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CHANGE MANAGEMENT IN SUPPLY CHAINS IN THE CONTEXT OF CHANGES IN DEMAND

Abstract

The article presents issues related to change management in supply chains as a response to changes in demand from end customers or consumers. The modern economy foundation for the development of enterprises includes an ability to respond appropriately to changes in demand. Because supply chains have become one of very important components in achieving a competitive advantage of enterprises, a response to changes in the market must be a component in managing a supply chain as well as changes taking place in it. Depending on the nature of changes in demand, change management in demand for final products can relate to supply processes, production, distribution as well as logistic processes - both at the level of one supply chain participant and numerous supply chain participants.

Keywords: Supply chain, management, change

Introduction

The presentation of the P. Krugman's theory in 1991, which explained the phenomenon of economic globalization in a model form, is regarded as the beginning of a "new economic geography" (NEG). When at the turn of the 80s and 90s of the 20th century this and other theories related to economic phenomena emerged, they were a response of the scientific environment to the phenomenon of the world economy globalization in which spatial arrangement of the producer and consumer markets ceased to be a barrier to the global

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development of trade. With specialized production, an increase in the production volume, which resulted in the reduction of unit costs, as well as lower labor costs in the developing countries and new tools used for managing enterprises and processes, a new, global economic system was built. As a result, what was created was a global economy with a network of enterprises which, by means of outsourcing processes, concentrate their resources in the primary area of their operations and develop a number of organizational and legal connections with suppliers, logistics operators or transport companies.

The development of "supplier-consumer" network connections as well as competition among production enterprises on a global scale are only two components which formed a base for supply chains in which enterprises connect with each other in their shared operations aiming at optimizing processes which range from acquiring raw materials to supplying final goods to the end customer/consumer. The aim of creating long term connections among companies in a supply chain and establishing a logistic system is to achieve a competitive advantage in the market.

Efficient company operations and the entire supply chain require management both at an enterprise level and chain level. What is created is a certain duality of management in which a number of processes at a level of particular enterprises must depend on the entire supply chain management. Hence, what is pointed out in academic discussion is the issue of a new paradigm in management sciences which is related to answering a question of whether or not supply chain management has become a new sub-discipline within a discipline of management?¹

Regardless of what is discussed in the scientific environment, it should be noted that logistic chain management covers a much larger area and bigger range of tools which are necessary for developing efficiency of processes which occur "across" internal processes of particular enterprises and chain participants, which aims at providing efficiency of a supply chain as a whole as well as of its particular participants.

One necessary area of enterprise and supply chain management is change management. Although a few years passed, since 2008 the global economy has been still struggling with the problem of crisis in which trade fluctuations result

¹ A. Łapińska, *Potrzeba tworzenia nowych paradygmatów w naukach o zarządzaniu – implikacje dla zarządzania łańcuchami dostaw* (part 1 and part 2), "Logistyka" 2014, No. 1, 2.

in market demand fluctuations, both globally and locally. Therefore, in the regional markets it is difficult to determine long term trends in the area of sales, which means that there is a necessity for change management in a supply chain, which guarantees its efficiency expressed by way of maintaining a competitive advantage or at least maintaining the final goods position in the consumer/end customer market

Supply chain management

"A supply chain is a relatively new term and its definition is ambiguous. That is why some logisticians use the terms 'logistic chains' and 'supply chains' interchangeably. [...] In the concept of a logistic chain, enterprises, which are part of it, concentrated their efforts mainly on efficiency and effectiveness of the flow of goods. What prevails in the concept of a supply chain is a philosophy of close integration of a producer with suppliers and consumers in order to achieve market success. [...] What is assumed, when it comes to a supply chain, is that it is customers who initiate decisions which are made in a supply chain. Hence, a customer is the beginning of a supply chain, but decisions flow in the opposite direction to the supply of products."²

In the analysis of the above statement, presented by E. Sołtysik, it should be recognized that a supply chain is a system providing an effective and efficient flow of goods, which is determined by the consumer's/end customer's needs, utilizing broad logistics, which in this case is a multi-functional tool for managing processes in a chain. The definition presented by C. Bozarth, R.H. Handfield is especially worth pointing out. According to this definition a supply chain is defined as a "[...] network of producers and providers of services, who cooperate with each other in order to process and transfer goods – from a raw material stage to an end user level. All these entities are connected by flows of material goods, information as well as money."

