



VIRTUAL LOGISTICS AS A SUPPORT FOR THE DECOMPOSITION PROCESS OF A SUPPLY CHAIN (CONCEPTUAL REFLECTIONS)

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ABSTRACT. Background: Traditionally the concept of the "supply chain" is connected with various forms of the technical, organizational and economic integration. The integration deals mainly with multilateral relations among firms, thus constituting subsequent links of products flows in supply chains and creating complex networks of business connections. Due to social and economic factors, and mainly outsourcing and resulting accent on logistics services, traditional supply chains become decomposed. Therefore, there is a need to reconsider some concepts connected with this process.

Methods: The description and analysis of present and decomposing supply chains were presented and discussed. The analysis of reasons and possibilities to give up the processes of the absolute integration of supply chains in the direction of decomposed structures and the indication of possibilities to use the concept of a virtual logistics as a concept, which allows essentially such actions, was conducted.

Results: The disintegration of traditional value chains is one of these kinds' concepts, which are reflected also in classic supply chains. Probably the commonly used methods of the research and analysis of these supply chains do not conduce to make decisions under conditions of the lack of the continuity of business processes. Old methods and techniques of the management do not fit fully to modern business requirements, which are probably not even fully highlighted and properly understood.

Conclusions: The saturation of modern supply chains with services caused significant modifications of the logic and many mechanisms of their functioning, which in turn can lead to changes of a paradigm of the management of these more and more complex business structures. The aspirations of companies to achieve the competitive advantage on modern markets help to change the structure and the nature of supply chains, which operate on these markets, in the direction of their virtualization.

Key words: supply chain integration, decomposition of supply chains, virtual logistics.

INTRODUCTION

The "Supply chain" covers the set of features, which together create the specific value in processes of the management of the products flow. The most essential features of these chains are:

- they cover the whole process of delivering goods and services to final consumers,
- they include all participants (including those who run the logistic activities), starting from first deliver of the goods to the final user,
- the scope of activities covers the procurement, the production and the distribution,
- the management exceeds the boundaries of the organization and includes planning and supervision over the activities of other organizational units,

- the common information system available for all participants of a chain enables to coordinate the activities of the organization,
- organizations, being the participants of a chain, achieve their own goals due to the functioning of the chain as a whole.

The existing concepts of the holistic look at the functioning supply chain do not always correspond to the real business processes, because at present the decomposition and the discontinuity of activities are the main characteristics of these processes. Under these conditions, the processes of the management of supply chains and logistics processes connected with them undergo the specific changes.

The aim of this paper is the analysis of reasons and possibilities to give up the processes of the absolute integration of supply chains in the direction of decomposed structures and the indication of possibilities to use the concept of a virtual logistics as a concept, which allows essentially such actions. The conducted contemplations present the basic assumptions of the integration processes within supply chains, indicate the main reasons of the decomposition of these chains and present the key elements of the concept of a virtual logistics, which are possible to be used in temporal supply chains.

INTEGRATION AS A PARADIGM OF FUNCTIONG OF SUPPLY CHIANS

The management of products' flow according to above defined concept of the "supply chain" means "...supervision of all subsequent steps connecting with the movement of products, irrespective of the legal, political or geographical boundaries, starting from the supplier of raw materials until to final deliveries to final consumers, deciding of a specific part of the demand..." [Cooper 1994]. This type of the integration often goes beyond typical logistic processes.

