

SUPPLY CHAIN OPTIMISATION AND COMPETITIVENESS OF AN ENTERPRISE – RESULTS OF THE STUDY

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Abstract The main objective of the study is to characterise the influence of key aspects associated with supply chain management on building a competitive advantage by enterprises operating in Lodz region. The study presents the influence of *Supply Chain Management* (SCM) on the supply chain optimisation process for all links of the chain. The paper also introduces reasoning and presents results of an empirical research referring directly to the influence of supply chain optimisation in enterprises on the dimension of their market competitiveness.

Paper type: Research Paper

Published online: 30 April 2016

Vol. 6, No. 2, pp. 177-189

DOI: 10.21008/j.2083-4950.2016.6.2.7

ISSN 2083-4942 (Print)

ISSN 2083-4950 (Online)

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Keywords: *Management, supply chain, competitive advantage, optimisation*

1. INTRODUCTION

In the era of omnipresent globalisation, the image of logistics altered. It is visible that not only financial connections but international cooperation of various economic entities expand. Entrepreneurs have to face the problem of building very complex logistic chains. In such conditions optimization of a supply chain becomes one of the most vital options to consider on the way to achieving a competitive advantage. Subject literature devoted to specific optimization concepts, strategies, tools and methods is fairly rich, although certain deficiency can be observed in the area of publications representing a holistic approach to the influence of optimization on competitiveness of enterprises. At present it is the dimension of competitiveness that decides about an enterprise's 'to be or not to be' on the market. The above approach results from the fact that currently the most important task for enterprises is to retain the clients they have won so far – the companies' most precious resource. In relation to the change of competition paradigm enterprises are forced to search for new ways of competing, based first of all on professionalization of actions in the whole supply chain. Thus, achieving an enterprise's growth and competitive advantage is possible under the condition of introducing an appropriate strategy oriented towards long-term relations with clients, based of trust. Still performing the above is not that simple, because a complex supply chain is threatened by various factors that can affect its effectiveness. Optimisation of supply chains is particularly significant in case of international companies. When acting to improve the flow of products, financial resources or information, a probability of a threat occurring to contribute to delays or losses has to be taken into consideration. Additionally it has to be remembered that currently most enterprises, when choosing their strategy for acting, use two basic elements of optimization: cost minimizing and time saving. Thereby, the optimum resource management in supply chain becomes the key element that can improve the organisation's functioning on the market.

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2. SCM AS A METHOD OF CREATING A COMPETITIVE ADVANTAGE IN A SUPPLY CHAIN

Progressing globalisation became possible not only thanks to immediate information circulation via Internet but also thanks to modern Logistics. Already a long time ago a large part of modern-managed enterprises gave up the concept of mass production in favour of a complex adjustment of their products to growing demands of consumers. The increasing competition forced enterprises to search for new possibilities of supply chains optimization through extending the chains and creating complex logistic networks. Such activities motivate the enterprises involved in a net of business connections to search for and apply modern methods and techniques of supply chain management for the purpose of increasing competitiveness of all the links. The entities operating on local markets face new threats resulting from change of client–supplier relation towards loyalty of business partners as well as of consumers themselves. As a result of products’ diversification, costs of changes lower, thanks to which frequent making of choices performed between economic entities becomes faster and easier. The consequences of struggling for a client include continuous pressure on extending the range of assortment, offering better extra services, more flexible adjustment to terms, as well as offering competitive prices. Still it has to be remembered that between the links of supply chain, besides physical flow of goods, a great role is played by flow of information. In spite of the fact that information is still perceived in the context of a strategic resource, it is more and more often discussed as needing to be treated by supply chain links as a shared resource. The above has influence not only on improving functional effectiveness of a supply chain but also on the increase of its competitiveness. It requires not only cooperation but also applying modern information and logistic solutions to coordinate all the processes taking place along the whole supply chain. Comprehensive systems facilitating optimisation of a supply chain include SCM (Supply Chain Management).