The concept of a network nature of supply chains is explained by M. Ciesielski who indicates the nature of connections among enterprises which are established in order to exchange resources, gain a scale benefit or launch a new product onto

² E. Sołtysik, *Rozwój koncepcji logistyki*, in: *Logistyka*, D. Kisperska-Moroń, S. Krzyżaniak (eds.), Biblioteka Logistyczna, Poznań 2009.

³ C. Bozarth, R.H. Handfield, *Wprowadzenie do zarządzania operacjami i łańcuchem dostaw*, Wydawnictwo Helion, Gliwice 2007.

the market. These connections make up a network with horizontal and vertical connections. But it is the vertical networks, where relations "supplier-consumer" are created, that define what supply chains are all about.⁴ In actual fact, extending such a network layout with connections including raw material suppliers, a logistic operator, whose area of concern is supplies to the market, as well as network of 3rd, 2nd and 1st class suppliers with a final producer is the essence of creating network connections in order to achieve a competitive advantage in the final product market where operations and processes in a supply chain make it possible to provide a specific added value which is the essence of business activity. The amount of this added value determines the chain participants' profit and how legitimate their shared actions are.

The C. Bozarth i R.H. Handfield's definition, which is presented above, addresses the issues of a network nature of a supply chain with a number of connections among its participants and indicates the forms of flows of goods, information and money in a chain. Therefore, it should be regarded as an integrated series of operations which occur in two directions, where the following factors are of importance:

- targeting the end customer/consumer and the market they represent;
- minimization of production costs and costs of delivering the final product to the end customer/consumer, and as a result optimization of the operational costs of chain participants;
- integration of alternate economic processes of production and services;
- shared information systems;
- principle of benefits for each participant of a supply chain as a basis for establishing organizational and legal connections over a long period of time, which guarantees that a supply chain is stable.

The supply chain structure depends on numerous factors. One of them includes a type of a produced good in the context of its durability and how frequently it is purchased by the consumer. In general, in these supply chains, where durable goods are produced, the leading position is occupied by the producer (assembler) of the final product where on the supply side suppliers of the 1st and 2nd class are distinguished (3rd class suppliers are also present in numerous supply chains) and on the distribution side there are consumers of the 1st and 2nd class, where the latter can be end customers, but not consumers. However, leaders in the supply

⁴ Instrumenty zarządzania łańcuchami dostaw, M. Ciesielski (ed.), PWE, Warszawa 2009.

chains of frequently used products are generally retail networks where the chain is formed differently – with a network system in which on the supply side there are the 1st and 2nd class suppliers and the process of distribution is an internal process fulfilled by a retail network.⁵

As a scientific discipline management is part of economic sciences. Since the attempts were made to provide a scientific basis for management it has been regarded as an activity which covers:

- planning, organizing, staffing, directing and controlling according to the Anglo-Saxon approach,
- planning, organizing, stimulating and controlling an approach presented by management classic H. Fayol and approaches of other management schools, including the Polish school as well.

Currently, no model of management exists. Because this process is more and more individualized an old definition given by an unknown author is used: management is a form of art or practice which involves reasonable application of resources for achieving formulated objectives. This definition is simple and provides an opportunity to have an individual approach to each economic phenomenon which requires management.

Figure 1 illustrates a chart showing management tools and concepts which are used in a comprehensive supply chain management. What is worth noticing is a multitude of management tools and concepts which are applied for establishing and maintaining efficiency of a supply chain and developing a competitive advantage in the consumer/end customer market.

One of the first definitions of supply chain management was formulated by M. Christopher who regarded it as: 'management of relations with consignees and suppliers as well as customers with the aim of delivering the highest value to the customer at lower costs for the entire chain.⁶ This definition emphasizes the issues in connection with developing relations among the participants of a supply chain and satisfaction of the customer who is a beneficiary of the goods which are made in the chain. This approach is in accordance with what M. Porter indicates in his studies – that it is the consumer/end customer who must

⁵ Ibidem.

⁶ M. Christopher, *Logistics and supply chain management: Strategies for reducing costs and improving service*, "Financial Times" 1998, Prentice Hall, London; in: S. Kot, M. Starostka-Patyk, D. Krzywda, *Zarządzanie łańcuchami dostaw*, Częstochowa University of Technology, Częstochowa 2009.

be subject to the actions performed by the participants of a supply chain, because in the modern, global economy she represents the "power of the market" which "wields in its hand" the most important tool: demand.

