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"3PL" Service Improvement Opportunities in Transport Companies

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Abstract

The article reports the results of investigation of "3PL" areas, which has to be improve. The goal of this article is to present the results of research of "3PL" influence for company and to select key factors, which they have the influence to affect the business development. There are two main reasons then the managers should think about "3PL" service use: 1) the company is in decline, there are problems which are difficult or impossible to resolve only with internal resources; 2) the company is up and looking for additional opportunities for improvement. There is the analysis of the sources is made in order to state criteria of the "3PL" improvement problems in transport companies. According to the summed assessment scores a "3PL" service improvement opportunities affecting criteria list is generated. The priority queue is based on the number of points that were given for each criterion; it is expressed as a percentage of their significance. Following a survey of experts, received kits of estimation are processed statistically. Is used the pairwise comparison method. By ranking method, significance of indicators is identified by direct means. Following the survey, there are received ratings of respondents. Respondents' reliability of the assessment is expressed by concordance coefficient of opinions characterizing the degree of overlap of individual opinions. Findings of research of "3PL" service providers are evaluated by eight factors (cost reduction, operational parameters, the use of information technology systems, flexibility, quality management, collaboration with customers, fixed assets and performance evaluation) as the most significant independent criteria, showing the importance. The result of the paper is a model designed and based on the analysis and criteria chosen by expert on "3PL" services that work for the improvement.

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Keywords: logistics, 3PL, services

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1. Introduction

In modern scientific literature logistics is defined as a science with the main goal – to solve the problems of optimal supply chain management, using the most effective scientific methods and techniques which are used throughout the overall movement of goods in the process chain – from the producer to the consumer. Dynamic development of markets, stiff competition and the willingness of the buyer to purchase a quality product determines the development of logistics as a science.

In the contemporary business world there is a tendency to eliminate side activities by transferring them to the specialized companies. The transference of the companies' logistics activities to a specialized company is known as "3PL" services (also referred to as third party Logistics) or "3PL". Logistics requires a great deal of attention and resources; however, it has no links to the most important areas of expertise within a company. More and more companies are refusing internal logistics departments, in this way they are capable of concentrating financial and human resources for the development of their main business activities, as well as providing flexibility to combine services in changing business demands.

Companies that are determined to use "3PL" services expect more efficient and less cost-demanding processes rather than performing these processes in their own establishments.

"3PL" companies perform a wide range of operations. They are taking care of delivery of goods, storage, revenue, assembly, loading, labelling, repacking and distribution. Additionally, the data must be collected and transmitted to the client. Their work is to optimize the logistics processes, where operating costs depend on several dozen of components.

"3PL" is a growing area; however, companies do not place enough attention to "3PL" improvement, which would be seen not only as a real benefit for the company, but also would help to identify "3PL" directions which are to be improved. Therefore, it is important for companies to evaluate "3PL" service criteria and select the best ones. Unsuitable "3PL" services may lead to customer dissatisfaction and reduction of long-term cooperation.

The purpose of the article is to measure "3PL" influence on the companies' activities and distinguish major factors that affect business development. The problem is as follows:

There are two main reasons why should managers think about "3PL" service use:

- the company is in decline, there are problems which are difficult or impossible to resolve only by internal resources;
- the company is in an upswing and looking for additional opportunities for improvement.

2. Literature analysis

The fundamentals of Logistics Company is a complex management and optimization of material flow; from the provider to the consumer to meet the interests of both parties. In case of such providers, it is thus allowed for companies to fully pass on the logistics functions to the "3PL" company. Therefore, financial and management resources are based to focus the main company's function that provide the main competitive advantage for future growth and prosperity. According to the scientists, [1–5] logistics is perceived as the science of the management of the flow of the goods (materials, machinery, end-production, etc.) between the point of origin and the point of consumption comprising coordination, planning and covering different types of services offered by corresponding companies in relation to goods' provision for the customer service, ensuring full disclosure of their use.

The goal of logistics process was formulated by Lynch [6], whose main rule is based on the principle of 7R in Logistics: Right Product, Right Place, Right Price, Right Customer, Right Condition, Right Time and Right Quantity. In case of misjudging of at least one of these conditions, the company may lose its customers, reduce competitive advantage and market share.