The task of a Supply Chain Management system is to coordinate and integrate activities of all supply chain participants. The system offers comprehensive methods of management, as well as information solutions for optimisation of decision processes in enterprise. The effectiveness of logistic factors in all links increases thanks to the above. SCM as an internal information system is used for optimum management of activities associated with production, supply and distribution – while externally – as a logistic system integrating suppliers and clients with an enterprise (Januszewski, 2008, p. 288). The baseline SCM system provides scheduling of materials and prefabricates streams at any stage of flow from the moment of acquiring them until supplying of the product to the final client. Moreover, the tasks of the system include: demand/supply control, shared information management, supply planning, stock monitoring, as well as coordi-

nation of activities for more effective creating of new products. Additional elements of SCM activities include multilevel integration of the elements of complex functioning of an organisation (Długosz, 2009, p. 68), i.e.:

- consolidation of various systems used in enterprise – which enables integration of data with transaction systems,
- integration between cooperative enterprises – possible thanks to use of Internet for partner communication,
- multifunctional consolidation – enabling integration and increasing effectiveness of the key functions in enterprise on the level of planning and realisation of current tasks.

Enterprises in a supply chain, thanks to application of SCM, have the possibility to integrate their activities and processes in such a way that they can function as one economic entity. Functional integration of supply chain enables optimisation of time, cost and stock of enterprise, as well as it influences improvement of effectiveness of activities taken. Adopting the solutions proposed within SCM results in quality improvement, increase of profits and better client service.

In the previous decade, when SCM systems were characterised by significant hermeticity, effective data exchange between information systems of business collaborators was the most serious problem. Currently, in the era of progressing informatization, information exchange in the real time is much easier. Therefore the main objective of modern SCM solutions is to assure safe information flow for the purpose of taking optimum business decisions, which became possible thanks to improving the system functionality – the system became more comprehensive. The system evolution led the system towards more efficiency and more benefits. The main benefits include (Blaik, 2010, p. 284):

- reduction of the level of stock even down to 60%,
- increase of forecasting accuracy and correctness to around 80%,
- better integration with the systems existing within enterprise,
- easier integration of business partners' information systems,
- reduction of times needed for physical, information and financial flows in supply chain,
- flexible reacting to communicated demand,
- improved supply timeliness,
- increasing the level of client satisfaction,
- possibility of directions planning and optimisation of supply sources,
- simultaneous planning of material demand and production capacity,
- increasing profitability up to 30% thanks to optimisation of the whole supply chain,
- increasing turnover and market share,
- more transparency in mutual relations,
- easier identification of chances and threats in supply chain functioning.

Numerous benefits associated with SCM systems implementation awaken the hopes expressed by the boards of many enterprises to rapidly achieve competitive advantage. Yet implementation of the system is still associated with numerous barriers, not only the cost-related ones. The main obstacles include: political-legal factors, drop of managing staff engagement, fear of exchanging key information, incompatibility of information systems of cooperators, different organizational cultures in supply chain links paired with globalization (Murphy & Wood, 2011, p. 133). Overcoming the barriers will enable effective implementation of SCM and at the same time optimisation of the whole supply chain in all enterprises establishing networks of connections.

Table 1 SCM system and ERP system – comparison Source: the author's own study based on: (Tarn, Yen, Beaumont, 2002, p. 30)

Indicator	SCM	ERP
Task of the system	Integration and optimisation of internal business processes in a single organisation, as well as coordination of the organisation interaction with its partners in the whole supply chain	Integration and optimisation of internal business processes within a single organisation
Influence	Optimisation of information flow, physical flow of materials and financial resources in the whole supply chain	Optimisation of information flow and physical flows of materials within a single organisation
Objective of the system	Unlimited tool enabling generating business plans without a necessity to consider accessibility of key resources	Limited tool enabling rational and feasible business plans basing on the accessibility of required key resources
Functions	Managing production, stock, logistics, and supply chain planning	Managing production, finances and human resources
Implementation process	Stress on planning and realisation of supply chain	Stress on configuration and coordination of system components

