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INFLUENCE OF THE DEMAND INFORMATION QUALITY ON PLANNING PROCESS ACCURACY IN SUPPLY CHAIN. CASE STUDIES

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ABSTRACT. Background: Identification and analysis of factors that affect the accuracy of demand planning process across the supply chain is one of the most important problems which influence the effectiveness of its material and information flows.

Material and methods: On the basis of demand planning process investigation authors define the main elements affecting the right supply chain performance level and investigate the possible connections between demand information quality and demand planning process accuracy. Later, an overview of some recent developments in the analyzed research area is provided.

Results: Based on the literature review, there is described the defined factors impact on the accuracy of demand plan in each echelon for case companies. There are considered three cases. The examples illustrate supply chains of different manufacturing companies. The focus is placed on demand planning across the supply chains. The issue of determining the accuracy of future sales plans in each echelon of supply chains and factors affecting it are raised. Taking into account the case companies demand planning process analyses, there are defined possible quality measures, that are possible to be used when forecasting the customer demand.

Conclusions: One of the most important and difficult planning area in the companies is becoming planning demand. Errors in planning are reflected not just in the business resource planning but also in the entire supply chain. Presented cases show that many factors affect the proper demand planning process in the supply chain, like e.g. information technologies, lead-time, or number of supplied materials. As it can be seen from the case studies, the model of collecting information from the market plays an important role in the demand planning process.

Key words: demand planning, information flow quality, supply chain.

INTRODUCTION

Supply chain may be defined as an integrated process wherein a number of various business entities (like suppliers, manufacturers, distributors, and retailers) work together in an effort to: (1) acquire raw materials, (2) convert these raw materials into specified final products, (3) deliver these final products to retailers and final customers.

[Beamon 1998]. Such a logistic network is then characterized by a forward flow of materials and a backward flow of information. As a result, the reliability and efficiency of supply chain performance can be affected by many different factors.

There exist many models in the literature which are concerned with material procurement, production, transportation, and storage or distribution activities and with information flows performance. However, lot

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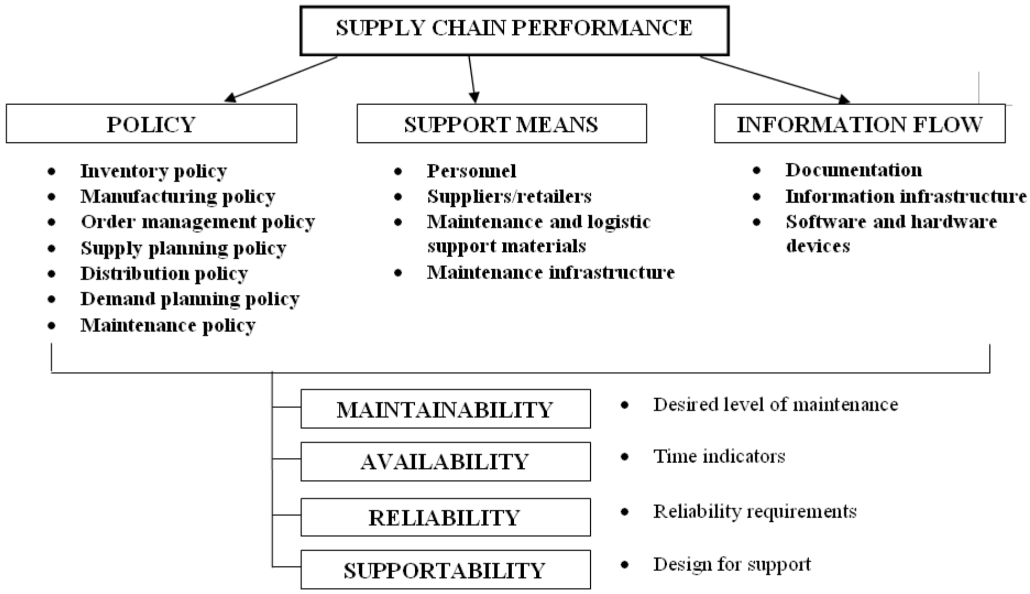
of them treats each stage of supply chain as a separate system [Cohen and Lee 1988]. As a result, many of the supply chain interactions are ignored. This may led to improper identification of elements, which may influence the proper performance of a given chain (Figure 1).

Nowadays, any system cannot perform in a satisfactory manner without reliable information flow. Thus, lots of works are focused mainly on supply chain information flow strategies definition (see e.g. [Vanpoucke et al. 2010]), supply chain information systems management (see e.g. [Gunasekaran and Nagai 2004]), reliability of information flows investigation (see e.g. [Petkova et al. 2005]), or data quality modeling problems (see e.g. [Chen and Wolfe 2011]).

As a result, the focus of this study is to identify factors that affect the accuracy of the demand planning process across the supply chain.

Following this, the rest of this paper is organized as follows: In the Section 2 authors present the main elements affecting the reliable and available supply chain performance. Later, information flow quality and demand planning process accuracy has been investigated. The paper is ended by the presentation of the obtained analysis results in comparison with the knowledge about the case companies' present conditions.

The aim of this paper was to estimate and evaluate some factors, which influence the demand process planning in companies.



Source: Blanchard 2004, Nowakowski 2006, Nowakowski and Werbińska 2006, Werbińska 2008

Fig. 1. Reliability, availability, maintainability and supportability in achieving supply chain performance
Rys. 1. Nieuszkadzalność, gotowość, obsługiwalność oraz zdolność do realizacji wsparcia logistycznego w obszarze zapewnienia funkcjonowania łańcucha dostaw

FACTORS THAT DETERMINE SUPPLY CHAIN PERFORMANCE LEVEL

Supply chain networks are vulnerable to disruptions and failure at any point in the supply chain may cause the entire network to fail. A key factor in effective supply chain management is the ability to minimize the effects of such undesired events/disruptions occurrence. As a result, understanding what disruptions may occur in a supply chain, how they will affect a supply chain system, and how far reaching these effects will be, would be of considerable benefit [Wu et al. 2007].

Treating the supply chain disruptions as unexpected events occurrence, we can describe them as having uncertainty in supply chain operations [Wu et al. 2007]. Uncertainty in the supply chain can be seen from different aspects, such as [Vlajic et al. 2008]:

- time (in the sense of duration of activity/process, starting/ending moment of activity realization, frequency of activity/demand occurrence),
- quantity (of supply, demand or physical transfer of goods),
- location/place (where activity starts/ends),
- quality (of service/products),
- cost (fluctuation, occurrence).

