A study of models and methods of supply chain management was conducted. In an ever changing business conditions, the need has been identified for adapting existing and creating new mechanisms in logical stick.

An overview is presented and an analytical assessment of models, methods and concepts used in supply chain management in modern conditions. Generalization of the experience of leading experts made it possible to conditionally divide the models and methods used in logistics into general scientific and special ones.

Special models and methods are modeling tools that are designed and effectively applied to solving such logistics problems as problems of managing logistics infrastructure objects (object modeling) and tasks of managing logistics flows and processes (process modeling). The optimal approach to supply chain regulation is substantiated.

The most current model for restoration the normal mode of operation of supply chains is the Quick Response model, which is based on immediate action taken when delivery dates change; the model is being implemented into digital platforms to actively track cargo status and possible delays. In conditions of lack of information, it is proposed to use analytical methods, including mathematical models, and various auxiliary tools for solving assigned problems.

The prospects for applying a multimodal approach to the regulation of supply chains, «green» logistics reengineering, models and methods of supply chain management based on the introduction of digital technologies: block chain, as well as the creation of an information platform in which the main objects of supply chains will be involved are explored. A draft European electronic certificate is being considered cleaning, designed to reduce the time costs of finding logistics operators; digital Cargo Stream platform, which is an aggregator for ordering logistics services. The key features of «green» logistics reengineering, based on the unification of the mechanism for selecting raw materials and the use of reusable containers, have been identified.

lancet supply management, logistics, lancet supply planning, models and methods, digital technologies

Одержано (Received) 20.10.2023 *Прорецензовано (Reviewed) 30.11.2023*
Прийнято до друку (Approved) 27.12.2023

UDC 656.052 DOI: https://doi.org/10.32515/2664-262X.2023.8(39).2.206-213

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Main aspects of third party logistics activities in modern transport realities

The article substantiates the aim of responsible transport logistics, which consists of the delivery of goods on time with minimal investment of labour and material resources. The level of responsibility is considered at each step of shipment of goods from the producer to the consumer. 4 stages of effective transport logistics are offered by the authors. It has been established that at the first stage it is crucial to formulate the tasks clearly for its solution by logistics in business; the second stage is analysing of the Best Practices in the researched field - the study of competitors' logistics, the study of available information; the third stage is the development of a specific action plan of the transport enterprise; the fourth is the introduction of improvements after the first results of the work.

transport logistics, transport enterprise, supply chain, logistics mix, logistics mission

Introduction. The analysis of the logistics mission should provide the transport company with a system for improvement of the quality of its facilities and services, competitiveness. The process of customer service should ensure the provision of additional competitive advantages in the supply chain in order to maximize the overall value of the provided services for the end user [1, 3]. The increase of the level of transport logistics is possible assuming the usage of the 3PL service (third-party logistics), which means the provision of a complex of logistics services from delivery and address storage to order management and tracking of the movement of goods [5, 6].

Currently, there are no specific sets of methods and techniques for the effective functioning of the transport logistics mix. Therefore, further research in this direction may yield some desirable result. Particular attention should be paid to the essence of the transport logistics mix and substantiation of the essence of the 3PL operator in this system. The main mistakes at the work with the 3PL operator, which lead to additional costs and affect the time of delivery of goods, should be identified.

Analysis of recent researches and publications. The development of theoretical and practical aspects of the functioning of the transport and logistics mix was represented in the works of the Ukrainian researchers [2, 4] and the researchers of other countries [7, 8]. Among the main recent scientific publications, the monograph edited by [5, 6] should be noted first. It examines third-party logistics within the scope of the study of the logistics mix in the transport supply chain. Particular attention should be paid to the works of foreign scientists, including authors such as D.K. Alain and S.J. Bell. Leading in this field are the works of Ukrainian scientists such as O. Yu. Bochko, S.V. Kovalchuk, M.A. Kozoriz, M.A. Oklandera, I.V. Petryk, Y.M. Petrovycha and others.

Despite the thorough level of scientific research, there are several unsolved problems related to substantiation of the level of responsibility of transport logistics within the logistics mix.