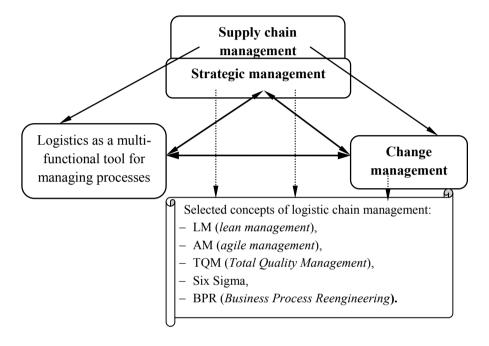


Figure 1. Supply chain management

Source: own work based on Instrumenty zarządzania...

Logistic chain management includes a number of tools and concepts of process or enterprise management. Because of the changeable and tumultuous nature of the environment a traditionally viewed enterprise management, which aims at efficiency of internal processes and optimal use of resources, must be extended with the issues of constant adaptation of operations to the changeable environment. Nowadays, strategic management, with an analysis of the environment and anticipation of changes taking place in it (in demand, for example) as one of the key components for building and maintaining a competitive advantage in the market, is an indispensable system for achieving the above objectives. It is even more important in supply chain management, because long-lasting interrelations established by the participants of a chain are one of the bases for long

term economic efficiency and increasing market share with regard to the product/final products which are made in it.

With the changeable environment a long term market success and financial success require such a strategic management which allows to quickly respond to changes taking place in it. Therefore, change management in a logistic chain must be a management subsystem whose aim is to introduce such transformations in the fulfillment of processes which will be an appropriate response of the organization (which a logistic chain is) to changes in the environment, particularly in the area of demand.

Change management in supply chains in relation to the nature of changes in demand

Although this article does not investigate the determinants of changes in demand in the end customer/consumer market, it should be noted that changes in demand are of continuous nature. Their direction (increase/decrease), extent and durability depend on many factors which have their impact on demand. Since, as indicated before, it is the end customer/consumer who must be subject to the operations of supply chains, it is therefore clear that the ability to respond to changes in demand is one of the key components of chain management in which the nature of response is dependent on the nature of changes in the area of demand.

In order to indicate the key areas of changes in supply chains the model approach to changes in demand, with an analysis based on two variables, was applied in this article. One variable is change durability (short term and long term), another one is direction (increase in sales and decrease in sales). Figure 2 illustrates a diagram showing the areas of changes in a supply chain in relation to how the two demand variables alter. On the left side of the diagram are primary operations in the case of short term changes in demand, both in the event of an increase and decrease in sales. On the right side are the areas of changes in a supply chain in the case of long term changes and various directions of changes in demand.

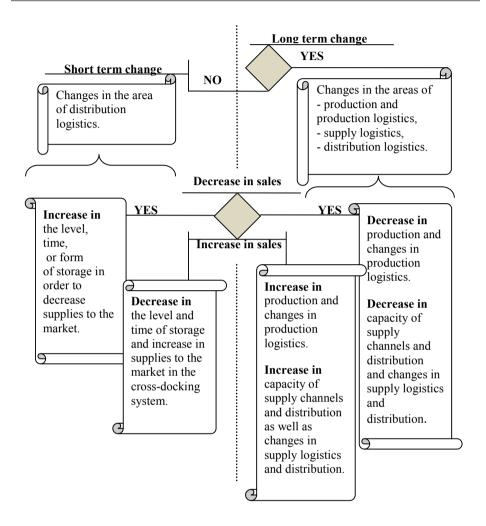


Figure 2. Scenarios of responses in supply chain to market changes in demand Source: own work.