For example, Landeghen and Vanmaele in their work [2002] profiled sources of uncertainty in the supply chain. They highlighted 13 sources of uncertainty across three supply chain's planning horizons (operational/tactical/strategic) and categorized them as Low, Medium and High.

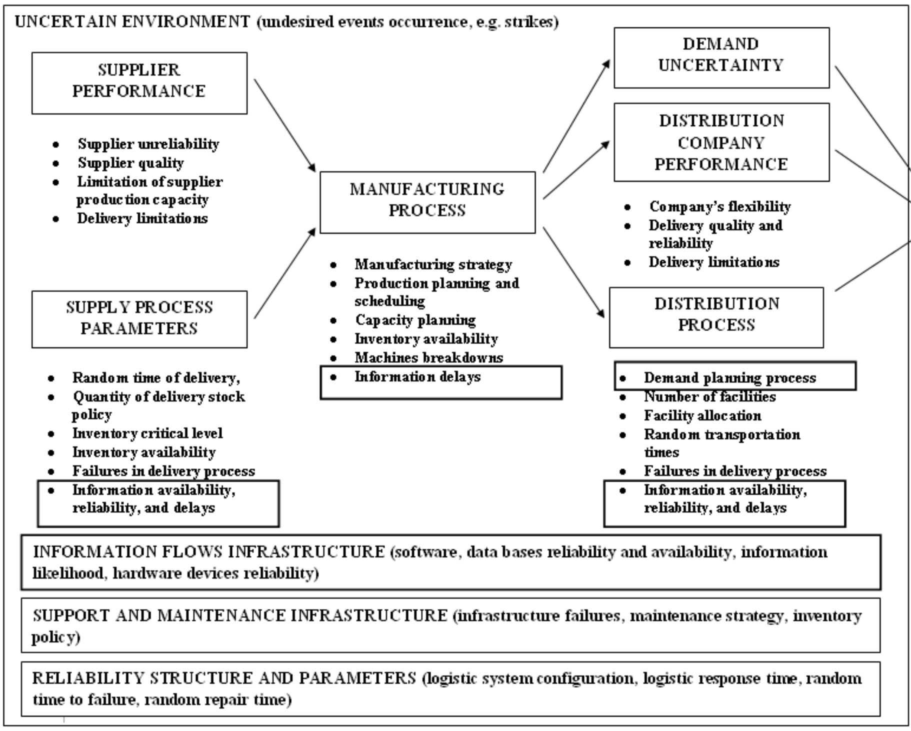


Fig. 2. Main factors which influence supply chain performance
Rys. 2. Główne czynniki wpływające na poziom funkcjonowania łańcucha dostaw

Taking the presented perspective of supply chain disruptions definition, we can identify the main factors which influence the supply chain performance (Figure 2). The factors which may affect the right supply chain performance are divided into six main groups. The first two regard to supply reliability. At the beginning of supply chain even the most reliable supplier could have a late delivery disrupting the whole production process. Moreover, improper supply process parameters could lead organizations to reschedule the regular production because running out of raw materials.

Problems with manufacturing process are the second source of supply chain unreliability. For example, a new machine could fail to work unexpectedly, even if it has just been purchased. The production process interactions, its stability, manufacturing lead time or changes in production technology are mostly unpredictable and usually hard to measure.

Finally, at the end of supply chain random customer demand is the most challenge problem, as well as the distribution process parameters and the condition of distribution company. An inaccurate forecast of customer demand could lead to overstock or under stock, what could cause the increase of inventory costs of organization performance. Moreover, decisions made during supply chain designing process in the area of distribution process performance also have the influence on chain reliability. The variability of retailers/ distribution centers performance, quality of transportation process, quality of demand planning process or information availability and accuracy may significantly disturb chain performance and lead to fail customer satisfaction achieving.

The researchers pay the most attention on demand uncertainty [Li and Schulze 2011]. The errors in forecasting the customers' demand could be e.g. changing customers' preference, irregularity of customer orders in terms of time, quantity and quality. Thus, in this paper authors focus on demand planning process and its quality. Moreover, the proper demand planning process cannot be executed without reliable and available information. Information sharing and collaboration with trading partners is seen as a company's top logistic challenge [Vanpoucke et al. 2010]. Thus, in the next Section, authors focus on the proper information flow performance and information quality.

INFORMATION FLOWS QUALITY AND RELIABILITY

Two main problems in analysing information flows are its quality and reliability. The information quality can be determined with the use of six attributes described in [Kehoe et al. 1992]. According to them, an efficient and seamless supply chain would ensure that the relevant information on all flows within the network is accurate and comprehensive, being made accessible in the right time, in the correct format.

Many researchers have identified several important characteristics of information quality. For example, authors in [Zhou and Benton 2007] have focused on nine aspects of information quality:

- accuracy,
- availability,
- timeliness,
- internal connectivity,
- external connectivity,
- completeness,
- relevance,
- accessibility,
- frequently updated information.

Moreover, when investigating the information quality, many literature works suggest MIR- concept use [Lin et al. 2004, Molenaar et al. 2002, Petkova et al. 2005, Sander and Brombacker 2000]. The MIR-concept aims at classifying the quality of information flows taking into account their ability to measure. The issues of information quality has been intensively discussed e.g. in [Ahmad and Zailani 2007, Chen and Wolfe 2011, Gustavsson and Jonsson 2008, Suhong and Binshan 2006].

In the reliability theory, there can be found a lot of works devoted to credibility and reliability of technical and logistic systems' information flows assessment. This situation is connected with the uncertainty of operational system data, which determines the level of compatibility between real-life situations and gathered information [Klir 2004, Nowakowski 2010, Nowakowski 1999]. This problem is directly connected with disruptions occurrence during information flows performance. The mentioned disruptions are generated by the operational system itself or its environment [Lopez and Sarigul-Klijn 2010, Nowakowski 2011].

On the other hand, during the supply chain's operational processes planning performance are used historical data and forecast analysis results. Both of the mentioned information sources are also in some way uncertain, what may affect e.g. the expected cost of system performance. The types of errors, which may occur during the information gathering process, are connected with [Madanat 1993, Nowakowski 1999]:

- intentionally input of false data,
- accidentally errors connected with not proper filled documentation,
- unreadable data,
- lack of data,

– errors connected with data processing process.

In turn, demand forecasting models are strictly related with the uncertainty connected with e.g. [Madanat 1993]:

– measurement errors of model's variables,
– randomness of performed processes,
– defined model parameters (e.g. too small statistical trial).