The aim of the article. The aim of logistics at a transport enterprise is to ensure the availability of the appropriate goods/services in the required quantity, in the right form, at the proper place and at the specific time for the relevant consumer at the appropriate price. This model is also known as the 7R model, derived from the concept of "right" and translated from English, meaning "appropriate." It consists of the following elements: right product – the necessary product, right quality – the required quality, right quantity – the necessary quantity, right time – at the required time, right place – at the required location, right customer – for the relevant consumer, right cost – with the necessary level of costs. In modern conditions, this model is supplemented by the concept of "responsibility." The goal of responsible transport logistics is the delivery of goods (passengers) on time with minimal investment of labour and material resources. The level of responsibility is considered at each step of shipment of goods from the producer to the consumer or to the final destination.

Results. The main condition of logistics to adhere to this principle requires the hight quality raw materials, semi-finished products, goods and their components and transportation is carried out with the maximum level of responsibility and transport conditions.

Let us note that responsible logistics has evolved into an independent sphere of commercial activity. The primary factors driven by the advanced development of logistics and the increasing investment attractiveness of the warehouse market are as follows:

a) High rates of economic growth and the standard of living;

b) Improvement of the investment climate;

c) Entry into the Ukrainian markets of large foreign companies (holdings) that require modern warehouse complexes compliant with international standards [1].

Thus, the logistics mix reflects the essential features of the logistics mission of the enterprise. The key elements are quality, time, and costs. A transport enterprise must develop

a logistics mission that aligns with both overarching marketing and production strategies, encompassing both long-term and short-term perspectives. The aim of logistics at a transport enterprise should be the coordination of material and ancillary flows as the foundation for achieving of the success in business.

Therefore, the logistic mission should ensure the transport enterprise with a system increasing the quality of its products and services, competitiveness, and integration of supply, production and marketing activities. The servicing process for consumers should provide additional competitive advantages in the supply chain to maximize the overall value of the product/service for the end consumer. To implement effective transport logistics, it is advisable to undergo the following steps (Figure 1). At the first stage, it is crucial to formulate the tasks that should be solved by transport logistics in the business. Efficient responsible transport logistics solves a multitude of both internal and external tasks of the company: supply planning, transport management and/or information flow management, storage, distribution, customs, legal, and other issues. Its primary goal in constructing an effective flow management chain is to consolidate all company resources, optimally allocate them in numerous business processes and reduce costs. It is reasonable to orientate towards the specifics of the transport market infrastructure, which is advisable to study. It is advisable to justify the need of a warehouse for storage or suppliers will independently deliver the cargo and customers can pick up the goods for self-pickup. It is reasonable to construct a complex logistics chain in case when complying with the terms of an international contract involving the transport of goods by the transport enterprise, customs clearance in Ukraine, organization of storage, and delivery to the final consumer's doorstep.