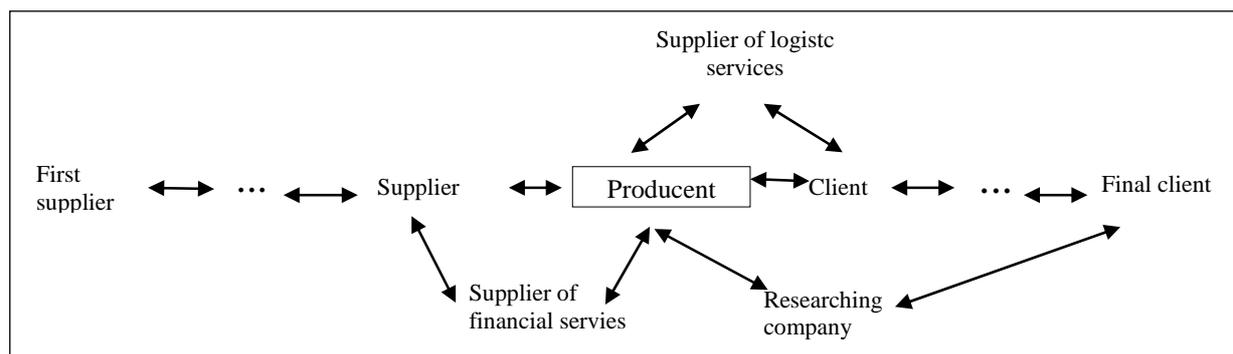
The classical definitions of the supply chain are presented in the table 1.

Table 1. Main definitions of the supply chain within the framework of the integration concept
Tabela 1. Najważniejsze definicje łańcucha dostaw w ramach koncepcji integracyjnej

Author	Definition of a supply chain
L.M.Ellram, M.C.Cooper	"The integrative philosophy for the purposes of the management of a total flow in distribution channel starting from delivers to final consumers"
F.Hewitt	"The integration in a supply chain is the result only of the modelling of business processes, and not of modifying of existing functional organizations"

Source: Ellram, Cooper, 1990, F.Hewitt 1994.

There are many definitions of a supply chains [Betchel, Jayaram 1997]. Although, the philosophy of the integration of a company with its suppliers and customers of products and services in order to achieve additional successes and market benefits is described the best by so-called "final supply chain" [Mentzer 2001], which is a group of all companies involved in mutual flows of products, services, finances and information, starting from an initial supplier to a final client (Fig 1). So-called main participants and specialized participants are the institutional elements of supply chains.



Source: Mentzer J.T. et al. 2001

Fig. 1. Relations in the final supply chain

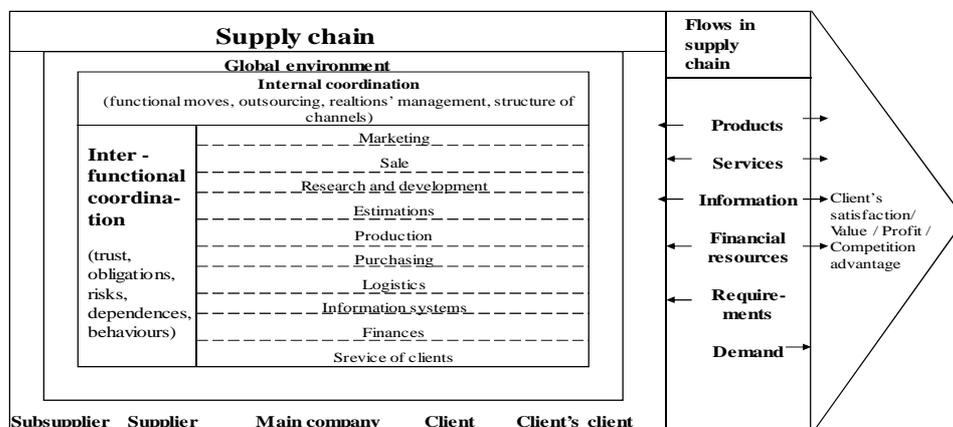
Rys. 1. Relacje w ostatecznym łańcuchu dostaw

The main participants are the main companies of the products' flow, fulfilling the role of suppliers and sub-suppliers and clients (intermediate: producers, traders, and final consumers). They are producers of manufacturing industry, mining, agriculture as well as wholesalers and retailers. The most diversified group in terms of forms is the group of wholesalers; they can represent the classical wholesale trade, fulfill the function of trade agents or sales agents of specific producers. The participants specialized in supply chains belong to two main groups: functional specialists and supporting specialists. Functional specialist companies provide to the main participants such services as transport, warehousing, completion, merchandising, etc. Supporting companies provide services in the areas of finances, information, advertising, insurance as well as research and consultation.