Yet SCM systems alone have no capability to comprehensibly manage all resources of an enterprise. In order to function efficiently they need a basis that will integrate supply chain management with other divisions of the enterprise activity. ERP systems (Enterprise Resource Planning) undoubtedly provide such a basis. ERP design and implementation is usually limited to an individual enterprise. It should be remembered that although the systems greatly improve effectiveness of business operations in a single link, they are not able to manage data, information and processes in the whole supply chain. However this does not

mean that in the current reality ERP systems are no longer valid, quite the opposite, they constitute a reliable and stable basis for SCM class systems. What is more, the enterprises that did apply ERP should not consider SCM implementation instead, because it performs complementary functions to the ones offered by ERP. A possibility of supply chain optimization with the use of SCM depends on having appropriate data, the collecting and processing of which is to a large extent facilitated by ERP. The ERP system integrates information within a single application, and SCM applications use it to update current database in real time (Ciesielski, 2006, p. 150).

Differently to ERP, SCM systems do not accumulate information in databases, but they use ready data models available on servers. Thanks to the above, CSM software has the capacity enabling processing a huge number of complex transactions in the real time. Thanks to connecting both the system platforms, information management in supply chain becomes cheaper and more effective (Ciesielski, 2009, p. 118). A detailed comparison analysis of the systems is presented in Table 1.

The urge to increase effectiveness in information management, as well as the need to coordinate activities of all links in the supply chain put SCM and ERP in the position of a factor crucial for achieving enterprise competitiveness. This fact is proven by high level of complementarity of the two systems, thanks to which enterprises do not face the need to build an information infrastructure from the scratch, but they can complement it with solutions of the SCM system. Better results in supply chain optimisation are thus obtained subsequently with lower functioning costs.

3. SUPPLY CHAIN OPTIMISATION AND ENTERPRISE COMPETITIVENESS – RESEARCH RESULTS

Current market situation forces enterprises to implement and apply in practice new solutions, particularly in the area of supply chain. This is first of all because of high level of client variability in terms of their requirements and expectations as regards the products they purchase. In order to stand up to the market demands most enterprises concentrate on tasks aimed at highlighting the role of individual approach to marketing-logistic actions oriented towards proper relations with clients (Raman, Wittmann & Rausedo, 2006, pp. 39-53). Optimisation of all activities related to the flow of resources in the whole supply chain, i.e. efficient and effective management of particular links, is the starting point for such an approach. Only such actions in consequence lead to creating a scale effect and offering above average benefits to the final recipient. Therefore it seemed justified to present selected results of the research carried out among enterprises operating in logistics branch in the Lodz region. The main objective of the research was to try and

determine the key elements of supply chain management that, when optimised, will contribute to building competitive advantage of the enterprises. The main stress was put on identification of the main methods and tools to be used for optimisation of supply chain as well as the elements of the chain influencing competitiveness of the whole organisation. The selection of the sample for the research was deliberate. The research included 93 enterprises using optimisation methods in supply chain management. The research involved a questionnaire technique with survey as the research tool. It was carried out among private enterprises (small, medium-size and large) operating in service, trade and production, and it took into account the source of their capital and the length of their functioning on market. The survey was carried out at the turn of October and November 2014 with the use of direct interviews conducted by trained pollsters.

The structure of the sample represents a cross-section of enterprise characteristics (length of functioning on the market, origin of capital, character of activity and the number of employees) is presented in Table 2.

Table 1 Structure of a sample in the cross-section of the studied characteristics of enterprises; Source: the author's own study based on research

length of functioning on the market¹		Enterprise capital	
less than 5 years	18%	foreign	29%
5 - 8 years	17%	Polish	49%
more than 8 years	65%	mixed	22%
Character of enterprise activity		Number of employees	
trade	42%	less than 50	39%
service	33%	50-250	24%
production	25%	more than 250	37%

¹ Due to assymmetrical distribution of enterprises, from the perspective of this variable division into two categories was applied in further analyses: functioning time up to 8 years and over 8 years.