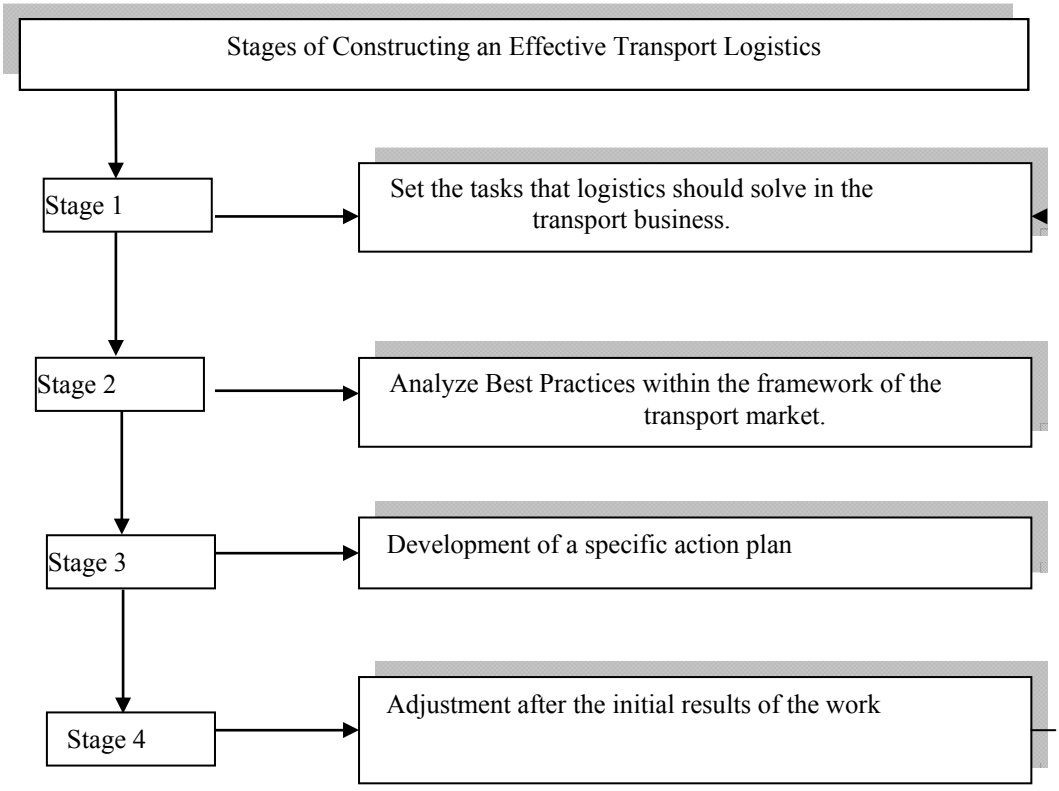

Figure 1 – Construction of Effective Transport Logistics

Source: Systematized by the author

At the second stage, it is advisable to analyze Best Practices in the researched field, examine how transport logistics is organized among competitors, and study all available

information. Often, it is expedient to use existing developments by adapting them to one's specific needs.

The third stage is associated with the development of a specific action plan. It is advisable for the transport enterprise to clearly define with whom and under what conditions it will collaborate in the future. Selecting a logistics partner, attention should be given to the availability of recommendations from reputable companies and ISO certification. The communication style of the logistics company manager can also influence the choice of a partner.

It is also advisable to establish a budget and deadlines for each stage. Under such conditions, the human factor should be taken into account: all employees must have a clear understanding of their responsibilities, the role they play in a particular business process, and the goals and tasks they need to accomplish. Additionally, plans, strategies and calculations must be documented in a separate file (for example, the P&L of the entire project, division of tasks by responsibility and deadlines for completion).

The fourth stage is characterized by making adjustments after the initial results of the work. It may be necessary to modify the initial action plan: it might involve reducing/enlarging the team, reviewing functional responsibilities, adjusting the budget, etc.

It is essential to be prepared for both optimistic and pessimistic scenarios of events: if deviations from the initially planned course arise, the enterprise will not have to urgently seek solutions.

Responsible transport logistics is the segment that is dynamically advancing in the field of warehousing and goods transportation in the modern economy of Ukraine. Warehouses providing responsible storage services are equipped with the latest equipment in line with the current trends in the warehouse industry, ensuring the highest level of product storage.

The basis of responsible transport logistics should be:

- Complete assurance of cargo integrity;
- Full assurance of cargo safety;
- Absence of expenses for maintaining warehouse personnel;
- Absence of expenses for maintaining warehouse facilities;
- High quality and speed of processing, unloading and transportation of goods.

We suggest to use the services of 3PL (from English third-party logistics), which denotes the provision of a range of logistics services from delivery and address storage to order management and goods tracking to enhance the level of responsible logistics. The functions of a 3PL provider include organizing and managing transportation, inventory tracking and management, preparation of import-export and freight documentation, warehouse storage, cargo handling and delivery to the end consumer.

According to the "Council of Supply Chain Management Professionals," a 3PL operator is a company that provides a sufficient logistic services for clients. The services should be integrated or provided separately. In general, 3PL operators offer services such as transportation, transport logistics, warehousing, goods storage, responsible storage, cross-docking, inventory management, packing and dispatch [3].

