

## LOGISTICS INNOVATIONS IN A SERVICE ENTERPRISE

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**Abstract** This article attempts to analyze and evaluate the influence of logistics innovations on the results of contemporary service enterprises. The first part of the article characterizes logistics processes and logistics innovations in a service enterprise. The second part presents methodology of the research. The author presented selected aspects of management of logistics processes in the surveyed small, medium and large enterprises providing a variety of services. An attempt to assess the influence of logistics innovations on the results of the surveyed service enterprises has been undertaken. The article is based on the study of scientific literature and own empirical research.

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## 1. INTRODUCTION

Processes having a character of economic technological, political, social and demographic changes, occurring in the environment, determine conditions and a way of enterprise functioning. In order to meet global, intensifying competition, contemporary enterprises have to produce goods and services of a higher quality, deliver them to a greater distance, quickly react to changing market conditions and reduce costs while respecting principles of sustainable development. One of the ways to respond to these changes and challenges is to implement innovations, through managers, constituting an opportunity to improve flexibility, and use every possible opportunity to improve efficiency and create and maintain a competitive advantage of the enterprise. The article attempts to analyze and evaluate the influence of logistics innovations on the results of contemporary service enterprises. It is based on the study of scientific literature and own empirical research.

## 2. AREAS OF LOGISTICS INNOVATIONS IN A SERVICE ENTERPRISE

The object of economic activity of a service enterprise is the provision of a service or products related to services and their exchange with the environment. The great diversification of the service sector causes difficulties in defining it. Many different definitions of services exist in literature (Biesok, 2013, pp. 10-12; Rudawska, 2009, pp. 11-13). Services constitute a separate activity that does not bring a tangible effect. The most frequently mentioned characteristics of services are: intangibility, simultaneity of processes of production and consumption, heterogeneity, impermanence and inability to own them (Panasiuk & Tokarz, 2012, pp. 42-43; Rydzkowski, 2009, pp. 213-214; Gilmore, 2006, pp. 17-18). A service has began to be seen as a logistics product, that is, a set of wishes and expectations of a customer in relation to goods and services of a particular form and quality that can be met in accordance with those requirements only through the use of a logistics system (Gołemska, 2012, p. 31).

Innovations include products, processes and methods that an enterprise has developed as the first one and also those that have been absorbed from other companies or entities (Knosala, Boratyńska-Sala, Jurczyk-Bunkowska & Moczala, 2014, p. 20). The article focuses on logistics innovations in a service enterprise. The author assumed that a logistics innovation is an improvement, new value from the point of view of a customer, which is reflected in the market value and relates to the flow of goods, services and associated with them information in the scale of the enterprise and between managing entities.

An innovation in logistics is most often associated with the use of new information technologies, streamlining processes, increasing employee engagement and employee management (Brdulak, 2010, p. 89). Contemporary managing entities

are implementing more and more competitive and flexible logistics processes (Yahya, Bae & Bae, 2013, p. 47; Grawe, 2009, pp. 360-377). Nowadays, innovation management in logistics belongs to the key processes in an enterprise.

A logistics system of a service enterprise can be defined as the integrated on the basis of information streams of all organizational and functional elements of the enterprise together with relationships between them and relations that take part in physical flows of materials and services. The purpose of the logistics system is to provide a service desired by customers at minimum cost. The logistics system in every enterprise is built differently, in a creative and innovative way, frequently without possibility of imitation. Logistics innovations can bring an enterprise the best results if the innovation process is run in the following order:

- perception of the need for a change in the logistics system,
- analysis and evaluation of current logistics processes,
- development of new possible solutions,
- analysis of new possible variants of logistics processes from the point of view of efficiency and effectiveness,
- selection of the most beneficial variant of the logistics system,
- implementation of new solutions in the logistics system,
- verification of the efficiency of logistics innovations.

Implementation of logistics innovations in a service enterprise requires a strategic approach for creating activities and logistics solutions. Logistics management is a logical sequence of decisions and actions which makes up the process of creating and shaping the strategic concept of logistics in an enterprise and in its market partners and implementation of this concept in properly shaped organizational structures by the usage of appropriate management and control instruments (Gałowska, 2011, pp. 251-265). Logistics management of a service constitutes the basis of all logistics innovations that affect effectiveness of the activity and gain a competitive advantage and development of a service enterprise.