At present building a competitiveness of an enterprise basing on new products or on market segmentation is hardly effective. What currently matters is the possibility of fast and flexible adjustment to the needs communicated by clients and ability to implement innovations optimizing activities in the streams of goods flow, which leads to the situation in which modern enterprises can create new competitive advantage basing on new technologies supporting effective supply chain management (compare with Fig. 1).

The respondents most often chose the following software facilitating optimisation of activities in supply chain: EDI system (almost all respondents pointed to this option) and DBMS (Database Management System) – over 70%. The tendency prevailed among enterprises having existed for over 8 years on market, with foreign capital, regardless of activity type. It should be noticed that over 40% of the studied enterprises declared the use of SCM and CRM systems,

which are among the comprehensive solutions offered by modern technologies leading to optimization of supply chain. However the same companies declared that they hardly use the following concepts: EFT (only 10% of the respondents gave such answer) and Flow Logistic (a bit more than 11% indicated that answer). Numerous modules that comprise SCM and CRM systems on one hand enable optimisation of flow of goods in all links of supply chain and on the other hand facilitate professional management of relations with clients. The research results indicate certain relationships as regards a profile of the studied entities activity. And so trade and service companies concentrate predominantly on well-developed and effectively functioning CRM. Production enterprises also highly value efficient CRM, yet they put more stress on SRM and ECR concept. Such responses were given first of all by production companies with foreign capital regardless of the length of their functioning on market.

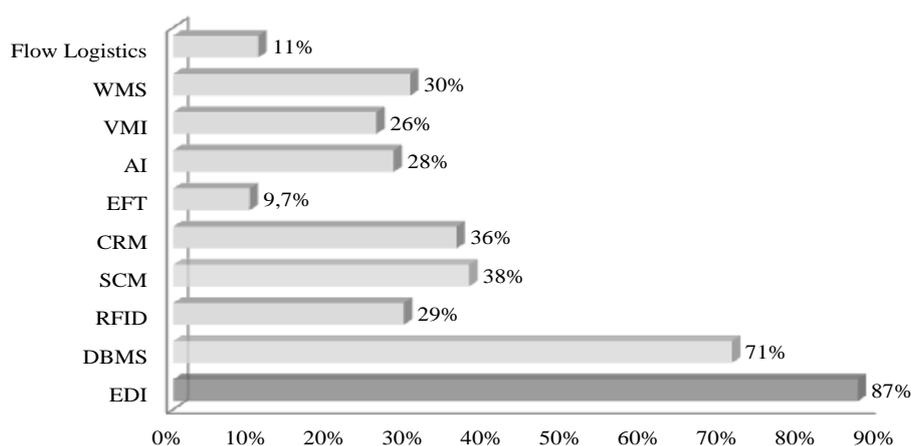


Fig. 1 Modern supply chain optimising methods; Source: the author's own study based on research

Today effective use of methods and tools in the process of supply chain optimisation should be based on partner relations. As stated by J. Witkowski: partnership is said to be the basic condition for supply chain creating and developing, which should be understood as shaping economic relations between its links based upon the rules of partnership, share of risk and benefits, leading to achieving additional synergic effect and competitive advantage (Witkowski, 2010, p. 41). Abiding by the rules of mutual benefits in the cooperation process enables achieving a synergic effect by the enterprises involved. This effect involves additional benefits that would not have turned up if the participants had taken their actions separately. The most important task of the cooperating links in supply chain is said to be achieving high effectiveness of particular enterprises and of their

network as a whole, as a result of coordination and integration of all activities in the supply chain area (compare with Fig. 2).