The interaction of participants within the supply chain consists not only on mutual relations with suppliers and customers in the process of goods' flow, which are called often as a partnership or alliances [Ellram, Cooper 1993]. The integration of the supply chain is based not only on cooperation between two companies, but also rather on the simultaneous relations of all its participants [Mentzer 2001]. So defined integration is the results of decisions made by individual persons or/and institutions [Kisperska-Moroń 1999].

The close integration with suppliers and customers in order to achieve additional benefits and market successes is the dominant philosophy in the concept of the "supply chain". The whole orientation of functioning of the supply chain is moved from problems of the inventory management in an individual company on the optimal inventories allocation from the perspective of the whole supply chain. The integration school in the literature is concentrated on the integration of separate areas of a chain into the system, defined as the set of processes [Hewitt 1994], which aims to create the greatest possible benefits for this system [Ellram, Cooper 2001] by multiplying the value.

The integrated management of logistic processes carries the constant flow of products through a stable chain of subsequent parts, each of which creating the new added value [Stevens 2001]. This new value means, that each participant of this flow increases the value of a product or a service for following participants, which receive this product or service. Resulting from such concept of a chain, which increases a value, the "integrated logistics" (integrated management of logistic processes) can be understood as "applying the same logic in the processes of planning, allocation and controlling of resources connected with distribution, production support and purchasing processes" [Johnson, Wood 1993].



Source: Ellram, Cooper, 2001

Fig. 2. Model of processes and activities creating the value in the supply chain
Rys. 2. Model procesów i działań tworzących wartość w łańcuchu dostaw

The integration school in the literature focuses the attention on the integration of areas of the supply chain into the system defined as a set of processes [Hewitt 1994], which aims to create the greatest possible benefits for this system [Ellram, Cooper 2001] by multiplying the value.

Each basic supply chain consists of parts executing the processes of the organization of the supply, logistic support of the production as well as the distribution of goods to clients [Hoekstra, Romme 1992]. As a result of above mentioned processes, the supply chain is a specific form of a value chain in the form of a set of specialized and consecutive main activities, such as deliveries, manufacture, distribution and supporting activities connected with marketing, research and development, finances, etc. It is presented in figure 2.

The number of stages of the value chain, involving companies participating in the supply chain, determines the level of the vertical integration of this chain. The number of participants can increase or decrease and accordingly the level of a vertical integration (as an added value) can increase or decrease. The integration of activities within the supply chain put on the participants and leaders of the management the obligations of monitoring the processes, which take place there, controlling the changes and supporting the main process of creating a new value for the members of this chain as well as its clients [Pfohl, 1998].

RATIONALES OF THE DECOMPOSITION OF TRADITIONAL SUPPLY CHAINS

Currently we are witnesses of the quality changes of consequences important for the whole economic reality. The intensity and the scale of these changes include such elements as:

- the increasing globalization and the expansion of supranational networks of the influences,
- the economic deregulation and the privatization and at the same time the increasing market competitiveness leading to big mergers of companies,
- the political liberalization and transformation of political systems,
- increasing offers of capital and financial markets,
- rapidly developing information technologies,

- new quality expectations of clients, faster process of development and dying out of products,
- the intensive development of the service sector, etc [Płoszajski 2000].

The essential feature of changes occurring in today's economic reality is the increase of management problems as the synergic effect of both the increased complexity and the increased inconstancy. It leads to a repetitive discontinuity of development processes, although the characteristics of new social and economic order are still not entirely clear. Under these conditions, rapid changes of priorities and methods of the management of logistics processes can be observed, which diverge increasingly from the common traditional practices. The uncertainty and the risk are more and more often observed in supply chains and there is no possibility to reach the comfort of the certainty of activities. It leads to searching for new techniques of solving problems in the management of logistics processes, configured in the supply chain.

The main reason of many failures to obtain the proper competitive advantage of a company within the supply chain seems to be the lack of understanding of changes in the philosophy how the modern business functions. The location of a company in a classic supply chain assumes its stable position in a rigid value chain of the one-way, linear and sequential nature. In this situation, the process of adding the value consists in an effective and efficient fulfilment of consecutive steps within the process of deliveries to clients, and the adding of the value is the process of creating the additional costs associated with the successive phases of flows of goods and services.