Moreover, the main problems being investigated in the analyzed research area regard to:

– issues of information systems optimal organization (e.g. [Aarset and Ulvestad 1993, Christensen and Voytek 1975, De La Cruz et al. 2006, Durango-Cohen and Sarutipand 2009, Petkova et al. 2005]), connected with e.g. effective decision support system designing,
– reliability analysis of computer devices (e.g. [Huang and Lo 2006, Nasser 1986]),
– information flow reliability analysis, which takes into account the following issues:
  – information credibility (e.g. [Dunbar 2010, Nowakowski 1995]),
  – information incompleteness (e.g. [Bolc et al. 1991, Guidebook 1999, Pierskalla and Voelker 1976]),
  – information uncertainty (e.g. [Lin et al. 2008, Nowakowski 2010, Nowakowski 1999, Rocco et al. 2000]),
– diagnostic monitoring of disruptions occurred during information flows performance in logistics and maintenance systems [e.g. Li and Schulze 2011, Sanchez et al. 2009], or plant maintenance systems [e.g. Carnero 2006],
– optimal system reliability modelling with taking into account the uncertainty information about system elements reliability levels [e.g. Coit 2004, Lin et al. 2003, Marsaguerra et al. 2005, Rakowski 2005, Wang et al. 2004].

As a result, it is important to determine the uncertainty level of obtained results from quality and reliability analysis of given supply chain, and to define how they can be implemented in the chosen decision model application.

DEMAND PLANNING PROCESS

Demand planning is the first step of business planning. As business are moving towards a demand planning becomes the initial step to subsequent business and operations planning process such as purchasing, production, distribution and cash flow planning.

Thus, the performance of a business depends on a large extent upon the quality of the demand plan. The forecasting process is critical for the business success achieving because poor forecast can lead to insufficient or unnecessary high, finished good stocks, unused raw materials, misused production assets, and low margin. The forecasting and demand processes become more critical and difficult because of market evolving, what cause increased pressure on products life cycles, increased global competition and business turmoil. Companies that establish demand planning practice have significant competitive advantages. Every enterprise should make forecast irrelevant to their market sector, size or business activities. Appropriate demand planning process can improve the quality of forecast especially when the increase of number of customers, markets and products can be observed.

Demand planning process depends on inter alia the model of collecting information from the market. It is important to look beyond the enterprise to create correct demand planning process. Two main models can be described - information sharing and non-information sharing models [Chen and Wolfe 2011].

The initiator of the first model is the plan determined on the basis of historical data - most sales forecast. Manufacturer does not collect the information about retailer's orders and its sales data. This model is shown in the Figure 3.

The demand planning process starts when appropriate numbers of historical data are gathered. Demand planning process starts with demand forecasting, which is a key process for maintaining efficiency throughout supply chain [Crum and Palmatier 2003]. When demand forecasting is considered as a process, the company has clear cut goals and predefined priorities towards it [Makridakis and Wheelwright 1997]. However, some problems appear to arise with demand forecasting. These problems correspond to making a forecast, which is based on pure sales historical data that could cause errors. It also causes a repetition of mistakes due to processing without understanding true customer demand [Sarang and Laxmidhar 2006]. This is the reason why demand forecasting should change or evaluate into demand planning based on multiple inputs. The forecast should be modified using information from the company such as: resources, production capacity, marketing input, product/brand management, statistical analysis, business plan and strategy etc. and environment: customers, competition, technology, economic trend etc. [Crum and Palmatier 2003].

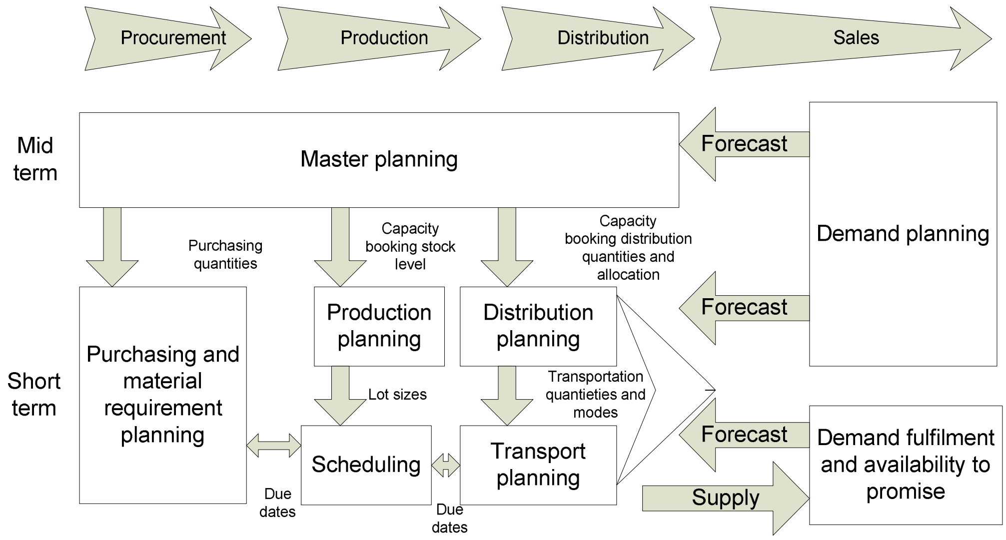


Fig. 3. Mid and short term planning process in manufacturing companies (Rohde 2002)
Rys. 3. Proces planowania średnio- i krótkoterminowego w przedsiębiorstwach produkcyjnych (Rohde 2002)

