

THE STRUCTURE AND PARAMETERIZATION OF FLOW COSTS IN LOGISTICS PROCESSES

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Abstract

The aim of the article is to demonstrate that logistics costs are a basic measure of the quantity and efficiency of logistics processes, and therefore their precise identification and detailed analysis are important. Logistics costs have a major impact on the overall performance of an of the enterprise's economic activity and on shaping the final financial result that determines the level of value added.

The issue of logistics costs is one of the most difficult and complex problems, resulting from the extensive and blurred structure of these costs and the difficulty in identification. Moreover, logistics cost definitions are numerous and ambiguous, they appear in various aspects, and are used in any way that impedes their identification and analysis. However, due to the growing share of logistics costs in total enterprise costs and their role in gaining and retaining a competitive position, they need to be identified, understood and structured.

Keywords: Logistics costs, cost sources, logistics cost structure, physical flows

1. INTRODUCTION

This article aims to demonstrate that logistics costs are a basic quantity measure of the efficiency and modernity of logistics processes, and therefore their precise identification and detailed analysis are important. Logistics costs have a major impact on the overall business performance of a company, shaping its final financial performance that determines the generated level of added value (Ficoń K., 2001., Ficoń K., 2004., Ficoń K., 2008., Kumar S., Wilson J. 2009, pp. 143-162).

The problem of logistics costs is one of the most difficult and complex issues, resulting from the extensive and vague structure of these costs and the difficulty of identifying them (J. Twaróg, 2003, K. Ficoń, 2001). What is more, definitions of logistics costs are many and they contradict each other, appearing in different aspects and being applied as one sees fit (J. Twaróg, 2003, P. Blaik, 2010), which impedes their identification and analysis. However, due to the growing share of logistics costs in total enterprise costs and their role in gaining and retaining a competitive position, they need to be identified, understood and structured.

Logistics costs are directly attributable to the effectiveness of internal logistics processes in the company, and are analyzed in a broader external market context, between the individual business counterparts of the company. The share of logistics costs in the overall costs structure of the company is significant. Their level varies depending on the industry in which the company operates. Excessive logistics costs significantly reduce profits and negatively affect competitiveness.

To sum up, costs of logistics processes are characterized by:

- dispersion among many groups of costs according to traditional cross-sections
- high and often increasing share of total costs,
- variation of size in particular periods,
- separation of responsibility for the development of these costs on many organizational units,
- effort in determining the size of these costs.

2. THE ESSENCE OF LOGISTICS COSTS

Cost analysis is one of the elements of the decision-making process, including the decisions regarding the offer of logistics services and products. Such decisions require analyzing customer needs, the system of logistics and, on that basis, determining the global costs and the costs and prices of individual products/services (T. Pirttila, J. Huiskonen, 1996, p. 45).

According to the Accounting Act, costs are the probable reduction in economic benefits of a reliably determined value in the form of a decrease in the value of an asset or an increase in the value of obligations and reserves that will lead to a decrease in equity or an increase in its deficit other than withdrawal by shareholders or owners (Accounting Act 2015, Journal of Laws 2013 item. 330). Costs are the main criterion for choosing the company's decisions and they are referred to as money-expressed, intentional consumption of fixed capital, equipment, intangible assets, materials, energy, fuel. Costs also include expenses that do not reflect the consumption of inputs, and are incurred in relation to the normal business activity of a given unit of an enterprise which results in useful products/services (J Matuszewicz, 2000).

Like J. Twaróg, K. Ficoń believes that logistics costs make it possible to evaluate the efficiency of modern logistics management methods and concludes that separating them among other costs is extremely difficult due to:

- excessive coherence of processes, causing administrative and organizational obstacles to clearly identifying only the costs associated with the logistics activities of the company,
- complex logistics cost structure and interrelations within it do not allow for their calculation according to individual divisions (K. Ficoń, 2001, p. 351; Twarog J., 2003).

The difficulties with identifying logistics costs are confirmed by P. Blaik in his reflections, according to which there is a lack of regular and comprehensive analysis of this cost group in Poland. The reason for this is the level of sophistication of information systems used by companies that rely on outdated accounting methods and does not provide the right information for quality logistics professionals (Blaik P., 2010). The difficulty in identifying logistics costs in other countries are discussed, inter alia, by F. Straube H-C. Pfohl (F. Straube, H-C Pfohl, 2008, pp. 48-49), R.Z. Farahani (R.Z. Farahani, N. Asgari, H. Davarzani, 2009, p. 60) czy Q. Dianwei (Q. Dianwei, 2006, p. 592), who point to the problems in this area. Almost each of the authors considering the subject at hand believes that the separation of logistics costs is hampered by the fact they are nested too well in the entirety of recorded costs and that without accurate identification it becomes impossible to assess the efficiency of the logistics system. Traditional accounting methods used in companies constitute the main barrier to determining logistics costs. These methods provide the necessary information that covers the financial activities of the whole company, but they do not solve the problems of modern logistics. The task of the logistics system is to ensure the highest level of coordination of logistical processes and optimal use of available resources, which influences the development of logistics costs that should be controlled (B. Slusarczyk, S. Kot, 2013, pp. 7-11).