Logistics management in a service enterprise requires an integrated approach, at the root of which lie (Kisperska-Moroń, Płaczek & Piniecki, 2003, p. 154): new forms of organizational integration, improvement of information systems, assurance of the adequate level of logistics qualifications of employees and improvement of principles of over organizational management in the supply chain to ensure the integration of the logistics chain.

Procurement logistics uses existing procurement opportunities organizing flows of goods and information to ensure minimizing costs of the procurement process, overcome technical and organizational barriers associated with transport services and achieve high confidence and regularity of supplying the enterprise in materials of a sufficient quality. Creation of a competitive advantage of the enterprise requires closer cooperation with suppliers. Logistics innovations in the area of procurement relate to improvement of processes of the flow of materials and information from suppliers to the enterprise and may contribute to shortening time of the procurement process, reduction in purchasing costs, building confidence, im-

provement of quality of customer service and quality of service. Logistics innovations in the procurement process have an influence on the increase in sales of services of a given enterprise and its market share, which in turn translates into generating cash flow balance and, therefore, into created new value.

Logistics in a service enterprise not only deals with management of processes of the flow of materials and information, but it also concerns management of the potential of a service company (Cichosz, 2010, p. 134). Coordinating activities in the sphere of services are more important than in manufacturing companies because in a service enterprise these activities are performed during the service realization. Bad functioning of the logistics system in a service company causes excessive waiting time for a customer and lost sale. Improvement of logistics processes contributes to shortening time of the service realization. Time aspects of providing services are inextricably connected with a size of production capacity of a service company. Too small production capacity causes delays associated with poor quality of services. On the other hand, surplus production capacity increases costs. The most important element of coordination processes in the sphere of services is an ability to properly manage the production capacity. A service enterprise must possess such equipment and people with such skills that enable fast and flexible change of a type of work. Nowadays, companies providing services are looking for new opportunities to distribute services, change the way of functioning channels used so far through extending the availability of services, increasing convenience of provision of a service or change the nature of services provided (Kisperska-Moroń, 2011, pp. 64-65; Zenka-Podlaszewska, 2012, pp. 234-235).

The aim of logistics process management is to increase customer satisfaction. Logistics customer service is a skill or ability to efficiently and effectively meet requirements and expectations of a customer, mainly those related to time and place of delivery of ordered products, with the use of all available forms of logistics activities, including transport, warehousing, inventory management, information, packaging etc. (Kempny, 2001, p. 15). Logistics making services available for a customer enables to offer him or her additional benefits. Logistics innovations in customer service of a service enterprise should primarily concern: preparation of the enterprise for the service, improvement of communication with a customer, shortening time of a service, realization of a service on time, payment service and acceptance of possible complaints.

Continuously increasing value for a customer becomes a key factor necessary to achieve a competitive advantage (Bailom, Matzler & Tschemernjak, 2009, pp. 45-218). To meet wishes and expectations of clients, a service enterprise should adopt full orientation to customer's needs and include the customer in processes of creation of new customized value of a service (da Mota Pedrosa, Blazevic & Jasmand, 2015, pp. 313-332; Krishnan & Prahaland, 2008, p. 8). It is a basis for creating and implementing logistics innovations in a service company. Added value for a customer of a service enterprise is value provided by a certain service

to the customer and seen as such from his or her point of view. It is the result of actions of all enterprises involved in providing the service to a customer.

Decisions in the area of logistics processes of an enterprise are becoming more and more complicated. Logistics managers supervise the flow of materials and information within the enterprise, supply chains or supply networks (Mellat-Parast, & Spillan, 2014, pp. 289-314; Ciesielski, 2011, pp. 40-48). The competition is won by those companies that efficiently and effectively manage the flow of goods, services and associated with them information in the scale of an enterprise and the whole market system. The key to create and implement logistics innovations lies in communication, collaboration within an organization and with business partners.

Enterprises can closely work with other companies participating in the process of service delivery to a customer within supply chains. Partnership is assumed as the key factor for creation and development of a supply chain, which should be understood as the formation of economic relations between the links on the basis of trust and sharing the risk and benefits, leading to additional synergistic effects and competitive advantage (Witkowski, 2010, p. 41); (Rakovska, 2011, pp. 93-104); (Winkler, Kuss, Wurzer, 2013, pp. 265-278). The service supply chain is formed by suppliers, service providers, customers and other partners of services in order to transform resources into services or products related to services. The particular importance for functioning of the service supply chain has the participation of the client-recipient in the design of a service, especially the innovative one (Lin, Shi Zhou, 2010, pp. 1189-1204).