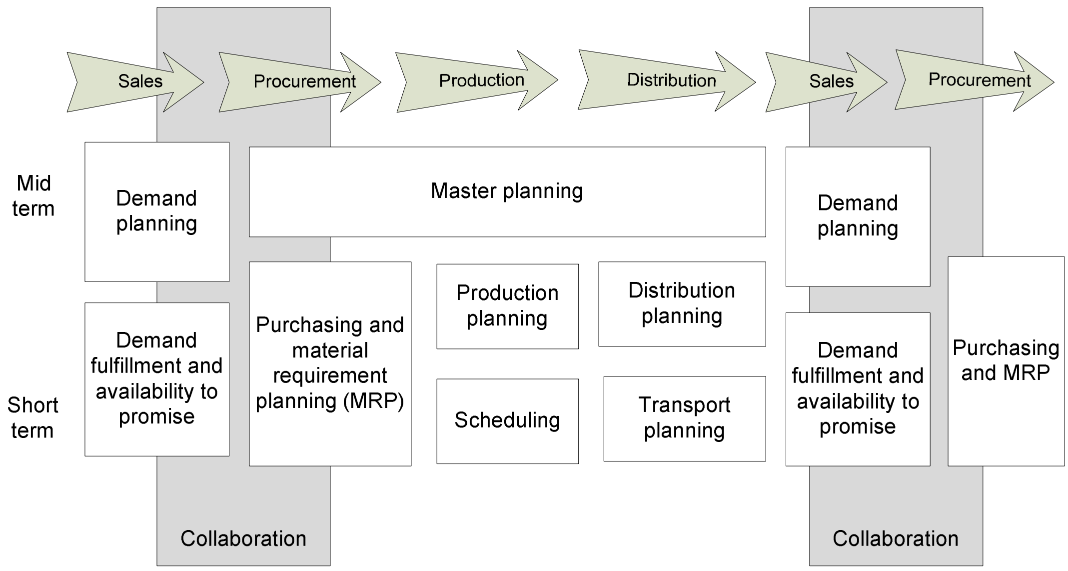


Fig. 4. Mid and short term collaboration planning process in manufacturing companies (Meyr et al. 2002)
Rys. 4. Proces planowania współpracy średnio- i krótkoterminowej w przedsiębiorstwach produkcyjnych (Meyr et al. 2002)

Favorable situation for the companies is connected with planning in the area of interaction with others. Sharing information allows determining the forecast based on the procurement and no historical data. The mid and short term collaboration planning process in manufacturing companies is shown in the Figure 4.

This model can be characterized as continuous planning process. The customers are the initiators of the process and sales collaboration is crucial. Co-operating companies share information on demand patterns, lead times, process and product configuration. If the collaborations are managed appropriately then the downstream supply chain will not lose its capability to promise lead times to customers and at the same time minimize the total costs of the supply chains [Kristianto et al. 2011]. Thus, each of the two shaded blocks in Figure 4 represents both sales and procurement collaboration to create a common and mutual agreed-upon plan [Chen et al. 2009]. Furthermore, sales and procurement collaboration should also be supported by using, for instance, vendor managed inventory (VMI) by sharing demand and inventory information amongst enterprises or factories such that it creates demand collaboration, inventory collaboration, capacity collaboration, and transport collaboration, as shown in the Figure 4 [Kilger and Reuter 2002]. In this model the demand planning process starts when customer's orders are collected. The statistical forecast is replaced by procurements. However, other sources of information are also needed to calculate accurate demand plan, such as: inventory level, business plan and strategy, product/brand management, marketing input, etc.

Although sharing information in the supply chain and the use of different data sources are not always the solution for the problems encountered with the demand planning. It depends on many different factors. Supply chains contain multiple echelons and are faced with uncertain demand and lead-times [Kian and Piplani 2003]. It also depends on the type of business, the products supplied to the market, companies size and production strategy. In the next Section, there is described the factors impact on the accuracy of demand plan in each echelon for case companies.

CASE STUDIES

In this part of the paper three cases are considered. The examples presented below illustrate supply chains of different manufacturing companies. The focus is placed on demand planning across the supply chains. The issue of determining the accuracy of future sales plans in each echelon of supply chains and factors affecting it are raised.

Case study - global car manufacturer

The first company described in this paper is a global car manufacturer. It operates in 22 countries and has more than 1 550 employees. The supply chain and demand information flow is shown in the Figure 5.

In the presented supply chain, there is provided the delivery of 9 product families with many variants in each product family. Due to the high value of final goods, the production process is organized according to the MTO (manufacturing-to-order) strategy. The lead time equals 1-3 months. Planning process bases on customer orders and manufacturer's forecasts about future demand. It is divided into two areas: strategic (capacity) and tactical (S&OP) planning. Capacity planning is a long-term decision which sets the overall level of capacity utilization. Performance decisions impact on lead time, customer responsiveness, operational costs and the company's ability to compete. The second area of planning is S&OP (Sales & Operational Planning) process. It is a common process that balances supply and demand across the extended supply chain. It aim is to maximize financial performance and customer satisfaction in a common plan. Demand planning is used to create forecasts of market demand. Forecast is based on historical sales data, customers' orders, market research, etc. Supply planning is a function of setting the general level of industrial production (production plan) and other activities related to

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capacity evaluation. As a result, there can be defined the planning quality in each echelon of analyzed supply chain (Table 1). Moreover, in the Figures 6-9, the examples of planning errors which occurred in each supply echelon are given.

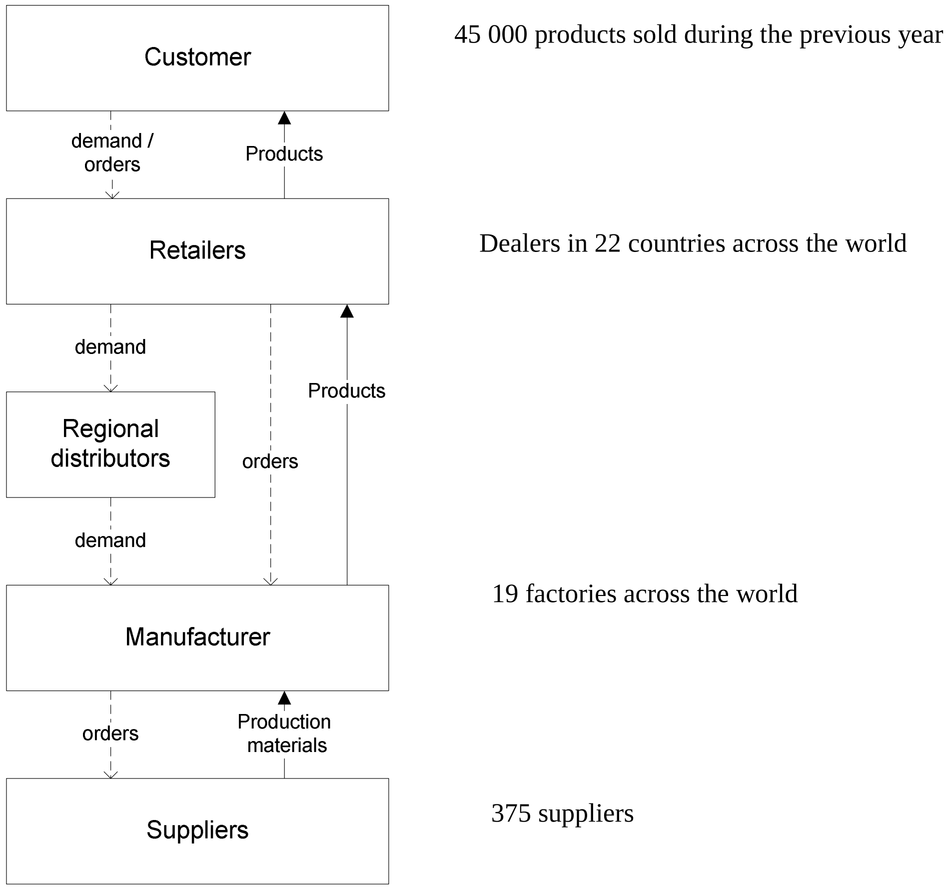

Fig. 5. Supply chain of car manufacturing company
Rys. 5. Łańcuch dostaw przedsiębiorstwa z branży motoryzacyjnej