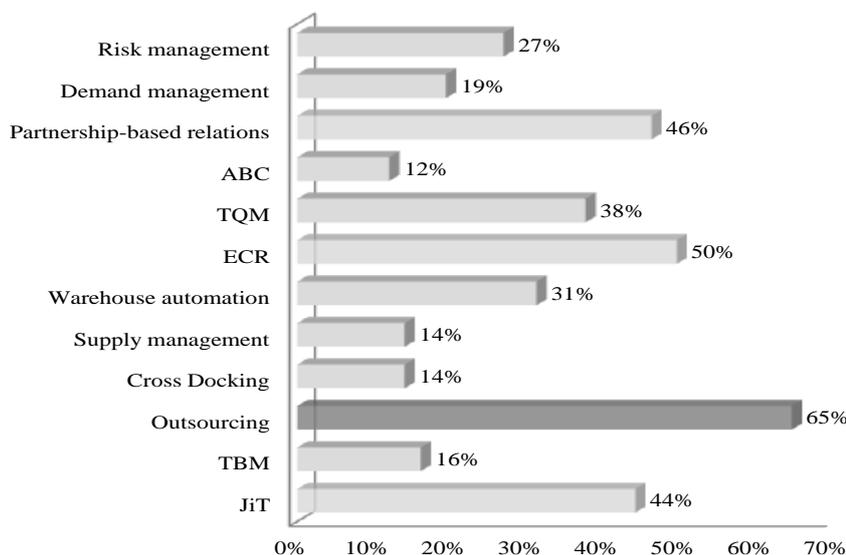


Fig. 2 Methods and tools used in supply chain; Source: the author's own study based on research

Undoubtedly more than half of the studied enterprises, especially of the production ones with long experience on market, regardless of capital source, declared that outsourcing is the most frequently chosen method of supply chain optimisation. This response results from the fact that "to buy or to do it using one's own resources?" is a modern dilemma faced by almost every enterprise. Currently most enterprises choose the option "to buy" (Dębski, 2010, p. 263). In the optimisation process an enterprise should concentrate on what it does best and does as its main process. The rest of processes, uneconomic compared to the services offered by another enterprise, should be commissioned from the outside, which undoubtedly will contribute to optimisation of functioning costs. The least chosen optimisation methods turned out to be: ABC method (a little above 10%), Cross Docking method and demand management (less than 15% of the respondents chose the option).

The analysed enterprises indicated the area of quality improvement as the most efficient in supply chain competitiveness (compare with Fig. 3). This choice results from the fact that ISO standards in 9000 series include proper guidelines for quality management. Their usage enables to an enterprise effective identification of consumers' expectations and needs as far as a specific good is concerned. Thanks

to such actions and enterprise is able to identify current needs of clients in the area of demanded quality of products, service and promotion – sale activities. As a consequence the product offer is rationally updated (Wieteska, 2011, p. 143). To a large extent the above is associated with 7W formula, very well-known in literature, used to increase competitiveness of the whole organisation.

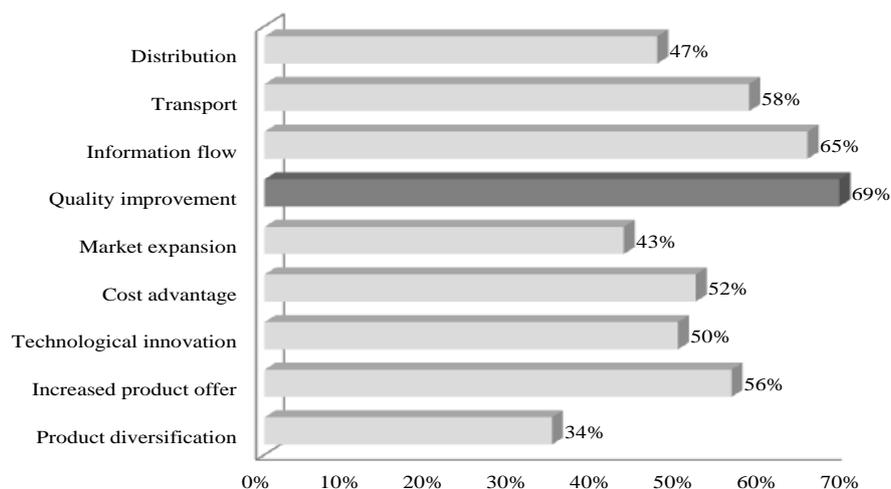


Fig. 3 Factors increasing supply chain competitiveness; Source: the author's own study based on research