Contemporary companies also compete within the supply networks establishing loose forms of cooperation with other related entities in the supplier-recipient relation in order to generate additional value. Enterprise networks are based on trust between partners and the rule of reciprocity. Network members share their resources (preserving individual rights of ownership) and together implement investments (e.g. implementation of logistics innovations), which can increase competitiveness of both individual entities and the entire network (Fuks & Kawa, 2013, p. 26). The absorption of knowledge, its efficient use and learning in innovation processes have become a competitive advantage for all partners of the network (Dolińska, 2012, p. 18).

Information initiates the flow of goods, influences efficiency of their flow and enables their analysis. The basic elements of an information system include: equipment (hardware), software, databases, telecommunications, people and an organization (Zajac, 2011, p. 16). An appropriate system of information is a prerequisite for obtaining high efficiency, effectiveness and innovation of logistics processes. Supporting the process of management in service enterprises takes place primarily through the use of modern methods of data collection and processing and complex communication systems. Implementation of innovations in processes of the flow of information in a service enterprise allows for shaping the unique features of a service, appropriate reacting to customer needs, lowering the level of uncertainty in logistics processes, effectively solving current logistics problems

and identifying areas requiring correcting actions. Investments in an effective information system enables to take actions which effects increase operational efficiency, allow for a steady growth in revenue, increase market share and achieve an advantage over competitive companies.

### **3. RESEARCH METHODOLOGY**

The results of the empirical studies presented in this article come from a more extensive pilot studies conducted by a direct interview concerning management of logistics processes in service enterprises. The research material was collected in 2015. A survey questionnaire was used to carry out the research. The research concerned management of logistics processes in service enterprises in 2012-2014. The study was conducted among 50 small, medium and large service enterprises in the north-eastern region of Poland, characterized by a diversified competitive position in the market. Small enterprises constituted 48,0% of the surveyed enterprises. The author surveyed 19 medium enterprises (38,0%). Large enterprises constituted the smallest percentage of the sample (14,0%).

The examined enterprises ran very diverse service activities: maintenance and repair services (14,0%), transport services (14,0%), financial services (8,0%), administration and support services (8,0%), health care services (6,0%), accommodation services (6,0%), telecommunications services (6,0%), educational services (6,0%), other personal services (6,0% ), utility services (6,0%), sports, entertainment and recreation services (4,0%), property security services (4,0%), catering services (4,0%), software, IT consultancy and other related services (4,0%), motor vehicle services (4,0%). The surveyed enterprises generated the vast majority of their revenues on the local market. Nine surveyed enterprises (18,0%) made a small part of a profit on the European market.

The results of the research presented in the article concern certain aspects of logistics innovations in the surveyed enterprises in 2012-2014.

### **4. LOGISTICS INNOVATIONS IN THE SURVEYED ENTERPRISES - SELECTED ASPECTS**

Logistics objectives determine the course of actions undertaken as part of the logistics system of an enterprise. The vast majority of the surveyed enterprises (82,0%) in 2012-2014 had clearly defined logistics objectives in the areas of procurement and distribution. These enterprise took deliberate actions related to transformation of resources in the area of logistics system processes, being at the disposal of the enterprise, and their exchange with the environment, which resulted

in creation of value for a customer. Most respondents indicated that in the surveyed period, logistics objectives had been identified in the operational plans (68,0%). Only 22,0% of the surveyed enterprises had identified ways of achieving logistics objectives in the strategic plans. Seven enterprises with formulated logistics objectives did not formally specify ways to achieve them. Taking into account logistics objectives in the strategic plans allows senior management for a systemic, consistent pursuit of their realization, foreseeing problems before they arise and preparing means and ways to overcome them. In the examined population, an entrepreneurial approach dominated, aimed at active usage of the occasion.