Table 1. Planning quality in each supply chain echelon (car manufacturer)
Tabela 1. Jakość planowania na poszczególnych szczeblach łańcucha dostaw (producent samochodów)

SUPPLY CHAIN	**Planning focus**	**Collected demand information**	**Planning accuracy**	**What impact the planning accuracy**
Retailers	Demand	Customer order & lead times Sales in values and volumes Market data – customer needs	Average forecast error for the last year equals 9,79%	Targets for dealers
Regional distributors	Demand	Determine future customer needs	Average forecast error for the last year equals 16,44%	Planning is done on total volume level per product family
Manufacturer	Demand and supply	New product development data Sales history - sales in values and volumes Costs Inventory Market forecast	Average forecast error for the last year equals 20,68%	S&OP process
Suppliers	Inventory, storage capacity	Inventory The manufacturer orders	Average forecast error for the last year equals 23,19%	Inventory control

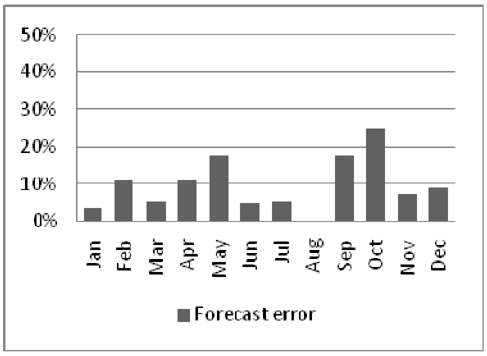

Fig. 6. Example of planning error (Retailers)
Rys. 6. Przykład błędu planowania (Dystrybutor)

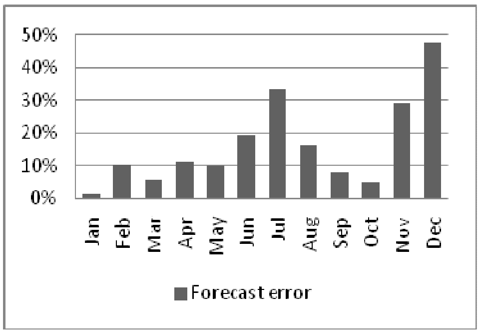

Fig. 7. Example of planning error (Regional distributors)
Rys. 7. Przykład błędu planowania (Dystrybutor regionalny)

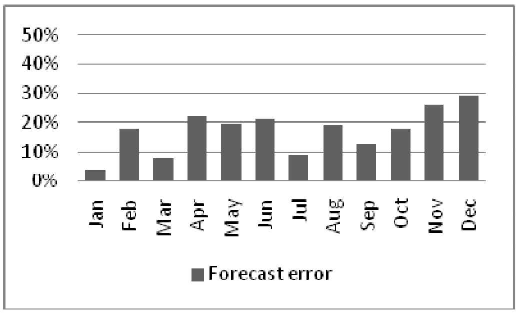

Fig. 8. Example of planning error (Manufacturer)
Rys. 8. Przykład błędu planowania (Producent)

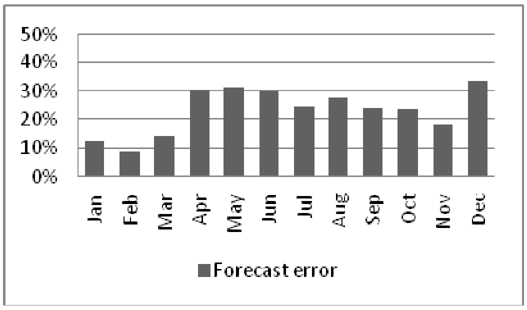

Fig. 9. Example of planning error (Suppliers)
Rys. 9. Przykład błędu planowania (Dostawca)

The strength of demand planning in the supply chain presented above is to use of S&OP process by manufacturer. The most significant fact is that it leads to the synchronization of supply and demand through collaboration between managers in the areas of sales, production and logistics.

Case study - global clothing manufacturer

The next case regards to the global clothing manufacturer from Europe, which has more than 1700 stores around the world. The supply chain is shown in the Figure 10.

In this supply chain manufacturer needs just two weeks to develop a new product and get it to the stores, compared with six-month industry average. Lead-time in Europe equals 2 weeks and 1 month around the world. It launches about 10 000 new designs (100 different product families) which 100% are changed each year. The assortments changes 70-90% each month in retail stores. It is possible by using appropriate manufacturing strategy - MTO (manufacturing to order). The pull system is based on fast reactions to retail sales. In addition to gathering POS data automatically, store manager around the world are in frequent contact by phone with product manager in the design department (Kaipia and Holmstrom 2007). The quick response strategy enables this company to be twelve times faster than its competitors. It allows the company to sell more items at full price. Only 15-20% products are sold of markdown (Table 2).