Short term changes in demand, both in the case of its increase and decrease, force changes in the area of final product distribution. The main actions aim at providing continuity of supplies to the market (short term increase in sales) at an unchanged level of production. However, in the case of short term decrease in demand the actions are narrowed down to increasing the level of storage at an unchanged level of production as well. Therefore, changes and their management relate to only one area of supply chain operations. This area is distribution

logistics in which processes aim at providing continuity of supplies to the final product market, independently of the direction of short term changes in demand. And it is in the situation in which application of a number of tools and concepts of management with the aim of building a competitive position of a particular supply chain (and consequently its participants) have resulted in a "lean" level of final products in stock reserve (LM – *lean management*: a commonly used concept of enterprise and supply chain management).⁷

What is regarded in distribution logistics as "lean" stock reserve is its possible low level maintained in accordance with the rule of JiT (*Just in Time*). JiT is a memorial methodology, i.e. it is based on the analysis of demand from the past and on building stock on this basis. In the case of a rapid, temporary increase in demand, which has not been reported before, continuity of final product supplies to the market can be broken, which should not take place in the philosophy of a supply chain which targets the requirements of the customer. That is why what is nowadays used in supply chain management is a combination of numerous management tools and concepts in order to fulfill the customer's requirements on the one hand (also in the sense of providing continuity of supplies to the market) and, on the other hand, to continuously seek to build a competitive position in the market.

The ECR (*Efficient Consumer Response*) strategy, for example, aims at 'lean' stock of final products on the one hand, and on the other hand it provides continuity of supplies to the frequently used products market. A distribution strategy, which was introduced by American companies in the 90's of the 20th century, which integrates producers, distributors and tradesmen in a supply chain with the aim of building a cost-effective system which responds to the changes in demand creates an added value for the participants of the chain at the same time. This system is driven by real demand. As a result the cost of entire stock reserve level is reduced and at the same time continuity of supplies to the end customer/ consumer is provided.⁸

By means of combining the concepts of LM and AM (*agile management*) in the ECR strategy it is possible to maintain the possible low stock of ready goods,

⁷ E.D. Arnheiter, J. Maleyeff, *The integration of lean management and Six Sigma*, "The TQM Magazine" 2005, No. 17 (1), pp. 5–18, Emerald Group Publishing Limited, http://www.emeraldinsight.com/toc/tqmm/17/1 (access 28.07.2015).

⁸ A. Baraniecka, ECR – Efficient Consumer Response. Łańcuch dostaw zorientowany na klienta, Instytut Logistyki i Magazynowania, Poznań 2004.

which leads to a reduction in the supply costs. The AM concept translates to a possibility of a quick response by producers, distributors and salesmen to changes in demand. It is especially important in a situation when demand rises sharply and reserve stock is below a temporary demand (idea of LM). If this is the case, the supply process participants' response consists in targeting the market (salesmen area) with two simultaneous streams of products. One stream flows from distributors' warehouses, the other one does directly from producers. Thanks to that the level of stock reserve does not have to include extrema in a temporary demand, which results in the reduced costs of storage of final products over a long period of time, and therefore in benefits obtained by the supply chain participants on the one hand, and on the other hand by the consumers who have continuous access to the products at prices which are lower than before the ECR system was reduced.

What is presented above is change management in the area of distribution logistics in the case of short term changes in demand, which is a normal phenomenon occurring independently of long term changes in demand. Consequently, it is related to demand cycles with stages of decline, which are expressed by economic crises, and growth stages which are often termed economic booms (changes in GDP – macroeconomic approach). An example of economic crisis, which ended the stage of growth in a demand cycle was the year of 2008 when the property market in the USA slumped and as a result problems of the financial sector in the United States of America led to a world crisis which was, among others, manifest in a considerable decrease in demand in numerous markets and sectors of final products. One market of this kind, which experienced a sales slump with a several dozen percent decrease in demand from 2008 to 2009, was the American personal cars market which forced numerous producers, in particular American ones, to make changes in the areas of production (at a level of 3rd, 2nd and 1st class suppliers and final producers), supply and distribution.

On the right-hand side of the chart in Figure 2 are scenarios of actions in supply chains when changes in demand are over a long period of time. Regardless of its direction, processing of the processes in a supply chain is related to practically each area: production and production logistics, and consequently to the operations of the entire chain (with its network nature) and each of its participants. This situation means that there is a necessity for applying a number of tools and concepts of management within the process of holistic chain management bearing in mind the fact that changes cannot have negative

influence on the value in the form of a final product received by the consumer/end customer. It is the value which indicates how the chain works and how the consumer's requirements are met, also defined as the customer's economic system. Therefore, chain management cannot be only expressed by means of a logistic approach of making processes efficient, but it must take into account the quality of a product and processes leading to its development, and delivery to the market as well.