Logistics objectives of an enterprise should be supported by an appropriate strategy. In 2012-2014, the vast majority of the surveyed companies (62,0%) did not have a formed logistics strategy, making it difficult to reach the set logistics objectives. Nine surveyed enterprises (18,0%) did not have a formed global logistics strategy, but had developed partial strategies concerning procurement and distribution. 12,0% of the examined population carried out a strategy of supply chain management. A mixed strategy, being a composition of two or three principles of logistics, indicated in the questionnaire, had been implemented by 8,0% of the surveyed companies. It should be emphasized that the all surveyed large enterprises had a formed logistics strategy. Five out of seven surveyed large enterprises used a supply chain management strategy.

Respondents were asked to determine the importance of logistics in activities of the surveyed enterprises in 2012-2014. Most participants of the study indicated that activities and logistics solutions had a significant influence on: quality of services of the enterprises (60,0%), reduction in operating costs (56,0%), achievement of a competitive advantage (52,0%), improvement of liquidity (48,0%), increase in operating income (42,0%) and reduction in transport costs (42,0%). Analysis of the results of the research allowed for formulating a conclusion that in 2012-2014, in the surveyed enterprises, actions and logistics solutions primarily constituted an instrument to implement economic objectives of the surveyed enterprises. Logistics significantly affected the achievement of a competitive advantage of most of the surveyed enterprises.

Innovations in logistics introduced in the surveyed enterprises in 2012-2014 were the subject of the analysis. 26 out of 50 surveyed enterprises (52,0%) introduced innovations in logistics in the examined period. Most enterprises that did not introduce logistics innovations were the small businesses (17 out of 24 surveyed small enterprises). The vast majority of the surveyed enterprises that introduced logistics innovations in 2012-2014 were companies adapting logistics innovations (80,8%). The most common logistics innovations introduced in the surveyed enterprises were innovations aimed at improving the organization of work (76,9% of the enterprises that introduced logistics innovations). The vast majority of logistics organizational innovations in the surveyed enterprises concerned closer cooperation with suppliers and recipients. Logistics organizational innovations support innovations in the area of processes and services. Respondents indicated the fol-

lowing effects of logistics innovations in the area of improving the organization of work in the surveyed enterprises: improvement of the communication system within the enterprise and with customers and suppliers, increase in efficiency of organization's functioning, increase in productivity and quality of work. These innovations indirectly affected costs and had a big influence on the growth of customer satisfaction.

In 2012-2014, the surveyed enterprises introduced innovations in logistics processes. Analysis of the research results gave a basis for concluding that the surveyed companies improved and developed logistics processes in order to achieve the following effects: improvement of customer service (61,5% of the enterprises that introduced logistics innovations), cost advantage (50,0%), advantage resulting from confidence and sense of security of customers (38,5%), time advantage (34,6%), quality advantage (30,8%), reliability advantage (30,8%), flexibility advantage (26,9%) and reduction in the engaged capital (7,7%). Respondents emphasized that the introduced innovations in logistics processes contributed to implementation of objectives of introducing these innovations. The surveyed companies also introduced the following logistics innovations in the analyzed period: implementation of information technology (26,9% of the enterprises that introduced logistics innovations), taking advantage of new distribution channels (15,4%) and introduction of new services that better meet the identified needs of customers (7,7 %).

The sources of logistics innovations introduced in the surveyed enterprises in 2012-2014 were the subject of the analysis. The most often sources of innovation in logistics of the surveyed enterprises indicated by the respondents were: ideas of employees and company's own resources (73,1% of the enterprises that introduced logistics innovations), customers (57,7%) and monitoring the competitive services on the market (53,8%). The next sources of logistics innovation indicated by the participants were: suppliers (26,9% of the enterprises that introduced logistics innovations), help of consultants and external advisors (19,2%), cooperation with a scientific research institution (11,5%), reaction to an unexpected event in the environment (11,5%) and reaction to an unexpected event in the enterprise (3,8%). In all enterprises implementing the strategy of supply chain management in the examined period logistics innovations were introduced. Cooperation of the surveyed enterprises with companies being the links of the supply chain significantly contributed to creation and use of knowledge of the logistics processes to generate (adapt) innovations in the logistics of the surveyed companies.