There are distinguished reasons why companies prefer establishments engaged in "3PL" services:

- the need for "3PL" arises from the lack of standards and greater efficiency of intermediaries while simultaneously interacting with several providers [7];

- simplification of the logistics system while significantly reducing transaction costs. This reduction may be associated with higher quality, lower quantities of documents, general work quality standards of the buyer/seller and "3PL". This in turn enables the company's administration to focus on core activities [8].

The most important thing is to identify which organization or several organizations in the supply chain will be responsible for the effective integration of systems and services [9].

Table 1. Findings/results by the scientists who analysed "3PL" service activities.

Author (year)	Objective/task	Conclusion
Sheffi [10]	To understand "3PL" service growth motives in the USA.	The main attention to be focused on: sphere of activity; better decisions in the field of transport; cost savings and qualitative services; Required development of technological and computerized systems and more professional logistics services.
Dougherty et al. [11]	To determine the comprehension of "3PL" service users.	Service users feel that they are receiving benefits, for example, they are reducing inventory levels, duration of order cycles, order implementation time and improving customer service.
Damme et al. [12]	To examine the performance management of "3PL" services.	"Make or buy" decision depends on the price and service evaluation compromise. One important factor determining the decision is the comparison of economically alternative variants. The solution of the lowest price is selected.
Sink & Langley [13]	To prepare management system for "3PL" services' order.	Concentration on the main activities was the most important factor, "3PL" services.
Bhatnagar et al. [14]	To know decision-making factors while choosing "3PL" providers.	Main reasons for "3PL" activities: cost savings (86.8%), customer satisfaction (76.3%) and flexibility (75%).
Persson & Virum [15]	To analyse "3PL" providers' growth strategy.	"3PL" providers' relationship building is an effective means of achieving the desired services and opportunities for significant investment in the property.
Sohail & Sohal [16]	To examine "3PL" activity reasons.	The main reasons: cost savings; better services; better transport solutions; greater professionalism.
Wilding & Juriado [17]	To identify customer understanding on the sector of "3PL" European consumer goods.	The main "3PL" performance reasons: "3PL" activity; operational flexibility; cost reduction; focus on main activities.

Source: own.

Webster [18] defines a partnership as a relationship between the companies, which may include a partnership between "arm's length" transactions "1PL" to "5PL" – full vertical integration (Joint Venture) – when each partner sees other partner as a growth of their own company. In this type of partnership, the concept of "end date" does not exist. Apart from the "arm's length" and Joint Undertaking (Joint Venture), Lambert et al. [19] provide three additional types of partnerships:

- "2PL" model comprises traditional logistics services – transportation, warehousing, freight forwarding, cargo consolidation, customs documents;

- "3PL" – third party logistics services – allows to refuse costs related to warehousing and transportation; to align services more flexibility in accordance with the changing requirements of the company and to optimize the costs by substantially altering its nature; involves a long-term commitments, complex functions and management processes;
- "4PL" – fourth-party logistics services – from the coordination of the activities into integration. The partnership is a long-term and involves multiple organizations in each department or functional units. Logistics management and decision-making is given to Logistics Company.

At international level, the use of "3PL" services started in the area of information technology, later on it covered such industries as finance, legal services, investment management, health care, pharmaceutics, biotechnology, insurance and the like [22].

3. Benefits of "3PL" service order

In a global "3PL" service study [9], the benefits are measured in indicators, such as: reduction in logistics costs, logistics real estate decrease, inventory costs decrease and order related indicators, which can be easily measured and compared with the company's data. These benefits and their corresponding values are presented in Table 2.

Table 2. Global companies that use "3PL" services, benefits in 2012.

Advantage		Result, %
Decrease in the total cost of logistics		15
Decreased cost of sales		8
Decreased long-term assets for logistics		26
Order cycle time	changed from	58
	changed to	65
Order fulfilment	changed from	67
	changed to	72

Source: [9].

Table 3 shows that all of these criteria indicate a positive change in company's activities. The total logistics costs, after using "3PL" services, declined by more than 15%, even a 26% drop can be seen in company's logistics for long-term property, the cost of sales decreased by 8%, the required amount of stock disposal fulfilment increased by almost 7% and accuracy of orders reached even by 72%, almost 5% more than without using the "3PL" services.

These changes indicate that the company's choice to transfer its logistics activities to "3PL" is correct. Therefore, by reducing logistics costs, the saved money can be invested in business development, this should encourage greater profits. Also, an opportunity arises for the company to transmit more logistics services to "3PL", allowing its integration into their business processes and transferring the entire supply chain management to an external "3PL" service provider.