The problem of identifying, interpreting and analyzing the costs of logistics processes is evident especially in the context of the definitions contained in the literature. According to K. Ficoń, logistics costs - as well as the costs of other economic processes - cover many different components, including mainly financial, material, time-related and personal expenses (Ficoń K., 2008, p. 255). M. Kufel believes that logistics costs form a specific category of costs, reflecting the monetary nature of the company's material consumption due to planning, implementation and control beyond the technological processes of time and space displacement of all forms of materials (M. Kufel, 1990). According to J. Kwejt, logistics costs should include: planned logistics costs (transportation of supplies, production, maintenance and aging of inventories and loans, etc.), unplanned logistics costs (maintenance of excessive inventories and loans, etc.), losses due to faulty material management (J. Kwejt, 1982). M. Nowicka - Skowron states that logistics costs are financially determined expenditures to accomplish logistics tasks (M. Nowicka-Skowron, 2000, p. 90). B. Szalek believes that logistics

costs include direct costs (transportation, warehousing, stocking, handling, communication) and indirect, fixed and variable costs, production and distribution costs, material and immaterial costs, costs of logistical elaboration, logistics-entrusted undertakings, and strictly logistics costs (B. Szalek, *Logistyka* 1994, p. 163). Cz. Skowronek assumes logistics costs to be the money-expressed use of live labor, work means and items, financial expenses and other negative consequences of extraordinary events caused by the flow of material goods (raw materials, materials, goods, products) in the company and between companies, and also stock maintenance (Skowronek Cz., 1999, p. 3).

The importance of logistics costs in business operations is determined by the fact that the account of these costs is the basis of important business decisions. Measurable costs generally expressed in financial terms are analytical materials for working out both short-term operational or tactical decisions as well as far-reaching strategic decisions.

3. THE STRUCTURE OF LOGISTICS COSTS

Logistics costs are mainly due to the need to handle physical material flows and the information flows that accompany them - see **Figure 1**.

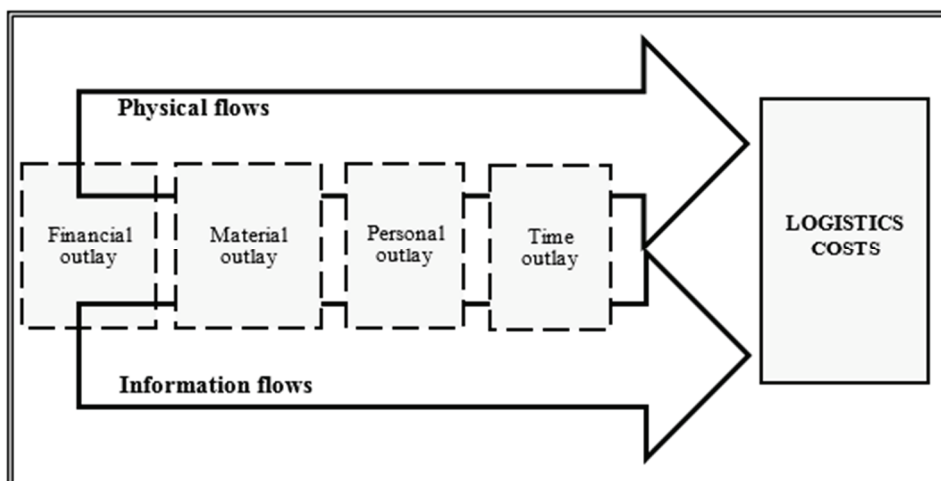


Figure 1 The structure of logistics costs

Execution of flows results in specific costs associated with the logistics sphere of the company, which has a large impact on its economy and naturally reduces its profit. Implementing efficient flows in the logistics sphere requires:

- large capital in the form of fixed assets that build up the company's logistics infrastructure (production and administrative buildings, storage buildings, equipment and means of transportation, information processing systems, etc.)
- employing appropriate staff to handle physical processes of material flows and of information and decision streams,
- accumulation and maintenance of appropriate material stocks, which condition the stability of economic activity, and the proper continuity and appropriate intensity of logistical processes (Ficoń K., 2001., Ficoń K., 2004., Ficoń K., 2008).

Projects shown in **Figure 2** involve financial costs that are proportional to the intensity and scale of the company's logistics activity, plus the need to involve specific capital and investment inputs and the necessary human resources to handle logistics processes.