However, in the practice of functioning of a company, there are many multilateral connections among companies, which are the reason, that the cooperating companies are simultaneously the participants of many supply chains, which leads to "creating diverse interorganizational relations and increasing number of cells at different points of flows of goods" [Swierczek 2009]. Already in the past, when the configuration of supply chains was not so complex, it was noted that "... the management of the supply chain is a concept of analyzing and management of the whole network from suppliers to final customers in order to obtain the results, best to the whole system" [Ellram, Cooper 1990]. Finally, one can talk about the networks of supply chains, which create the systems of dependencies within the network of "... many interdependent companies, representing both the areas of the supply as well as the distribution..." [Rutkowski 2004]. Therefore, the linearity of the relationships among companies is here enriched by multilateral dependencies at different stages of the flow of products.

The present saturation of contemporary networks by the services should be pointed out in particular, which is caused by strong tendencies to outsource many processes, in logistics – first of all the transport and the warehousing. Therefore, in presently functioning supply chains, one can observe the specific mix of activities connected with material flows and the coordination of services, which could be described as "intangible goods consumed at the moment of their manufacturing in the form of various benefits and satisfaction offered for sale" [Payne 1996] by companies. The services are a part of the offer of companies cooperating within the supply chain and resulting from generally accepted active customer service before, at the time and after the transaction [Ballou 1992]. They have usually the complementary character in relation to the material product, e.g. in case of the services of the maintenance, installation, trade, transport and finances.

Due to the saturation of the physical flows of products by material and immaterial service processes, the degree of the uniqueness of activities conducted in the supply chains increases. They are shaped based on such characteristic features of services as:

- immateriality, because most of services are not connected with the manufacturing of material goods,
- diversity (heterogeneity), since the services are very varied and inconsistent,
- inseparability (simultaneity), since the services are provided by provider and simultaneously consumed by the client,
- instability, in absence of the possibility of the storage of services.

The process management on mature markets, saturated by services, which support products, changes completely its character and requires specific tools to support the decision making process within distribution systems. Finally, it leads to the change of nature of the economy, from industrial to the service one, which is under the influence of the following factors:

- the changing nature of the operation of companies,
- the increase of the competition,
- changing organizational roles,
- changing external requirements,
- abilities of information technologies [Zairi 1994].

As a result of above mentioned occurrences, there is a clear pressure on the decomposition of traditional value chains and the perception of each part of traditional supply chain as a potentially high competitive node with specific perfect competencies to implement specific processes. Such node (company) can become an element of different supply chains and different value streams depending on appearing the opportunities to begin or continue a business.

The virtualization of supply chains and networks becomes more and more common, although it is not properly established in the theory as well as in the practice. For above a decade, the virtual system of deliveries becomes a symbol of modern economic and social development, but still it is one of the most misunderstood and discussed concepts of the contemporary world. However, certainly, this concept has a significant influence on the change of the model of the competition of companies, which want to work in such temporary organizations and profit from opportunistic opportunities of the development [Kisperska-Moroń 2010].

VIRTUAL LOGISTICS AS A SUPPORT OF THE DECOMPOSITION OF SUPPLY CHAINS

The above presented concept of the decomposition of supply chains requires the creation of foundations for the functioning of so-called virtual logistics, which should allow implementing the scale benefits by the use of common resources and at the same time to preserve to maintain the profits from fulfilment of individual tasks and transactions by individual companies [Kisperska-Moroń 2009]. The increase of the utilization of resources is possible as a result of flexible, in comparison to demands, allocation of resources, while the shortening of delivery's time is possible through better management of operational priorities [Clarke 1998].