Further on the studied enterprises equally (over half of the respondents) pointed out that increased product offer, cost advantage and technological innovations are the key factors in achieving competitive advantage. This trend definitely dominated among production enterprises, with longer experience on the market regardless of the type of capital. Such elements as product diversification (less than 35% of respondents) and market expansion (less than half of respondents identified that reply) influenced increase of competitiveness of particular supply chains in organization to a much lesser degree according to the studied enterprises. Such indications dominated first of all among production and service enterprises. It seems a bit puzzling that the transport factor (a great half of the respondents chose that response) is not a substantial element optimizing supply chain for all the studied entities. Even more so, if one considers the fact that this factor is the key aspect in flow of goods, and client's satisfaction to a large extent depends on its efficiency.

Modern enterprises are well aware of the benefits they can achieve thanks to partner cooperation and optimization along the whole supply chain (compare with Fig. 4). Therefore it is more and more a common form of functioning of enterprises on market to establish networks of connections, created upon

the rule of partner cooperation, and to use modern methods optimizing activities in the area of flow of resources along the whole integrated supply chain. Such a form, with intense competition, gives a chance to fulfil the needs of final purchasers and to efficiently stand above the competitors. Providing an outstanding value to a client is associated with activities not only of the organization itself but also of the whole supply chain. Therefore the benefits received by clients are a resultant of the benefits gained by all partners in an integrated supply chain.

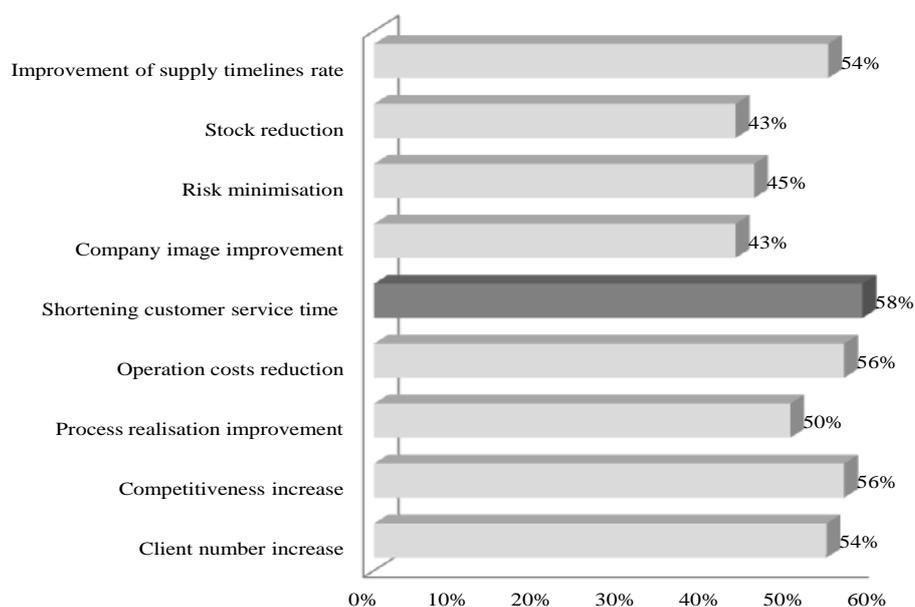


Fig. 4 Benefits of supply chain optimisation; Source: author's own study based on research

For enterprises with Polish capital shortening the time of client attendance was the most frequently achieved benefit in supply chain optimisation (almost two thirds of the respondents chose that answer), improvement of supply timeliness rate as well as reduction of operation costs (over half of the respondents indicated the answer). For over half of the respondents facilitations of processes realisation and increase of client number was a measurable benefit obtained from supply chain optimisation. For companies with foreign capital as well as for the ones with mixed capital, the substantial benefits included: improvement of supply timeliness rate, reduction of operation costs and shortening the client attendance time. Thanks to optimisation actions in supply chain as much as two thirds of small enterprises improved their competitive position on market. It is worth pointing out that in case of production enterprises optimisation to a large extent reduced the stock kept

and the level of risk in supply chain. Almost half of the studied production companies pointed specifically at these two aspects.