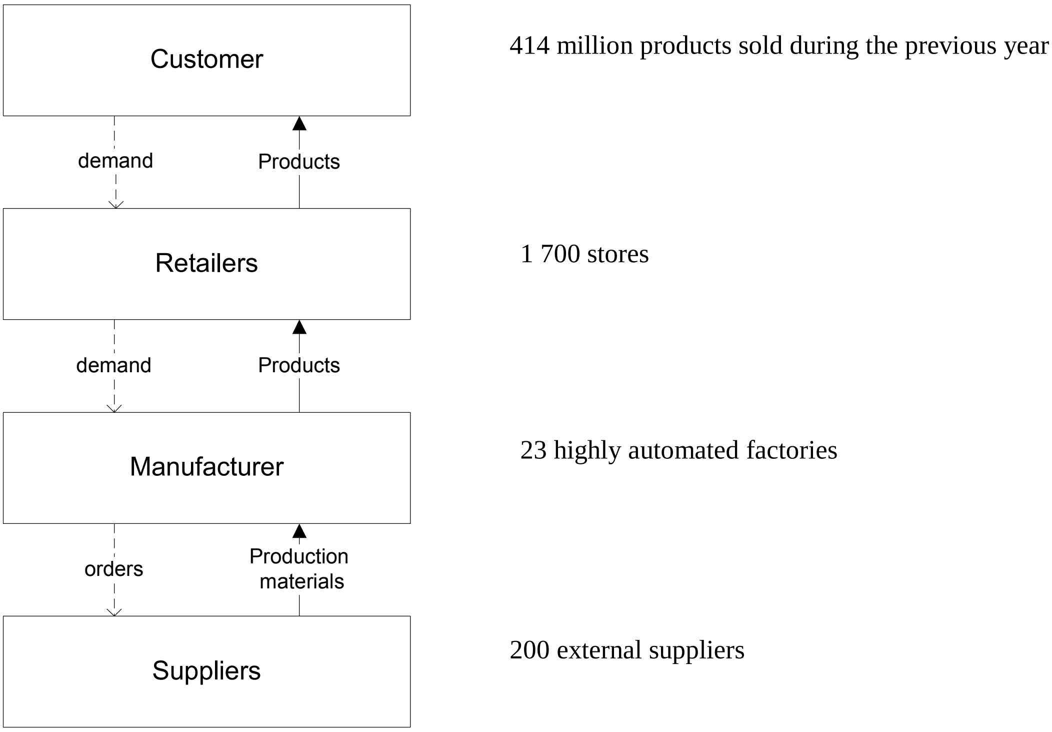

Fig. 10. Supply chain of clothing manufacturing company
Rys. 10. Łańcuch dostaw przedsiębiorstwa produkcyjnego z branży odzieżowej

Table 2. Planning quality in each supply chain echelon (clothing manufacturer)
Tabela 2. Jakość planowania na poszczególnych szczeblach łańcucha dostaw (producent odzieży)

SUPPLY CHAIN	**Planning focus**	**Collected demand information**	**Planning accuracy – average forecast error**	**What impact the planning accuracy**
Retailers	Demand	Customers' needs	Markdown 15% - 20%	Quick response strategy, POS terminals – current information on demand transmitted to design department
Manufacturer	Demand / production plan	Customers' needs Trends in the market Market forecast	Markdown 15% - 20%	Quick response strategy; close watch on trends and buying behavior; quick decisions; reducing risk
Suppliers	Inventory, storage capacity	The manufacturer's orders - history and current orders Lack of information about customer demand	Average forecast error 25% - 30%	Inventory control

Despite a large variety of products, demand planning in that supply chain is organized in the right way. Sharing information about customer demand provides quick response and flexible manufacturing system ensures short lead times.

Case study - global furniture manufacturer

The last case shows the supply chain of medium-sized company - a furniture manufacturer, which produces and sells its products at the European market. Its supply chain is presented in the Figure 11.

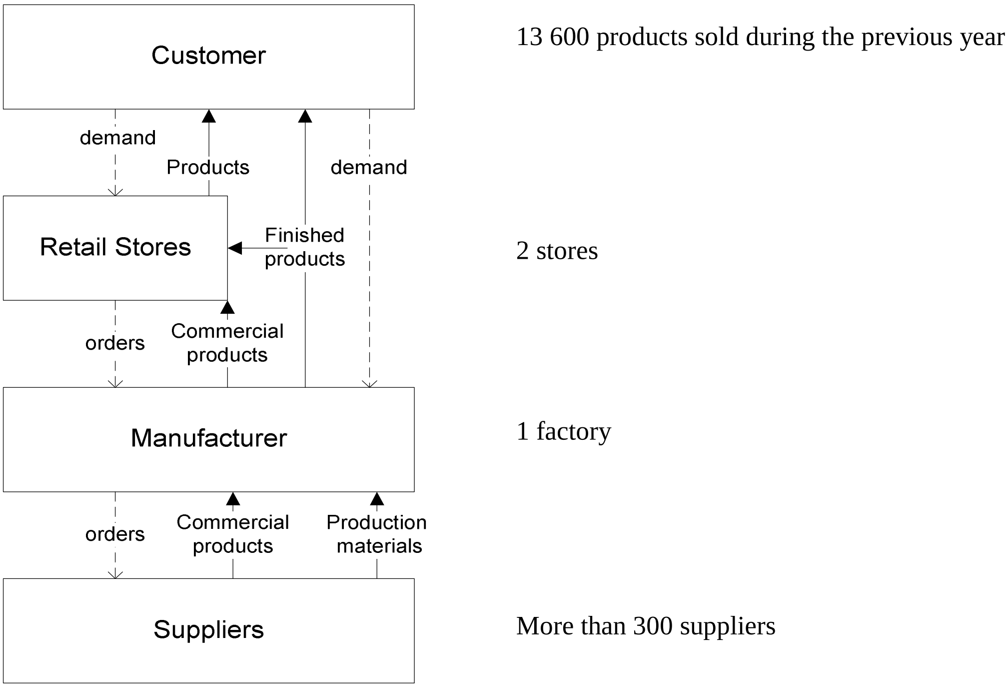

Fig. 11. Supply chain of furniture manufacturer
Rys. 11. Łańcuch dostaw producenta mebli

Table 3. Planning quality in each supply chain echelon (furniture manufacturer)
Tabela 3. Jakość planowania na poszczególnych szczeblach łańcucha dostaw (producent mebli)

SUPPLY CHAIN	**Planning focus**	**Collected demand information**	**Planning accuracy – average forecast error**	**What impact the planning accuracy**
Retail stores	Demand	Historical sales	45,17%	6 627 products are offered, lack of forecasting
Manufacturer	Production plan	Historical data	Commercial products – 53,35% Produced products – 46,82%	Production Director experience, statistical analyzes are conducted for each department, forecast for semi-products are calculated
Suppliers	Inventory, storage capacity	Manufacturer orders	Commercial products - 57,19% Production materials – 72,54%	Inventory control

Commercial products are sold from stock (MTS strategy) and furniture production takes place on the customer's order (MTO strategy). Characteristic of this supply chain is the huge number of products - 6 627 commercial products in 50 different families of products are offered and 304 products are produced (13 families). This situation causes a lot of problems. One of them is an accurate forecasting performance. A large number of products make it impossible to predict the demand without a proper predictive system. Another problem appears in the input of production process. It is a large group of suppliers, who providing 3 400 production materials.