Respondents were asked to indicate barriers of innovation in logistics of the surveyed enterprises in 2012-2014. Analysis of the results allowed for concluding that high costs limited the ability of most of the surveyed enterprises to generate (adapt) innovations (56,0%). The research shows that the second, most frequently indicated factor reducing the ability of the surveyed enterprises to create (adapt) innovations were innovative competencies of employees and lack of adequate experience of managers in shaping business processes (40,0%). Later, respondents indicated the following barriers of logistics innovations in the surveyed enterprises:

lack of funds (32,0%), uncertain demand (26,0%), attitude of employees (16,0%), legislation (14,0%), frequent changes of objectives, unreasonable interruptions in implementation of innovative projects (14,0%), lack of external cooperation (12,0%) and insufficient independence of innovators' activities (10,0%).

## 5. CONCLUSION

Most of the surveyed enterprises introduced logistics innovations in the analyzed period. On the other hand however, almost half of the surveyed enterprises did not introduce logistics innovations being an opportunity to improve performance of the enterprise. The vast majority of the surveyed enterprises that introduced logistics innovations were companies adapting innovations. In the surveyed small enterprises innovative activities were significantly lower than in the other enterprises. Almost all large enterprises introduced logistics innovations in the analyzed period. Customers are becoming more and more demanding and expect a higher quality of services. An enterprise that does not introduce logistics innovations must take into account the loss of its competitive position. Logistics innovations allow enterprises to adapt the company to wishes and expectations of customers, shape customer expectations and respond to changing requirements, experience and customer behaviour.

In a few of the surveyed enterprises lack of tendency to generate innovations made the introduction of logistics innovations impossible. The vast majority of the respondents from the surveyed enterprises in which logistics innovations were not implemented, indicated that in the enterprise exist areas of activity requiring logistics improvements, but the enterprise does not have sufficient capacity to generate (adapt) innovations. In conditions of globalization, growing requirements of customers, large fluctuations in demand, persistent uncertainty, pressure to reduce costs and increasing competition, the surveyed enterprises were making improvements in the area of logistics at the lowest costs that do not risk transitional losses or a temporary decrease in revenues. Most of the surveyed enterprises were making improvements in the area of logistics depending on economic conditions and customer requirements. The surveyed enterprises tried to increase customer satisfaction, attempting, at the same time, to minimize costs.

The conducted research confirmed that logistics plays an important role in management of a contemporary service enterprise, and logistics processes should be a subject of changes adequate to market conditions. The enterprises were increasing the ability to create (adapt) logistics innovations through collaboration with companies being links of the supply chain and with customers. Logistics innovations in a service enterprise contribute to the improvement of customer service and quality of services, improvement of communication within the enterprise and with customers and suppliers, improvement of liquidity, increase in resource productivity, increase

in enterprise flexibility, creating unique value of a service, reduction in logistics costs, increase in sales revenue and, consequently, increase in enterprise value. Logistics is this area in which service enterprises should implement innovations.