"3PL" companies fulfil a lot of different operations. They take care of the arrival of goods, storage, revenue, assembly, loading, labelling, repacking, distribution and delivery of goods. In addition, data must be collected and transmitted to the client. Their work is to optimize the logistics processes, where operating costs are dependent by many components.

The companies do not place enough emphasis on improving "3PL" services. The application of these services would not only benefit the company, but also help to identify possible "3PL" service improvement directions. It is therefore important for companies to evaluate the "3PL" service criteria and select the best options. Inappropriate "3PL" services may lead to customer dissatisfaction and loss of long-term cooperation.

Table 3. "3PL" service improvement possibilities determining criteria evaluation.

Assessment factor	Criterion code	Evaluation criteria	Evaluation score	Weight	Total scores
Price reduction	X1	Cost reduction	5	0.9	4.5
	X2	Geographical position	3	0.3	0.9
	X3	Provider reputation	4	0.9	3.6
	X4	The added value of the service	3	0.9	2.7
	X5	Experience	4	0.8	3.2
Exploitation parameters	X6	Skills based on knowledge/Innovation	4	0.6	2.4
	X7	Qualified logistics specialists	5	0.8	4.0
	X8	Carrier reliability	5	0.8	4.0
	X9	Company size	2	0.3	0.6
	X10	Control options	4	0.7	2.8
	X11	Production capacity	4	0.5	2.0
Use of IT systems	X12	Exchange of information in real time	5	0.8	4.0
	X13	Effective application of IT capabilities	4	0.8	3.2
	X14	Flexible application of IT	4	0.7	2.8
Flexibility	X15	Greater flexibility and adaptability	4	0.9	3.6
	X16	Customer orders flexibility	5	0.8	4.0
	X17	Job market flexibility	3	0.4	1.2
Quality management	X18	Delivery completion time	5	0.9	4.5
	X19	Services timeliness	5	0.9	4.5
	X20	Service improvement	5	0.7	3.5
	X21	The ability to understand	4	0.9	3.6
	X22	Variety of services	5	0.8	4.0
	X23	Service scale	4	0.9	3.6
Collaboration with customers	X24	Easy cooperation	5	0.7	3.5
	X25	Mutual trust	5	0.7	3.5
	X26	Cooperation experience	4	0.6	2.4
Non-current assets	X27	Investments in IT systems	5	0.4	2.0
	X28	Technological improvement	3	0.8	2.4
	X29	Reduction of assets	4	0.9	3.6
Performance evaluation	X30	Financial stability	5	0.7	3.5
	X31	Specialization	5	0.6	3.0
	X32	Specific capacity	4	0.7	2.8
	X33	Consistency	3	0.6	1.8
	X34	Connections	4	0.6	2.4
	X35	Individual services	4	0.8	3.2
	X36	Quality of service	5	0.9	4.5
Total					111.8

Source: authors' calculations.

4. Evaluation of "3PL" service improvement criteria and priority arrangement

On the basis of the selection criteria existing in the literature, a "3PL" service provider selection model was developed, which affects service improvement possibilities. A total of 36 "3PL" selection criteria were identified, which were grouped into 8 groups of factors.

Table 3 contains all 8 "3PL" improvement possibilities with factors and its criteria (criteria are displayed in a non-priority order).

Ratings are given in five grading system (1 – unimportant for "3PL" development, 2 – not very important, 3 – average importance, 4 – important, 5 – very important) and it also provides a criterion for the significance of the weight (where 1 – determining factor for "3PL" improvement, 0.9–0.8 – very significant, 0.8–0.7 – significant, 0.7–0.5 – average significance, 0.5–0.3 – not significant, 0.3–0.1 – completely irrelevant factor).

In accordance with the summed assessment, a priority queue of influential criteria determining "3PL" service improvement is established. The priority queue is based on the number of points that were given to each criterion; it is expressed as a percentage on the basis of its significance. In assessing the significance in percentages, the drivers are divided into three categories of importance: I category includes criteria, its significance is scored up from 5 to 3 (the total of category I is 62.61%), category II includes criteria, its significance is scored up from 2 to 3 (total 29.79%) and group III includes criteria, its significance is scored up from 0 to 2 (total of 7.6%).