Information between manufacturing department and trading units is not exchanged. This causes the large errors occurrence in forecasting process. Forecasts are formulated solely on the basis of available historical data. Data from previous years are updated on ongoing orders. The obtained order quantity is the forecast for future periods. In this supply chain statistical forecast is calculated only for semi-products in various production departments in order to avoid lead-time delay of the ordered products. This allows managers to keep lead-time of 2-5 weeks (Table 3). In the Figures 12-16, there are presented the examples of planning errors occurred in the supply chain.

In this supply chain the problem is connected with the lack of integration between network echelons and inside the companies. The problem also appears on the input and output of the manufacturing process. A large number of ordered materials and manufactured products prevent effective planning without adequate information system.

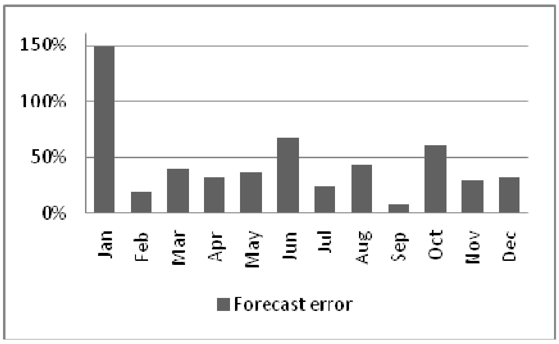

Fig. 12. Example of planning error (Retail stores)
Rys. 12. Przykład błędu planowania (Sklepy detaliczne)

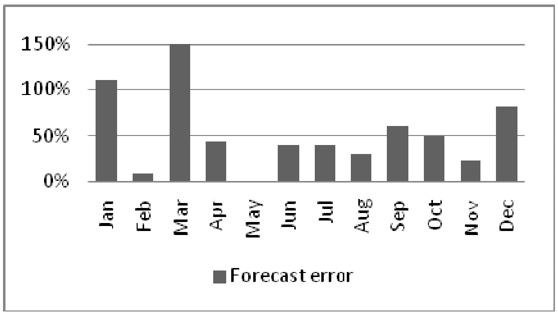

Fig. 13. Example of planning error (Manufacturer - commercial products)
Rys. 13. Przykład błędu planowania (Producent - produkty komercyjne)

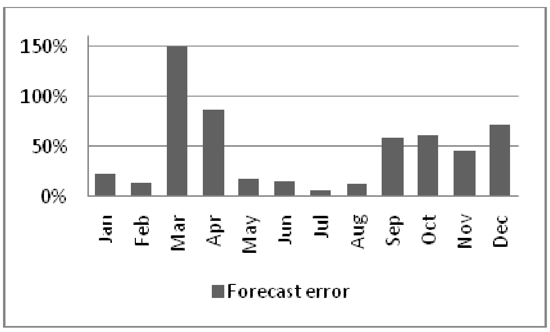

Fig. 14. Example of planning error (Manufacturer - produced products)
Rys. 14. Przykład błędu planowania (Producent - produkty wytwarzane)

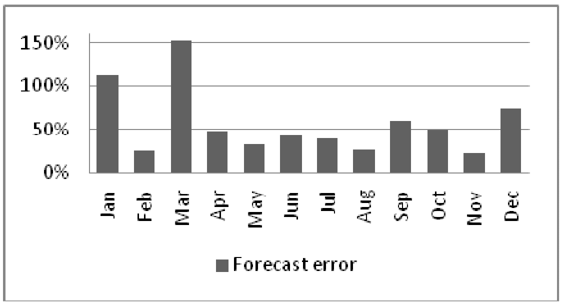

Fig. 15. Example of planning error (Suppliers - commercial products)
Rys. 15. Przykład błędu planowania (Dostawca - produkty komercyjne)

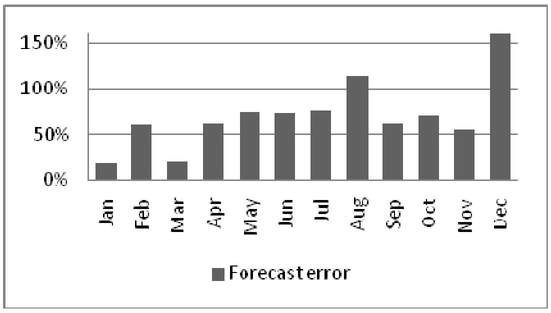

Fig. 16. Example of planning error (Suppliers- production materials)
Rys. 16. Przykład błędu planowania (Dostawca - materiały produkcyjne)

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SUMMARY

The rapid changes in consumer buying behavior change the business environment. It's very important that the company is equipped with the flexibility that allows it to adjust and adapt to changes very quickly (Palladino et al. 2010). One of the most important and difficult planning area in the companies is becoming planning demand. Errors in planning are reflected not just in the business resource planning but also in the entire supply chain. Presented cases show that many factors affect the proper demand planning process in the supply chain. It includes inter alia: (1) level of collaboration in the relationship - integration, (2) information technologies, (3) lead-time, (4) life cycle phase, (5) demand predictability, (6) number of product variants - product variety, (7) number of supplied materials.

These factors determine the availability and inventory needs to meet demand (Kaipia and Holmstrom 2007). To improve the quality of demand planning some managerial actions are suggested. Efficient information sharing between companies is significant. Using available demand information more effectively, companies are able to predict future demand with higher accuracy. The possibility of integration in supply chain needs information technologies such as transferring data in real time about direct customers' needs. Quick response is more possible and easier to implement when vertical integration is applied. The level of collaboration in the relationship should be as high as possible. More accurate demand plans provide also reduction of product variants and supplied materials. Manufacturers and others companies in supply chains should reduce lead-time as much as possible.

As it can be seen from the case studies, the model of collecting information from the market plays an important role in the demand planning process. The main differences are: the forecast calculations and system reliability. The possible quality measures, that are possible to be used when forecasting the customer demand, are given in the Figure 17.