A long term decrease in demand is a necessity for lowering the level of production at the suppliers' and end producer's, reduction in the storage and transport potential, both at particular stages of supply and processes distributing end products. They are changes in distribution channels as well. On the one hand, all changes aim at reducing the costs of operations in order to correlate them with a decline of sales income with maintaining efficiency of a supply chain, and on the other hand, maintaining the current value obtained by the customer. In the case of a long term increase in demand the area of changes is similar to what is presented above, but it aims at meeting an increase in sales, and therefore rising a potential level of a supply chain by means of increasing production capacities and the corresponding potential in the areas of supply and distribution.

In the case of long term changes in demand change management in supply chains requires a mixture of tools and management concepts. The primary tools include marketing mix, logistics and SCM (*Supply Chain Management*). The most appropriate concepts include: LM, AM, Six Sigma and BPR (*Business Process Reengineering – reengineering*). Figure 3 illustrates a chart representation of the above mentioned tools and concepts, which, due to their qualities and anticipated effect of implementation, should be used in change management of supply chains. What is important is that while adjusting a supply chain to changes in demand each concept and tool should be used appropriately with determining the tasks of change management as well as combine particular tools and concepts into one process or decision process.

⁹ A.J. Slywotzky, D.J. Morrison, B. Andelman, *Strefa zysku*, PWN, Warsaw 2000.

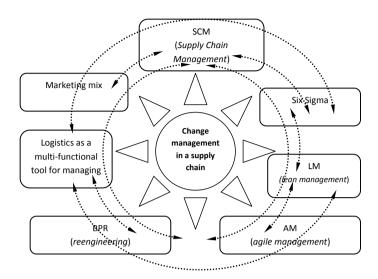


Figure 3. Mix of primary tools and concepts in change of supply chains Source: own work.

The task of marketing mix in change management of supply chains is to analyze changes in demand, their duration and directions. The conclusions drawn from this analysis provide a basis for making decisions related to changes in the area of production, supply and distribution and connections among the participants of a supply chain and, therefore, how the processes in connection with manufacturing the final product and information support unfold.

As a multifaceted management tool, logistics aims at optimizing production processes, supply and distribution in a supply chain at each stage of the product or information flow.

Another tool, which is commonly applied in supply chains, is the SCM system regarded as a high class information system which supports supply chain management. As a data processing and communication tool in a supply chain it supports optimization of supply processes, production and distribution, which corresponds with increasing economic efficiency of a chain by optimizing prices of materials, components and other material factors of production or storage minimization. In SCM, which is often connected with internal ERP systems (*Enterprise Resource Planning*) of the participants of a chain, it, on the one hand, enables to collect data and its processing, which supports decisions made by managers of a higher level.

With the development of supply chains the LM concept, which was originally used for making the structures and production processes costs 'lean', was applied in their management, which benefited the areas of storage economy (supply and distribution), production, productivity, reduction in the personal costs and quality improvement of products at each stage of their processing¹⁰. The AM concept, which provides similar benefits as LM, aims at elasticity in adjusting internal processes to changes in the external environment of a supply chain, while taking into account, among other things, the maximum reduction in the time of response to the above processes. Both of the concepts, which are often used as a mix of tools provided to the managers, allow to correlate the costs of functioning of a chain and responses to changes in demand.

Six Sigma, like LM and AM, is a concept of management which was originally implemented in production processes with the aim of seeking to achieve their perfect quality, and consequently of what is produced – all of that with the aim of meeting the customer's requirement. It is a method based on the broad database possible, which allows to define a problem, measure it and analyze in order to perfect it. The last tool of the Six Sigma concept is control on changes in a process.¹¹ By extending application of the concept with regard to a supply chain it is possible to achieve a similar result – not only in the area of production, but also in the area of supply and distribution with maintaining the value which is expected by the end customer/consumer. In reference books it is pointed out that efficiency of Six Sigma application requires a very large dataset, which can result in slowing down processes of changes as well as decision processes. It seems, however, that if the data is processed in the SCM system connected with ERP systems used by the participants of a chain, this problem will not occur. In turn, what can also be a task of SCM is decision scenarios which are a ready background for decisions made by higher level managers of a leader in a supply chain.