The top three criteria of category I are as follows: 1) cost reduction, 2) service timeliness 3) quality of services. They are considered to be the priority factors.

5. Determination of indicators' significance

Following a survey of experts, the received data of estimation are processed statistically. The most commonly used is the pairwise comparison method. Thus, this expert assessment is carried out in pairs in order to determine the weighting for each pair of prominent target. Expert evaluation and calculations are carried out in the form of a matrix. Every expert records their assessment x_{ij} in the matrix row and column intersection. It can be set to 1.0 or 0.5 depending on whether the index i has a higher priority than j, or they are equal. Thus, such an approach enables to determine indicator weights very accurately. However, this method requires a lot of resources, since the pairs are compared with one another.

By the means of the ranking method, significance of indicators is identified by direct method. Discrete or real numbers of the scale are used. For example, the significance of the parameters can be determined in a 10-point scale from 1 to 10. Primary index receives 10 point value (may be a few most important indicators). All other indicators are compared with the main one.

In the questionnaire the companies had to note which of the provided "3PL" services they are using. For each choice, the corresponding weighted value of the relative percentage of the services is given. It was determined, that the most widely ordered "3PL" service is international transportation services (10.53%). This service can be summarized as a transportation service, which is one of the necessary conditions to describe "3PL" clients. 8.77% determines warehousing, freight forwarding, labelling, inventory management, order management and execution services. By transferring transportation to "3PL" companies refuse long-term assets, i.e. vehicles. At the same time this condition reduces the costs of the vehicle maintenance. Using these relative values, the distribution of "3PL" service demands were compiled. The data is presented in Table 4.

For further evaluation, average values of assessment indicators are calculated according to the formula by using survey data of experts.

Following the survey, there are received ratings of respondents. They are the definition of the most important criteria of selection. The average assessment value is set by the formula [20]:

$$\bar{t}_j = \sum_{k=1}^{r} w_k \cdot t_{jk} : \sum_{k=1}^{r} w_k \ \text{ arba } \bar{t}_j = \left(\sum_{k=1}^{r} t_{jk} \right) : r \,, \tag{1}$$

where: t_{jk} – efficiency estimation of j criteria; r –number of respondents.

The significance of each variable q_j is calculated by the formula [20]:

$$q_j = \bar{t}_j : \left(\sum_{j=1}^{n} t_j \right). \quad (2)$$

Table 4. Ordered "3PL" services by companies, %.

Services ordered from a third party	%
International shipments	10.53
Storage	8.77
Freight Forwarding	8.77
Product labelling, packaging and gathering	8.77
Inventory Management	8.77
Order management and execution	8.77
Local transportation	7.02
Customs brokerage	7.02
Reverse logistics	7.02
Cross-docking	7.02
Transport planning and management	7.02
Spare Parts Logistics	5.26
Vehicle fleet management	5.26

Source: authors' calculations.

Respondents' reliability under assessment is expressed by concordance coefficient of opinions characterizing the degree of overlap of individual opinions [21]:

$$W = \frac{12S}{r^2\left(n^3 - n\right) - r\sum_{k=1}^{r} T_k}, \quad (3)$$

where: W – concordance coefficient; S – evaluation of the results for each variable deviation sum of root-mean-squares.

It is very important to determine the weighting of the criteria while using method of multipurpose.

It was found that 14.89% of the companies, which provide "3PL"logistics services, provide warehousing services, 10.64% – freight forwarding, customs brokerage and transportation planning and management services.

6. Findings of "3PL" service providers

Findings of "3PL" service providers are evaluated on the basis of eight factors (cost reduction, operational parameters, use of information technology systems, flexibility, quality management, collaboration with customers, fixed assets and performance evaluation) as the most significant independent criteria showing the importance. The most important criteria are the quality of service and service execution time (5.0), cost reduction (4.7) property loss is not that important (2.8).

Experts believe that the most important criteria affecting improvement of "3PL" is the service execution time (X12 – 0.032), since it is very important that the goods would reach consumers in the shortest time possible, the service would be given quality (X36 – 0.035) and the lowest possible expense (X1 – 0.033) (Fig. 1).