## REFERENCES

- Bailom F., Matzler K. & Tschernernjak D., (2009), *Jak utrwalić sukces. Co wyróżnia najlepsze przedsiębiorstwa*, Wolters Kluwer business, Kraków.
- Biesok G., (2013), „Usługi”, G. Biesok (Ed.), *Logistyka usług*, CeDeWu, Warszawa, pp. 9-35.
- Brdulak H., (2010), „Innowacyjność w usługach logistycznych”, T. Janiak, J. Ogrodowczyk (Eds.), *Logistyka wobec nowych wyzwań*, ILiM, Poznań, pp. 87-95.
- Cichosz M., (2010), *Lojalność klienta a logistyka firm usługowych*, Szkoła Główna Handlowa w Warszawie, Warszawa.
- Ciesielski M., (2011), „Logistyka na tle problemów nauk o zarządzaniu”, J. Witkowski, A. Baraniecka (Eds.), *Strategie i logistyka w sektorze usług. Logistyka w nietypowych zastosowaniach*, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław, pp. 40-48.
- da Mota Pedrosa A., Blazevic V. & Jasmand C., (2015), *Logistics innovation development: a micro-level perspective*, *International Journal of Physical Distribution & Logistics Management*, Vol. 45, No. 4, pp. 313-332.
- Dolińska M., (2012), „Rozwój przedsiębiorstw innowacyjnych na rynku międzynarodowym”, *Przegląd Organizacji*, No. 5, pp. 18-20.
- Fuks K. & Kawa A., (2013), „Sieci w nauce i gospodarce”, M. Ciesielski (Ed.), *Sieci w gospodarce*, Polskie Wydawnictwo Ekonomiczne, Warszawa, pp. 13-27.
- Gąsowska M. K., (2011), *Zarządzanie logistyczne jako przełom w zarządzaniu przedsiębiorstwem*, R. Borowiecki, L. Kiełtyka (Eds.), *Przełomy w zarządzaniu. Zarządzanie procesowe*, TNOiK „Dom Organizatora”, Toruń, pp. 251-267.
- Gilmore A., (2006), *Usługi. Marketing i zarządzanie*, PWE, Warszawa.
- Gołębska E., (2012), *Istota, cel i zakres logistyki*, E. Gołębska (Ed.), *Logistyka*, C. H. Beck, Warszawa, pp. 11-42.
- Grawe S. J., (2009), „Logistics innovation: a literature - based conceptual framework”, *International Journal of Logistics Management*, Vol. 20, No. 3, pp. 360-377.
- Kempny D., (2001), *Logistyczna obsługa klienta*, PWE, Warszawa.
- Kisperska-Moroń D., (2011), „Czynnik ludzki jako element jakości zarządzania logistycznego w firmach usługowych”, J. Witkowski, A. Baraniecka (Ed.), *Strategie i logistyka w sektorze usług. Logistyka w nietypowych zastosowaniach*, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław, pp. 60-72.
- Kisperska-Moroń D. & Płaczek E., Piniński R., (2003), *Zarządzanie logistyczne w firmach usługowych*, Wydawnictwo Akademii Ekonomicznej w Katowicach, Katowice.
- Knosala D. & Boratyńska-Sala A., Jurczyk-Bunkowska M., Moczala A., (2014), *Zarządzanie innowacjami*, PWE, Warszawa.
- Krishnan M. S. & Prahalad C. K., (2008), *The new age of innovation: driving cocreated value through global networks*, McGraw-Hill, New York.
- Lin Y., Shi Y. & Zhou L., (2010), „Service supply chain: nature, evolution, and operational implications”, G. Q. Huang, K. L. Mak, P. G. Maropoulos (Eds.), *Advances in Intelligent and Soft Computing*, Vol. 66, Springer-Verlag, Berlin/Heidelberg, pp.1189-1204.

- Mellat-Parast M. & Spillan J. E., (2014), „Logistics and supply chain process integration as a source of competitive advantage”, *International Journal of Logistics Management*, Vol. 25, No. 2, pp. 289-314.
- Panasiuk A. & Tokarz A., (2012), „Specyfika i klasyfikacja usług”, S. Flejterski, A. Panasiuk, J. Perenc, G. Rosa (Ed.), *Współczesna ekonomika usług*, Wydawnictwo Naukowe PWN, Warszawa, pp. 41-58.
- Rakovska M., (2011), Characteristics of supply chain management in Bulgaria, *Research in Logistics & Production*, No. 2, pp. 93-104.
- Rudawska I., (2009), Usługi w ujęciu teoretycznym, I. Rudawska (Ed.), *Usługi w gospodarce rynkowej*, PWE, Warszawa, pp. 11-33.
- Rydzkowski W., (2009), „Usługi logistyczne”, D. Kisperska-Moroń, S. Krzyżaniak (Ed.), *Logistyka, ILiM*, Poznań.
- Winkler H., Kuss C. & Wurzer T., (2013), „Investigating the relevance of supply chain improvement systems (SCIS)”, *Research in Logistics & Production*, Vol. 3, No. 4, pp. 265-278.
- Witkowski J., (2010), *Zarządzanie łańcuchem dostaw. Koncepcje. Procedury. Doświadczenia*, PWE, Warszawa.
- Yahya B. N., Bae H., Bae J., (2013), „Structural and semantic approach to similarity measurement of logistics processes”, *International Journal of Industrial Engineering*, No. 1-2, pp. 47-59.
- Zajac P., (2011), *Systemy informatyczne i telematyczne w logistyce*, S. Krawczyk (Ed.), *Logistyka. Teoria i praktyka. Tom 2*, Difin, Warszawa, pp. 15-144.
- Zenka-Podlaszewska D., (2012), *Usługa jako produkt logistyczny*, E. Gołemska (Ed.), *Logistyka*, C. H. Beck, Warszawa, pp. 228-261.

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