The costs of logistics processes are primarily the costs of physical flows and the accompanying information flows, as well as depreciation costs of fixed assets and personnel costs of handling these processes.

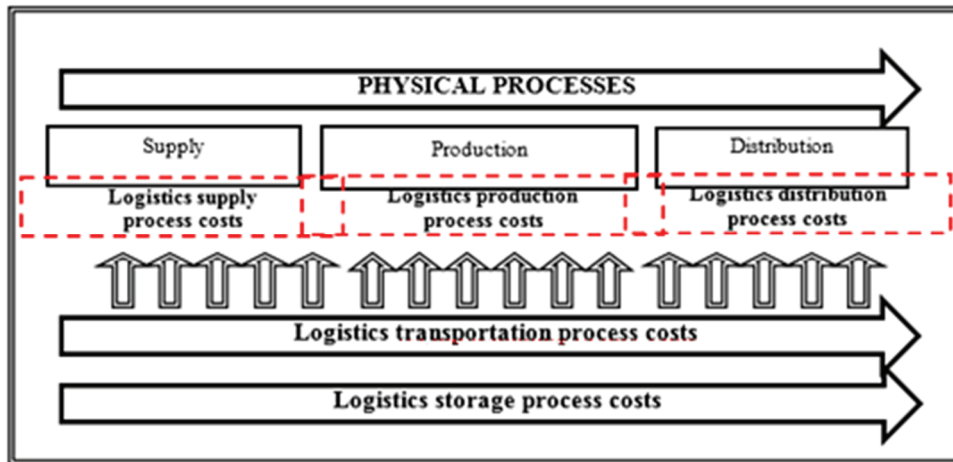


Figure 2 Costs associated with the structure of physical processes

4. COSTS OF LOGISTICS FLOWS

Logistics costs are most often expressed in practical terms and can be presented in various information cross-sections, according to various classification criteria. The logistics costs of the logistics processes must be based on credible data demonstrating the actual expenditure incurred over a specified period of time and should be calculated according to a uniform financial system (quantitative one). The most important practical significance are the so-called structural cross-sections of logistics costs such as those based on logistics phases (places) of origin, those based on logistics processes, those based on wear factor or those based on the criterion of relative cost stability.

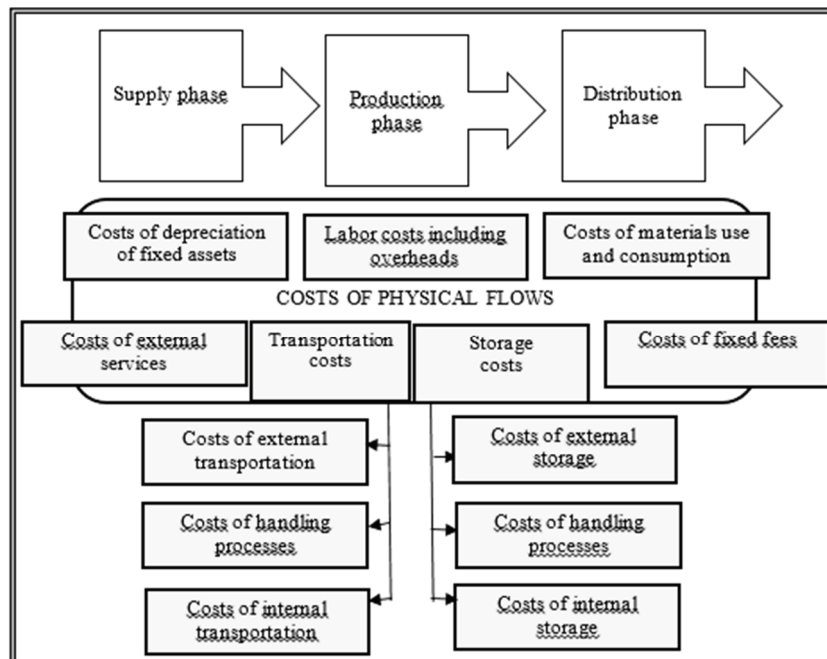


Figure 3 The structure of the system of physical flow costs

The costs of physical flows are related to the movement of all kinds of material goods that are involved in the logistical processes of a business. Material logistics processes generate the following costs: costs of supply phase (raw materials, materials, semi-finished products), costs of production phase (materials, parts and

components, intermediates), costs of distribution phase (semi-finished products, finished products, goods) costs of waste phase (finished products, materials, recyclables).

In general, the logistics costs of physical flows in a company should be considered in the system of internal flows within the enterprise, as the costs of the storage, production and waste phase, external flows connecting the enterprise to the market environment as supply, distribution and return costs. The structure and volume of physical flows directly determine the costs of the flow of material goods in a company. These, meanwhile, belong to the internal costs class and are determined by: the size of the technical infrastructure of physical flows, the involvement of labor resources in the flow processes, consumption of consumables in transportation and storage processes, additional charges and other financial obligations.