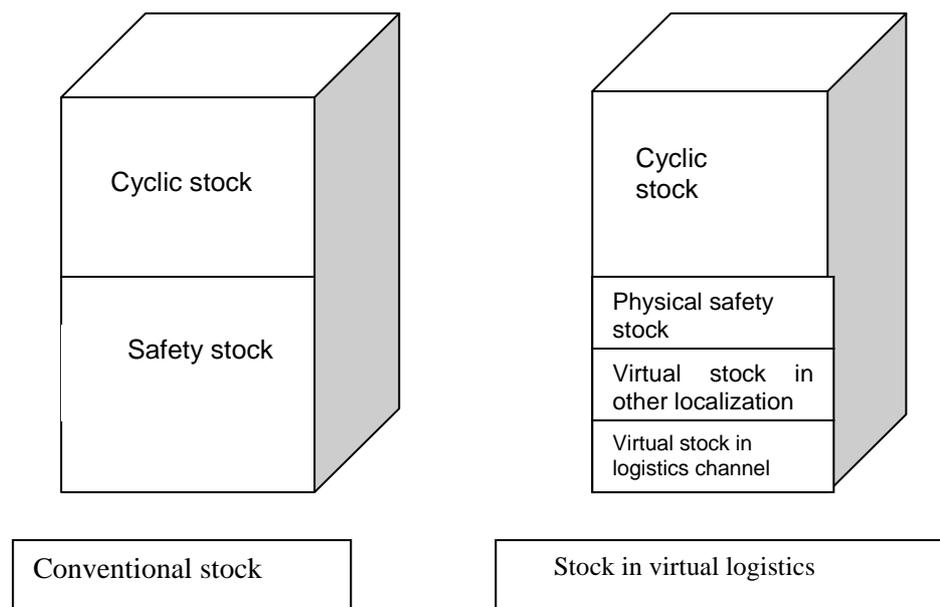
The localisation of resources or their form should not be important in terms of logistic support of scattered business processes, but it is important, that the adequate resources should be available according to requirements. The location of these resources, and most of all, stocks of products and transport services, can be of secondary importance in this case. Similarly, it should be irrelevant, whether the resources should be produced, delivered or purchased from external sources. The availability of these resources in accordance with the demand is the most important issue. Therefore, the important problem arises: how to ensure this availability in a way at a distance but for the specific production or distribution tasks located in specific space and time.

It should be assumed, that the virtual logistics could treat the product and transport logistics resources as goods, similarly to the role of the currency in banks' operations. It means that the logistics resources can be borrowed and sold, consolidated in a flexible way, divided or allocated. It is a very bold assumption, changing the existing system concepts of the logistics in terms of the construction of these systems as well as their effectiveness. Such concept of a virtual logistics requires a very wide range of the outsourcing and subcontracting of logistics services [Hoek 1998].

The logistics resources in the virtual logistics may include production processes, production sub-processes, logistics tools, vehicles, free transport capacities, material handling equipment, inventories,

spare parts or even warehousing spaces. The virtual logistics bases on the “trade” of these resources on a large scale. These resources are purchased and used in a remote way, and then lent or sold in the situation, when they become a surplus to current needs. The logistics services of various types may be traded individually or in the form of a portfolio of services, matched according to current market requirements for logistics services. The physical location of individual resources cannot be a significant obstacle in this process, the cost of their availability will be the only barrier of the method of the remote use of these resources. In practice, there is already a virtual system of making these resources accessible, based on Internet technologies, e.g. sales of free transport capacities in the international transport. It should be recognised, that the scope of this system is still very limited [Clarke 1998].

In practice, the fundamental logistics resource is the stock of goods in form of materials, finished products or goods. Departing from the classic form of the stocks, according to the concept of the virtual logistics, the stocks are created on the basis of properly planned production processes rather than the accumulation of physical goods. For this purpose, the products’ flows will be adequately secured by the precise definition of logistics channels, by which the goods can be offered and by providing the necessary production capacities and resources in these logistics channels. According to such concept, the need to maintain the traditional safety stocks in a form of fix quantities of products in the warehouse are reduced (Fig 3).