There are four categories of 3PL operators:

1. Standard 3PL Provider is the primary form of a 3PL operator. They undertake responsibilities such as picking and packing, warehousing and distribution – the fundamental functions of logistics. For most of these firms, 3PL functions are not their core business activity.

2. Service Developer is the type of 3PL operator who offers its clients enhanced value-added services, such as specific package detection and tracking systems or the

provision of a unique security system. These operators emphasize having advanced Warehouse Management Systems (WMS) and will encourage clients to implement an increasing amount of IT services.

3. The Customer Adapter: This type of 3PL operator comes to the aid of the client and essentially takes full control of the company's logistics activities. The 3PL operator improves logistics dramatically but does not develop new services. The client base for this type of 3PL operator is typically very small.

4. The Customer Developer: This is the highest level a 3PL operator can achieve regarding its processes and types of activities. This occurs when the 3PL operator integrates with the client and assumes all logistics functions. Such operators will have only a few large clients but will handle a very significant volume of tasks for them [7, 9, 10].

According to the consulting company SJ Consulting Group the following can be concluded that the introduction of the 4 categories of 3PL operators the results of client companies as depicted in Figure 2.

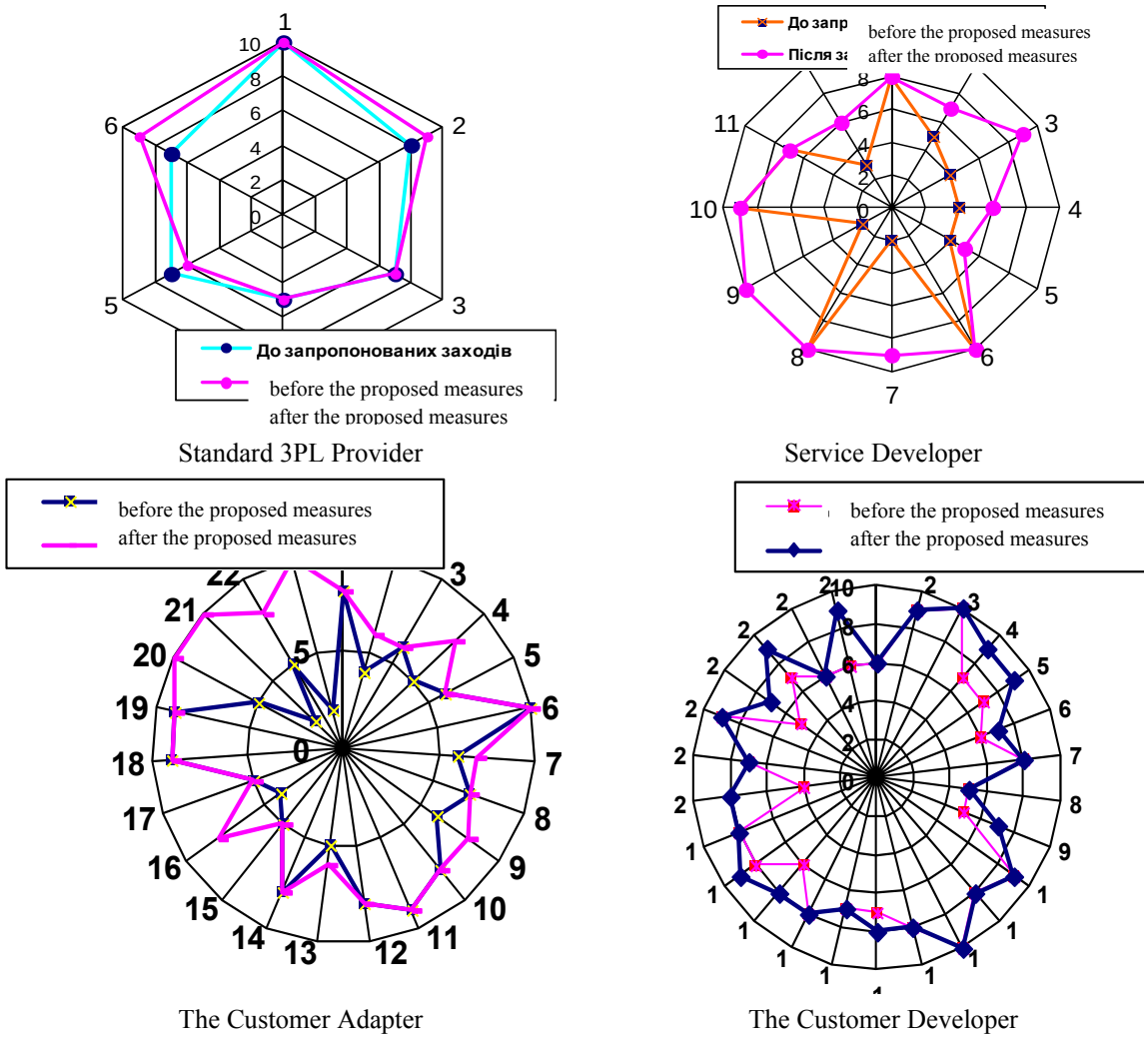

Figure 2 – Results of client companies' activities with the implementation of the 4 categories of 3PL operators
Source: Systematized by the author

To confirm the above statements we provide an example of the dynamics of the aggregate income of the top 50 global logistics companies in the 3PL operator market, as depicted in Figure 3.