The last concept, suggested by the author, suitable for managing changes in a supply chain in the circumstances of long term changes in demand is BPR. And in this case the concept was originally used to redesign processes in enterprises when changes in the external environment required decisions made by an enterprise with regard to significant changes in its operations – not only

¹⁰ Instrumenty zarządzania łańcuchami dostaw, M. Ciesielski (ed.), PWE, Warszawa 2009.

http://mfiles.pl/pl/index.php/Six_sigma (access 29.07.2015).

in the context of changes in processes, but also in the philosophy of its functioning. Hence, reengineering is defined as a concept of redesigning all areas of enterprise operations. Similarly, according to E. Stawiarska, BPR should be used in supply chains, which allows it to be redesigned with the aim of coordinating and simplifying processes which take place in all of its chains. What is key in this case is agreement on who in a supply chain should be a leader of changes. However, it seems obvious that it should be a chain leader who should be responsible for change management. In the age of outsourcing, it does not matter who actually develops redesigning.

Conclusion

As a result of the modern globalized economy competition has become a world scale phenomenon and changes in a particular region often have their impact on changes in general. Since the global economy is demonstrated in supply chains, they also have to be adjusted to changes which take place locally, regionally, and globally as well. This means that they have to be prepared for these changes and their various nature. Supply chain management, regardless of whether or not it is actually different in nature to a single enterprise management, ¹³ requires application of numerous tools and concepts which, on the one hand, allow to build a competitive advantage and, on the other hand, provide the end customer/consumer with a value in the form of the highest quality product which provides economic and operational benefits expected by her.

The tumultuous environment, in which modern enterprises operate, requires that they implement strategic management in which the key components include: an analysis of the environment and developing scenarios of changes in the external environment with the aim of adjusting an enterprise to them and management of changes so that reengineering of operations performed by an enterprise corresponds with the requirements of the market and customers who represent it. It is no different in the case of supply chains which, within the framework of strategic management, must include changes in the environment and actions which are related to it.

¹² E. Stawiarska, *Reengineering w zarządzaniu łańcuchem dostaw*, "Gospodarka Materiałowa i Logistyka" 1999, No. 11, pp. 233–237.

¹³ A. Łapińska, Potrzeba tworzenia...

The focus of this article is indication of what management tools and concepts, which originally were used in the case of enterprises, are necessary for managing changes in a supply chain in the event of short term and long term changes in demand. In particular, in the case of the latter, marketing mix, logistics, SCM, LM, AM, Six Sigma and BPR are used in specific configurations and areas of changes in supply chains should guarantee such a reengineering of operations and processes in a supply chain that, on the one hand, a competitive advantage in the final product market is maintained, and on the other hand, the end customer/consumer is provided with a value she expects.

Summary

The article presents issues related to change management in supply chains as a response to changes in demand from end customers or consumers. The modern economy foundation for the development of enterprises includes an ability to respond appropriately to changes in demand. Because supply chains have become one of very important components in achieving a competitive advantage of enterprises, a response to changes in the market must be a component in managing a supply chain as well as changes taking place in it. Depending on the nature of changes in demand, change management in demand for final products can relate to supply processes, production, distribution as well as logistic processes – both at the level of one supply chain participant and numerous supply chain participants. The article aims at presenting the most important tools and concepts of change management in the above mentioned areas over long term and short term changes in demand.

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ZARZĄDZANIE ZMIANAMI W ŁAŃCUCHACH DOSTAW W KONTEKŚCIE ZMIAN W OBSZARZE POPYTU

Streszczenie

W publikacji zaprezentowano zagadnienia związane z zarządzaniem zmianami w łańcuchach dostaw jako reakcja na zmiany w obszarze popytu po stronie klientów finalnych lub konsumentów. We współczesnej gospodarce podstawą rozwoju przedsiębiorstw jest między innymi umiejętność właściwej reakcji na zmiany po stronie popytu a skoro łańcuchy dostaw stały się jednym z bardzo ważnych elementów budowania przewagi konkurencyjnej przedsiębiorstw to reakcja na zmiany na rynku musi być elementem zarządzania łańcuchem dostaw i zmianami w nim. Zarządzanie zmianami, w zależności od natury zmian po stronie popytu na produkty finalne, może dotyczyć procesów zaopatrzenia, produkcji, dystrybucji jak również procesów logistycznych zarówno na poziomie jednego z uczestników łańcucha jak również wielu z nich. Celem opracowania jest zaprezentowanie najważniejszych zagadnień z zarządzania zmianami w powyższych obszarach.

Słowa kluczowe: łańcuch dostaw, zarządzanie, zmiany