Source: Clarke 1998

Fig. 3. Comparison of stocks’ structure in traditional and virtual concept of a logistics
Rys.3. Porównanie struktury zapasów w tradycyjnej i wirtualnej koncepcji logistyki

Additionally to stocks in traditional logistics channels, there are so called “virtual stocks”, which appear in the virtual logistics, located in a place other than a location of a company. These are the physical stocks of goods, which can be obtained regardless of their location, by purchase and sale transactions, as well as by “borrowing” of these products without changing their localization [Kisperska-Moroń 2009]. The potential clients and their suppliers, in order to carry out local deliveries, can sell each other the products stored in remote warehouses without changing the physical localization of goods. In case of deliveries connected with covering long distances or bearing high transport costs, it is possible to look for alternative sources to fulfill the deliveries. The main criterion

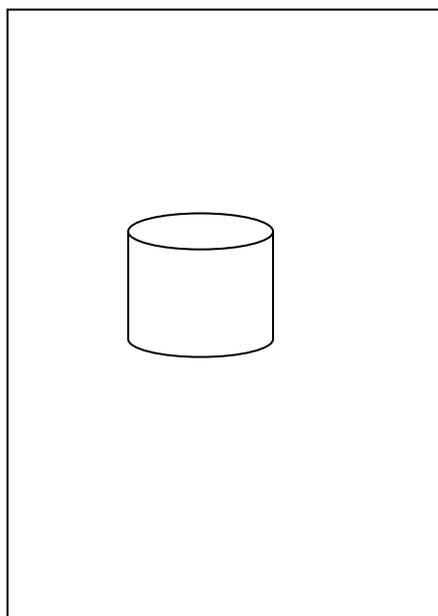
for the selection of the source of a supply is the localization closer to the target point or lower costs of the transaction.

Similar to “virtual stocks”, the direct supplies from producers can be used to eliminate the physical medium of a warehouse of a third party participant in the process of a goods’ flow. In this way, the virtual logistics, based on huge information and Internet systems, can carry out the substitution of a transport through series of transactions, which leads to fast deliveries of physical goods to final customer. In this way, it is possible to eliminate high transport costs, to increase the profitability of supply and distribution processes, to improve the level of the customer service as well as to shorten the lead-times of deliveries.

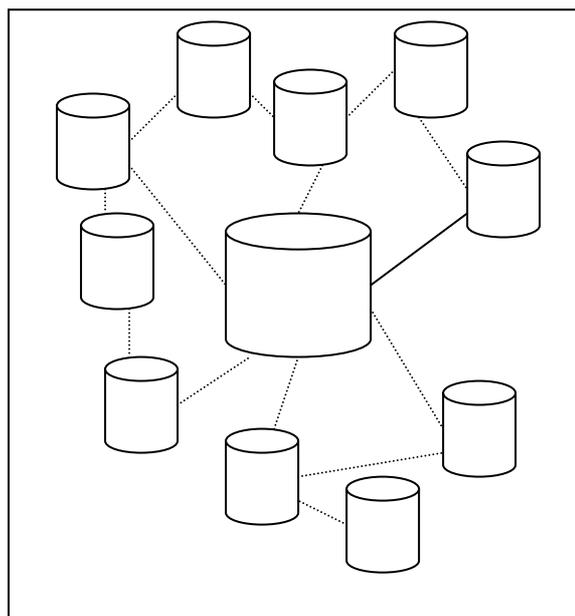
As a conclusion, it can be stated, that the systems of the potential virtual logistics will be better organized and will function in a way different from a way, in which conventional logistics systems work.

The conventional logistics services require usually the allocation of large amounts of resources as a security buffer in case of significant fluctuations of supplies and changes of requirements for needed services. The concept of logistics resources in conventional and virtual systems is presented in the figure 4. The only easily available resources in the conventional logistics are these, located in one location. The virtual logistics has an easily access to logistics resources in external localization, as well.

Accessibility of resources in conventional logistics system



Accessibility of resources in virtual logistics system



Source: Clarke 1998

Fig. 4. The concept of the accessibility of logistics resources
Rys.4. Koncepcja dostępności zasobów logistycznych

There is a necessity to use computerized information networks to locate and access indispensable logistics resources. Certainly, one of their characteristics is to base their work on systems of e-commerce and e-business [Croom 2005].