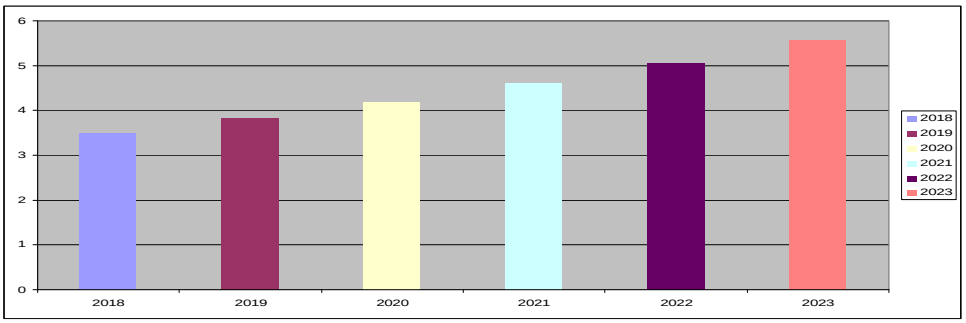

Figure 3 – Dynamics of the aggregate income of the top 50 global logistics companies in the 3PL market, billion dollars

Source: Systematized by the author

The American consulting company SJ Consulting Group annually publishes the TOP-50 ranking of the world's largest logistics operators, based on the companies' income. According to the results of 2022, the aggregate income of the top 50 logistics companies was $341 billion, which is 14% more than in 2021. The TOP-50 ranking of the world's largest logistics operators calculates income from a wide range of logistics services provided by companies, including freight forwarding, air transportation, maritime transportation, cargo and intermodal transportation, as well as storage and specialized transportations.

The ranking of leading 3PL operators in 2022 was topped by Amazon, with income of $42.7 billion for providing logistics services, that was less than 20% of the company's total revenue for the year 2022.

However, significant errors in working process with a 3PL operator may arise, leading to additional expenses and impacting delivery time:

1. Unnecessary notifications to the 3PL operator about the arrival and unloading of the cargo. The loading/unloading process can take several hours, and in some cases, up to 24 hours, which may lead to delays in transportation and the completion of the loading/unloading process outside regular working hours. It results in additional fees for 3PL operators for overtime work.

2. Submission of orders for receiving/picking/marking of the cargo on time. The 3PL operator plans its work several days in advance. In situations where the cargo is urgent but was not included in the work plan, the 3PL operator will have to process the cargo outside regular working hours, resulting in additional costs for the client.