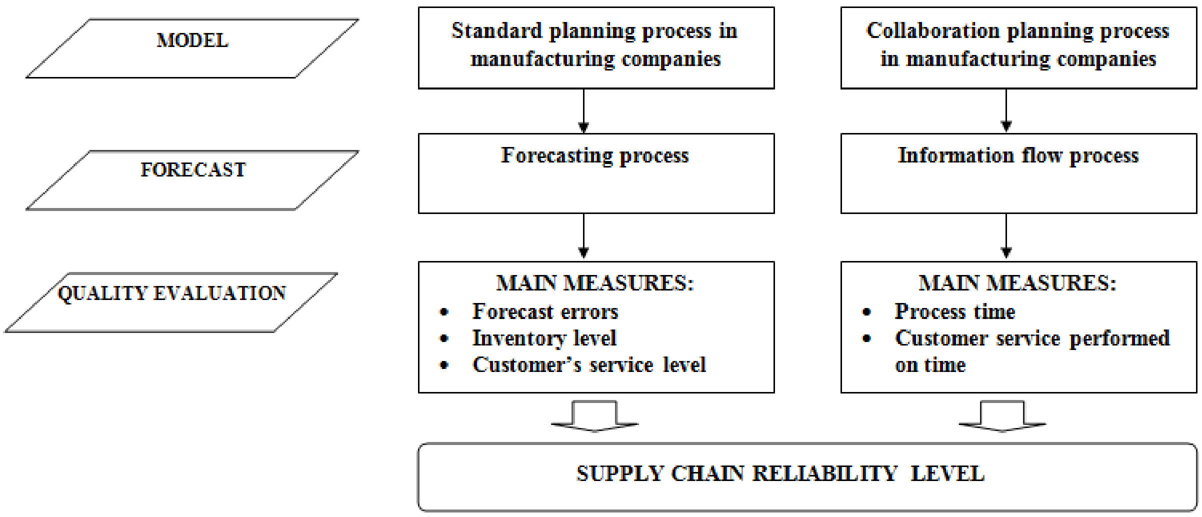

Fig. 17. Quality in the demand planning process
Rys. 17. Jakość w procesie planowania popytu

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WPŁYW JAKOŚCI INFORMACJI O POPYCIE NA DOKŁADNOŚĆ PROCESU PLANOWANIA W ŁAŃCUCHU DOSTAW. STUDIA PRZYPADKU

STRESZCZENIE. **Wstęp:** Identyfikacja i analiza czynników wpływających na dokładność procesu planowania popytu w łańcuchu dostaw jest jednym z ważniejszych problemów wpływających na efektywność przepływów materiałowych i informacyjnych.
Metody: W oparciu o badania procesu planowania popytu autorzy definiują główne elementy wpływające na poziom funkcjonowania łańcucha dostaw oraz badają możliwe zależności pomiędzy jakością informacji o popycie oraz dokładnością procesu planowania popytu. Następnie, przedstawiono przegląd literatury badanego obszaru naukowego.
Rezultaty: W oparciu o badania literatury, scharakteryzowano wpływ czynników na dokładność planu popytu w poszczególnych ogniwach łańcuchów dostaw analizowanych przedsiębiorstw produkcyjnych. Rozpatrzono trzy studia przypadków, w których rozpatrzono trzy przedsiębiorstwa produkcyjne z różnych branż. Skupiono się na procesie planowania popytu w analizowanych łańcuchach dostaw. Celem było określenie dokładności przyszłych planów sprzedaży w poszczególnych ogniwach łańcucha dostaw oraz czynników je zakłócających. W oparciu o analizę procesów planowania popytu przykładowych przedsiębiorstw produkcyjnych, zdefiniowano możliwe miary jakości, które mogą być wykorzystane podczas prognozowania popytu klienta.
Wnioski: Jednym z ważniejszych i trudniejszych obszarów planowania w przedsiębiorstwach jest planowanie popytu. Związane jest to z faktem, że błędy popełnione w procesie planowania przekładają się na funkcjonowanie całego łańcucha dostaw. Przedstawione studia przypadków pokazują, że wiele czynników ma wpływ na poprawność procesu planowania popytu w łańcuchu dostaw, jak np. technologie informacyjne, czas dostawy, czy liczba dostarczanych materiałów. Jednocześnie, można zauważyć iż model gromadzenia informacji rynkowej również jest istotnym zagadnieniem w procesie planowania popytu.

Słowa kluczowe: planowanie popytu, jakość przepływu informacji, łańcuch dostaw.

EINFLUSS DER QUALITÄT VON INFORMATIONEN ÜBER DIE NACHFRAGE AUF DIE GENAUIGKEIT DES PLANUNGSPROZESSES IN DER LIEFERKETTE. FALLSTUDIEN

ZUSAMMENFASSUNG. Einleitung: Die Identifikation und Analyse von Einflussfaktoren auf die Genauigkeit des Nachfrageplanungsprozesses in der Lieferkette ist eines der wichtigsten Probleme, die einen Einfluss auf die Material- und Informationsflusseffizienz ausüben.
Methoden: Basierend auf den Forschungsarbeiten am Nachfrageplanungsprozess definieren die Autoren die Hauptelemente, die das Funktionsniveau der Lieferkette beeinflussen. Zusätzlich werden die Zusammenhänge zwischen der Informationsqualität und der Planungsprozessgenauigkeit der Nachfrage erforscht. Anschließend wird ein Literaturüberblick aus dem erforschten Bereich präsentiert.
Ergebnisse: Basierend auf der Literaturforschung, wurde der Faktoreneinfluss auf die Nachfrageplanungsgenauigkeit in einzelnen Gliedern der Lieferketten in den analysierten Produktionsunternehmen gekennzeichnet. Es wurden drei Fallstudien, mit Produktionsunternehmen aus drei verschiedenen Branchen, betrachtet. Die Arbeiten waren auf den Planungsprozess der Nachfrage fokussiert. Das Ziel war es, die Genauigkeit der zukünftigen Verkaufspläne und Störfaktoren in den jeweiligen Gliedern der Lieferkette zu bestimmen. Auf der Grundlage der Analyse des Nachfrageplanungsprozesses in ausgewählten Produktionsunternehmen konnten Qualitätsmaße definiert werden. Diese können in der Kundennachfrageprognose verwendet werden.
Fazit: Einer der wichtigsten und zugleich schwierigsten Bereiche der Planung im Unternehmen ist die Nachfrageplanung. Dies ist aufgrund der Tatsache, dass die Fehler im Planungsprozess einen direkten Einfluss auf die

Funktionsweise der ganzen Lieferkette haben. Die vorgestellten Fallstudien zeigen, dass viele Faktoren die Genauigkeit des Nachfrageplanungsprozesses in der Lieferkette mit beeinflussen können, z.B. in Bezug auf Informationstechnologien, Lieferzeit, sowie Anzahl der gelieferten Materialien. Gleichzeitig ist zu erkennen, dass das Sammelmodell für Marktinformationen ebenfalls ein wichtiges Thema im Nachfrageplanungsprozess ist.

Codewörter: Nachfrageplanung, Qualität des Informationsflusses, Lieferkette.

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