The exploiting of full potential of the virtual logistics needs not only to base them on public systems, allowing the access to information about logistics resources, but also far reaching standardization of logistics resources such as transport modes, sizes of vehicles, production processes, machines and products as well as handling operations. This type of the standardization allows

obtaining the high level of the compatibility and the consistency of various groups of users. The production systems should be modular. Additionally, there is a need to introduce monitoring systems, which will control the quality and ensure the accuracy, the reliability and the availability of logistics resources. The computer systems, which control the logistics, should be widely available, and logistics operations and processes must be synchronized in time. Similarly, the systems ensuring the efficient payment processes for providers of logistics services must be introduced. The regulations of the responsibilities of users of logistics services must also be introduced. Such virtual logistics systems can support the cooperation between the traditional supply chains and the decomposed ones in the area of enlarged regional and global markets.

There are a few basic rules to design virtual logistics systems:

- logistics resources are commodities, which have their functional availability,
- the separation of the ownership and the control over logistics resources from their physical localization allows the remote use of these resources,
- the change of the ownership of logistics resources or the modification of their use does not mean their physical transfer,
- there is a need of a public common access to information about logistics resources as well as the electronic trade of these resources,
- there is an integration of warehousing, transport and production services, in order to obtain the possibility to model the availability of products and the inventories' control [Power 2005].

The concept of the virtual logistics can provide an important support for the efficiency and the effectiveness of not only decomposed supply chains but also of more classic forms. It allows the movement of small volumes of products of a high value. It can be also implemented in small and medium-sized enterprises, which inherently carry out the flows of products under conditions less favorable than large companies do, because they are not able to achieve the same profits of the scale rate. The virtual logistics should facilitate them the consolidation of complementary products. In the long run, the virtual logistics should allow increasing the rationality of many logistic operations within supply chains, shortening the lead times as well as increasing the reaction capacity to changing demands. The higher level of the efficiency of the logistics will be demonstrated also in terms of external costs, resulting from savings of the energy and other resources, the reduced transport congestion and the reduction of the environmental pollution.

There are many conditions for the development of the virtual logistics, among them the necessity of the transformation of the TSL sector in the direction of higher use of information techniques as well as an enlargement of the range of logistics services, is one of the most important ones. The managers of this sector will have to face a greater diversity of transported goods and a bigger market offer of products and services.

SUMMARY

The economic difficulties, faced by companies in recent times, lead to a deep reflection on well-established ways of perceiving business processes and commonly accepted concepts of the management of logistics processes.

The disintegration of traditional value chains is one of these kinds' concepts, which are reflected also in classic supply chains. Probably the commonly used methods of the research and analysis of these supply chains do not conduce to make decisions under conditions of the lack of the continuity of business processes. Old methods and techniques of the management do not fit fully to modern business requirements, which are probably not even fully highlighted and properly understood.

It seems that we are standing right now before important transformations of the business and the business management. The saturation of modern supply chains with services caused significant

modifications of the logic and many mechanisms of their functioning, which in turn can lead to changes of a paradigm of the management of these more and more complex business structures. It can be also stated, that the aspirations of companies to achieve the competitive advantage on modern markets help to change the structure and the nature of supply chains, which operate on these markets, in the direction of their virtualization.

The understanding of this fact is the basis of the revolution of management systems in the area of the logistics. It seems that the consideration of modern concept of the virtual logistics can be a beginning of a new concept and methods of the business, the management as well as the achievement of objectives, put in ahead of them.

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LOGISTYKA WIRTUALNA JAKO WSPARCIE PROCESÓW DEKOMPOZYCJI ŁAŃCUCHA DOSTAW (ROZWAŻANIA KONCEPCYJNE)

STRESZCZENIE. **Wstęp:** W tradycyjnym rozumieniu koncepcja łańcucha dostaw obejmuje różne formy technicznej, organizacyjnej i ekonomicznej integracji. Pod pojęciem integracji należy rozumieć przede wszystkim różnokierunkowe połączenia między firmami, które to generują przepływy towarów w obrębie łańcuchów dostaw i przyczyniają się do powstawania złożonych sieci połączeń biznesowych. Z powodu różnych czynników socjalnych i ekonomicznych, a przede wszystkim rosnącej roli outsourcingu w usługach logistycznych, tradycyjne łańcuchy dostaw ulegają dekompozycji. Z tego też powodu wynika potrzeba przeanalizowania na nowo koncepcji związanych z tym procesem.