3. Approval of transport unit numbers on time. The 3PL operator cannot load cargo into any available transport unit arriving for loading. The client is required to provide a written list of transport units, containers and wagon numbers with precise instructions regarding the correspondence of transport unit plates to the appropriate transport unit. Clients often forget to provide this information, creating downtime for transportation, which leads to additional expenses for downtime and overtime work.

4. Changes of label format, WMS file formats, the content of information on labels, etc. In such situations, cargo processing is delayed, delivery plans are postponed, and significant additional expenses for the restoration of certain programs. Most of 3PL operators use the services of IT companies, it is impossible to make certain changes instantly because IT companies have their own schedule of planned work, and all work outside the plan will be done for an additional fee, which will be passed on to the client who ordered the corresponding logistics.

The high growth rates of the Ukrainian e-commerce sector lead to growth of the 3PL logistics market. Provider can be selected to meet the requirements of business by 100%. Among the top 3PL companies in Ukraine are Raben Ukraine, FM Logistics, Meest Express, Denka Logistics, and others. Large logistics providers operate not only within the borders of

Ukraine but also internationally. Therefore, companies, requiring expansion or already having international partners, should contact prominent and well-established logistics providers.

However, the rates of major players in the logistics market are also higher. For small companies, it makes sense to pay attention to less popular 3PL operators. The cost of their services will be lower, while quality is guaranteed. These companies should primarily focus on their business needs rather than the popularity of the provider. If a company cannot find a suitable option, it can submit a request on the WareTeka

Conclusions. Summarizing the above, we can state that the implementation of a 3PL operator will accelerate the process of convincing potential and existing clients about the ability to transform their supply chains, ensuring exceptional control and service at the lowest cost. Orientation towards continuous improvement through strategic modeling can help differentiate logistic services from other providers and establish long-term relationships with clients.

The prospects for further research in this direction involve studying the experiences of other countries regarding the advantages and disadvantages of employing 3PL and 4PL operators.

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Основні аспекти діяльності third party logistics в сучасних реаліях транспортних перевезень

У роботі визначено мету відповідальної логістики, яка полягає в доставці вантажів у встановлені терміни з мінімальними витратами праці та матеріальних ресурсів з урахуванням ступеня відповідальності на кожному етапі доставки вантажу від виробника до споживача.

Автором запропоновано чотири етапи ефективної відповідальної логістики. Підтверджено, що на першому етапі доцільно поставити завдання, які має вирішувати бізнес-логістика. Другий етап присвячений аналізу передового досвіду в досліджуваній області, вивченню логістики конкурентів, аналізу наявної інформації. Третій етап передбачає розробку стратегії підприємства.

Четвертий етап вносить корективи після перших результатів роботи. У дослідженні стверджується, що логістична місія повинна забезпечувати систему, яка спрямована на підвищення якості продукції та послуг підприємства, його конкурентоспроможності, інтеграції постачальної, виробничої та маркетингової діяльності. У процесі обслуговування споживачів система також повинна забезпечувати додаткові конкурентні переваги в ланцюжку поставок, щоб максимізувати загальну вартість товарів для кінцевого споживача.

Для підвищення рівня відповідальної логістики пропонується застосовувати послуги 3PL (від англ. third-party logistics), що означає надання комплексу логістичних послуг від доставки та складування на місці до управління замовленнями та відстеження руху вантажу. У роботі названо основні помилки в роботі 3PL оператора, які призводять до додаткових витрат і впливають на терміни доставки.

Підсумовуючи вищесказане, можна сказати, що використання оператора 3PL прискорить процес переконання потенційних і поточних клієнтів у здатності трансформувати свої ланцюги поставок – забезпечуючи винятковий контроль і обслуговування за найнижчою ціною. Зосередження на постійному вдосконаленні процесів за допомогою стратегічного моделювання може допомогти відрізнити логістичні послуги від інших постачальників і встановити довгострокові відносини з клієнтами.

логістика, ланцюг поставок, логістичний комплекс, вартість товару, місія, відповідальна логістика

Одержано (Received) 02.11.2023 *Прорецензовано (Reviewed) 06.12.2023*
Прийнято до друку (Approved) 27.12.2023