4. CONCLUSION

In a turbulent environment, competitiveness of enterprises should result first of all from observing long-term changes in purchasers' behaviours. In accordance with the marketing concept of enterprise management, clients' needs and preferences are decisive for directions and structure of resources allocation (Mruk, 2008, p. 25). Due to unlimited availability of products, clients expect cost reduction and purchasing products at a price lower than the one currently offered. In this context creating a competitive advantage is conditioned by application of the solutions, which supported by information tools, enable maximum use of skills and competences of enterprises in the task of fulfilling final needs of clients. Yet economic practice reveals a significant dissonance between the enterprises of Lodz region (and the whole Poland) and the "western" companies. In the times when western enterprises were building strong foundations for competitive markets, in Poland interest in the problems of supply chain management was small. In consequence, (which is confirmed by the results of the research), native companies functioning in Lodz market rarely can boast themselves of modern technological support and a know-how on the applied optimisation method. Such technologies as WMS, VMI and SCM are used by large companies, predominantly the ones with foreign capital and well-grounded position on market. What barriers influenced such a situation? Among others lack of trust and perceiving competition as a zero-sum game can be enumerated here. Financial instability, frequent cases of declaring bankruptcy, abusing legal loopholes and a low level of business ethics are only a few out of the factors that block building of partner cooperation. Lack of efficient methods of activities optimization in supply chain caused no real diversity of bargaining power of partners and of economy modernization, the consequence of which was the inflow of foreign competitors but also opening of new sales markets. However, out of all the barriers, the most severe ones were financial limitations and lack of interest of leading enterprises in taking the role of initiators of the supply chain management integration (Witkowski, 2010, p. 237). Although at present awareness of the importance of supply chain optimisation and of creating partner relationships seems to be increasing when directions in development of supply chain management are convergent with European trends, the pace of changes appears to be insufficient. The will to stand up to the requirements of aggressive competition makes it necessary for companies to optimise their supply chains from the angle of demands of the attended markets. Efficiency of the chain and effectiveness of processes taking place within the chain are the greatest source of compe-

titive advantage of modern enterprises. Currently the postulate of continuous improvement ceases to be a wishful thinking and becomes an indispensable requirement that has to be fulfilled by enterprises wishing to maintain their leading position.

REFERENCES

- Blaik P., (2010), *Logistyka. Koncepcja zintegrowanego zarządzania*, PWE, Warszawa.
- Ciesielski M., (Ed.), (2006), *Instrumenty zarządzania logistycznego*, PWE, Warszawa.
- Ciesielski M., (Ed.), (2009), *Instrumenty zarządzania łańcuchami dostaw*, PWE, Warszawa.
- Dębski D., (2010), *Ekonomia i organizacja przedsiębiorstw, Część 1*, WSiP, Warszawa.
- Długosz J., (Ed.), (2009), *Nowoczesne technologie w logistyce*, PWE, Warszawa.
- Januszewski A., (2008), *Funkcjonalność informatycznych systemów zarządzania, Tom I*, PWN, Warszawa.
- Mruk H., (2008), *Makrotrendy w zachowaniach nabywców a strategia rozwoju przedsiębiorstwa*, Mruk H. (Ed.), *Nowoczesne sposoby konkurowania*, PWE, Warszawa.
- Murphy R.P. & Wood F.D., (2011), *Nowoczesna logistyka*. Wydanie X, HELION, Gliwice.
- Raman P., Wittmann C.M. & Rauseo N.A., (2006), *Leveraging CRM for sales: The role of organizational capabilities in successful CRM implementation*, *Journal of Personal Selling & Sales Management*, vol. 26 Issue 1.
- Tarn M.J., Yen C.D. & Beaumont M., (2002), *Exploring the rationales for ERP and SCM integration*, *Industrial Management & Data Systems*, vol. 102, no. 1.
- Wieteska G., (2011), *Zarządzanie ryzykiem w łańcuchu dostaw na rynku B2B*, Difin, Warszawa.
- Witkowski J., (2010) *Zarządzanie łańcuchem dostaw*, PWE, Warszawa.

BIOGRAPHICAL NOTES

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