Metody: Przedstawiono i przedyskutowano opis i analizę łańcucha dostaw w aktualnej formie oraz po dekompozycji. Przeprowadzono analizę przyczyn i możliwości zaniechania procesów zmierzających do pełnej integracji łańcuchów dostaw na rzecz struktur zdekomponowanych. Wskazano możliwości stosowania logistyki wirtualnej jako koncepcji umożliwiającej takie procesy.

Wyniki: Rozkład tradycyjnych łańcuchów wartości jest jedną z koncepcji, która ma swoje odzwierciedlenie również w klasycznych łańcuchach dostaw. Prawdopodobnie tradycyjnie stosowane metody oceny i analizy tych łańcuchów dostaw nie będą odpowiednie do podejmowania decyzji w warunkach braku kontynuacji procesów biznesowych. Dawniej stosowane metody i techniki zarządzania nie sprawdzają się w pełni w obecnych warunkach, które nie są jeszcze nawet całkowicie przeanalizowane i zrozumiałe.

Wnioski: Nasytanie usługami współczesnych łańcuchów dostaw powoduje istotne modyfikacje w logice i mechanizmach ich funkcjonowania, co z kolei prowadzi do zmian paradygmatu zarządzania tymi coraz bardziej złożonymi strukturami biznesowymi. Dążenia przedsiębiorstw do osiągnięcia przewagi konkurencyjnej na współczesnych rynkach pomagają w zmianach struktury i natury łańcuchów dostaw w kierunku ich wirtualizacji.

Słowa kluczowe: integracja łańcuchów dostaw, dekompozycja łańcuchów dostaw, logistyka wirtualna.

DIE VIRTUELLE LOGISTIK ALS DIE UNTERSTÜTZUNG FÜR DEN ZERSETZUNGSPROZESS DER LIEFERKETTE (KONZEPTIONELLE ÜBERLEGUNGEN)

ZUSAMMENFASSUNG. Hintergrund: Das Konzept der Lieferkette ist traditionell mit verschiedenen Formen der technischen, organisatorischen und wirtschaftlichen Integration verbunden. Die Integration beschäftigt sich hauptsächlich mit multilateralen Beziehungen zwischen Unternehmen und nachfolgend verursacht die Produktenflüsse innerhalb der Lieferketten wie auch die Erstellung der komplexen Netzwerke von Geschäftsbeziehungen. Aufgrund der sozialen und wirtschaftlichen Faktoren, von allem Outsourcing, werden die traditionelle Lieferkette zerlegt. Deshalb ist es notwendig, einige Begriffe, mit diesem Prozess verbunden, zu überdenken.

Methoden: Die Beschreibung und die Analyse der gegenwärtigen und zersetzen Lieferketten wurden vorgestellt und diskutiert. Die Analyse der Gründe und Möglichkeiten um die Prozesse der absolute Integration der Lieferketten aufzugeben, wurde durchgeführt. Die Richtung der zerlegten Lieferketten wie auch das Konzept der virtuellen Logistik wurden diskutiert.

Ergebnisse: Der Zerfall der traditionellen Wertketten ist eines, von dieser Art, Konzept die auch in klassischen Lieferketten gibt. Wahrscheinlich die üblichen Methoden der Forschung und der Analyse von diesen Lieferketten nicht genug sind um die Entscheidungen unter Bedingungen des Mangel an der Kontinuität von Geschäftsprozessen zu machen. Traditionellen Methode und Techniken der Verwaltung erfüllen nicht die modernen Geschäftsanforderungen, die wahrscheinlich noch nicht vollständig markiert und verstanden sind.

Fazit: Die Sättigung der modernen Lieferketten mit Dienstleistungen verursacht die erhebliche Änderungen der Logik und Mechanismen von das Funktionieren dieser Lieferketten. Und das bringt die Veränderungen des Paradigmas von der Verwaltung von dieser mehr und mehr komplexe Unternehmensstrukturen. Die Bestrebungen der Unternehmen, die Wettbewerbsvorteile auf modernen Märkten zu erreichen, helfen die Struktur von Lieferketten in die Richtung ihrer Virtualisierung zu verändern..

Codewörter: Integration von Lieferketten, Zersetzung der Lieferketten, virtuelle Logistik.

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