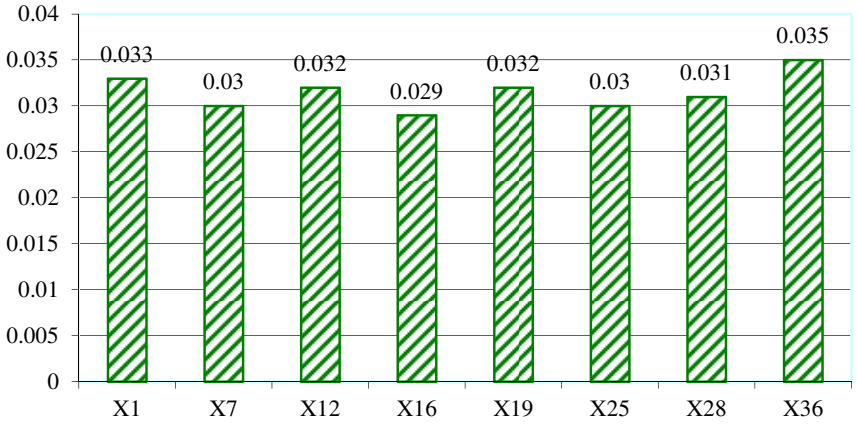

Fig. 1. Overall chart of survey criteria for significance of "3PL" providers Source: authors' calculations.

In addition, other important criteria for "3PL" service providers is the use of information technology systems since there is a need for exchange of information on IT tools in real-time (X12 – 0.032). According to the experts, all these criteria affect "3PL" development.

Companies analyze their activities to improve quality of service. In order to attract customers and retain existing ones, there is a need to reduce costs, which affect the cost of the services and quality management; it enables to perform the service right on time.

7. Summary of research findings

Considering the opinions of the experts, the most important factors for "3PL" service improvement are the quality of services, cost reduction and service execution time.

Interviewed experts claim that it is very important to select the best criteria to ensure "3PL" service improvement as a priority. However, it is necessary to consider "3PL" as a unity, because "3PL" service improvement is a broad and complex system, thus one cannot distinguish one major criterion. Criteria evaluations of the most important "3PL" factors, which affect the "3PL" development, are summarized in Table 5.

Table 5. Criteria evaluation of the most important logistics factors, which affect "3PL" improvement, summary.

Service provider		Service costumer		Authors	
Performance Evaluation	Quality of service	Quality Management	Services timeliness	Price Reduction	Cost Reduction
Price Reduction	Cost Reduction	Performance Evaluation	Quality of service	Performance Evaluation	Services timeliness
Quality Management	Services timeliness	Price Reduction	Cost Reduction	Quality Management	Quality of service

Source: own.

The analysis of the expert survey results show that the best "3PL" service improvement criteria – quality of service and cost reduction. The most important "3PL" service improvement criteria are as follows: in assessing the performance, the quality of the provided services is the most important; in assessing the questions of cost reduction, the most important criterion is price reduction; in assessing the quality of management, the most important criterion is delivering services on time.

8. Conclusions

1. Scientific literature analysis showed that the focus while selecting a "3PL" provider should be given to proper selection of criteria. These criteria must be analysed continuously to ensure the effective supply chain for partners.
2. The hierarchical analysis method determines the compatibility level for each expert individually. All the expert group compatibility can be determined by using the concordance coefficient.
3. Questionnaire data was processed by using expert method; the results indicate that "3PL" customer service experts (50%) were from Vilnius, "3PL" services are booked by medium-sized companies (45%), with 50 to 249 employees. Typically, they book "3PL" service to fulfil international shipments (10.53%).
4. The calculations showed that priority queue, causing "3PL" service improvement, was set by experts of 3PL customers. The results indicate which criteria must be respected in order to improve the "3PL" services. This is service execution time, because it is very important that the goods would reach consumers in the shortest time possible; the service would be provided with high quality and at the lowest possible cost.
5. The calculations showed that experts of 3PL Services Providers identified the factors, influencing "3PL" improvement. According to its importance they are as follows: quality of service, cost reduction, service execution time.
6. A comparison of "3PL" expert studies was conducted in order to clarify the importance of each criteria, which are significant for the development of 3PL's services; it was found that significant "3PL" service improvement criteria are as follows: for the evaluation of the activities – the service quality criteria; assessing the cost reduction issues – the most important criteria is cost reduction; assessing the quality of management – service timeliness criteria.
7. The creation of the most important criteria for development is relevant in order to make services more attractive and compete with logistics companies that provide similar services.

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