The size of global physical flow costs is a complex function made up of a number of variables and sub-costs, where the most important are the depreciation costs of fixed assets involved in logistics processes, labor costs along with logistics overheads, technical and material consumption costs, fuel and energy costs, costs of external services such as transportation, storage, fixed costs, e.g. taxes, insurance.

Physical flow costs are a predominant component of overall logistics costs, and therefore their minimization reduces the overall costs proportionally and thus increases the profitability of the business. At the same time, these are costs with well-defined origins and established financial parameters, so optimizing activities are strictly defined and rationally justified.

5. CONCLUSION

Logistics processes condition the running of a business in time and space, and the cost of their implementation has a significant impact on the company's overall financial performance. The execution of logistics processes is an inherent part of the business activity of any company and is an important factor shaping its economy and its ability to operate an active competitive strategy. New possibilities in this respect are offered by parameterization of the cost of risk of logistics processes.

In traditional accounting and reporting systems, the costs of logistics processes - although important determinants of corporate profitability - are very broad and inaccurate. The difficulty of strict accounting of logistics costs is due to their very complex nature and large dispersion in various enterprise accounting systems. Running a strict logistics cost accounting is hampered by an extensive spectrum of objective and subjective, procedural and random, as well as historical and economic factors, as evidenced by many publications in the field of logistics (Ficoń K. 2008., Nowicka-Skowron M. 2000., Kristianto Y. 2010, Kull T. 2008, Kumar S., Wilson J. 2009, Lambert D. (red) 2006, Lee H., Tang C. S. 1997, Janssen M., Feenstra R. 2010, Celik N., Lee S., Vasudeavan K., Son J. 2010, Chan H., Wang W., Luong L., Chan F. 2009, Chen Y., Lin Ch. 2008, Chopra S., Meindl P., 2007, Chopra S., Sodh M. S., 2004, Chopra S., Reinhardt G., Mohan U. 2007, Christopher M., Towil D., 2005, Christopher M., Lee H., 2004, Christopher M., Peck H., 2004), as well as the research study in question.

The costs associated with logistics processes should be sought mainly in fixed assets constituting substantial assets in the form of buildings and storage facilities, transportation means, auxiliary machinery and equipment, technical equipment and specialized telecommunications infrastructure, which constitute the logistics infrastructure of the company. Material stocks of fixed assets in the form of supplies, raw materials, semi-finished products and production stocks, such as production in progress or semi-finished products, as well as goods and finished products, are also an important source in this regard. A very large cost group is the workforce that generates personnel costs and associated overheads, plus variable costs that arise from the implementation of production processes.

Maintaining the highest possible rate of economic turnover is determined primarily by the efficiency of logistics flows of material goods and information streams. In turn, the higher the efficiency of logistics processes, the

lower the cost of their operation. In this sense, the unambiguously identified costs of logistics processes can determine the economic efficiency of the logistics activity and the efficiency of the logistics processes that serve it.

The research conducted by the author shows that not all expenses incurred in the company are properly qualified, i.e. they are not associated with costs caused by risk factors. These costs, instead of increasing the profit and loss account items, stem instead from the lack of proper identification of such items as the cost of products sold, the value of goods and materials sold, and the cost of products, goods and materials sold. In addition, the costs of risk factors can be sought in the cost of sales, general administrative expenses, i.e. gross profit (loss) on sales.

Developing a costing model enables more accurate estimation, levelling or reduction of costs to an acceptable level, thus translating into net profit. This is of particular importance in the implementation of logistics processes since this sphere of operation of production companies is mostly associated almost exclusively with costs.

Key separation areas of production companies cannot be analyzed separately. This is important in the decision-making process, the correctness of which depends on a comprehensive perspective of the problem at hand.

The costs of logistics processes have a decisive influence on the economic performance of the business, which is why their precise identification and analysis must be conducted very reliably, using modern economic methods such as the AWZR model (E. Kulińska, 2011).

In the case of complex and inaccurate systems of logistics cost classification, with great dynamics and large dispersion, the current logistics costs and the creation of risk registers are crucial. Accounting for logistics costs is a very powerful basis for dynamic control of the development of these costs, both in cross-sectional areas as well as in particular time periods, and also by place of origin. There must be a parallel record of the costs incurred in accordance with the established estimate. Monitoring logistics costs rationalizes the cost management strategy, which in turn should reduce logistics costs. It should be noted that the goal of logistics is to find a logistical process management strategy that minimizes global costs by maintaining a certain level of customer service. The theory of logistics costs and the problem of their minimization is the primary task of logistics managers in the process of planning and organizing logistics supply chains, both in the company as a whole and in all phases of that company's business operation.

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