific) cost per transport unit is the cost factor that refers to the monetary expression of the quantity unit assigned to the transport service.
		- Storage cost per storage unit is the cost factor that refers to the monetary expression of the quantity unit assigned to the storage service.
		- Service cost is the cost factor that expresses the monetary value of other services used.

Applied technique, parameters characterizing the technology aspect

* + - Application of tracking systems (tracking and tracing) expresses the existence, extent and quality of tracking tools and systems used during the performance of the service.
		- Provision of electronic data exchange (EDI) is a parameter describing the existence, quality and operation of the service.
		- Provision of Internet and e-commerce is a parameter describing the existence, quality and operation of the service space and sales platform.
		- Willingness for process improvement is a descriptive parameter that evaluates the company's willingness regarding process improvement in the perspective of the Kaizen philosophy.
		- Willingness to develop technology is a descriptive parameter that evaluates the company's willingness to develop technology in the perspective of the Kaizen philosophy.

In the next step of the procedure, we can use the mathematical evaluation method, the weighting procedure representing different importance, and numerical values expressing different evaluations to find the optimum formulated by the given goal.

# Summary

Evaluation and selection of a logistics service provider is a critical decision for any organization. The success of the supply chain depends heavily on the efficiency and reliability of the logistics partner. Therefore, it is essential to evaluate potential providers thoroughly before making a selection. The evaluation process should begin with assessing the provider's experience and expertise in handling similar operations. A track record of successful projects indicates their ability to meet deadlines and deliver quality services. Additionally, it is crucial to consider their network coverage, as a wide reach ensures seamless transportation across different regions. Another important factor to consider is the provider's technological capabilities. In today's digital age, advanced systems and software can enhance efficiency and provide real-time tracking information. Therefore, evaluating their IT infrastructure becomes imperative. Cost-effectiveness is also a significant consideration while selecting a logistics service provider. It is essential to compare prices offered by different providers while ensuring that quality standards are not compromised. Furthermore, customer feedback plays an integral role in evaluating potential partners. Reviews from existing clients can provide valuable insights into their performance, reliability, and customer service. In conclusion, selecting the right logistics service provider requires careful evaluation based on experience, network coverage, technological capabilities, cost-effectiveness, and customer feedback. By conducting a thorough assessment of these factors, organizations can make an informed decision that will positively impact their supply chain operations.

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