

COOPERATION IN THE SUPPLY CHAIN NETWORK

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ABSTRACT

Experts often mention the fact that nowadays neither products nor enterprises, but supply chains rather are competing in the market. The companies and participants will be the winners who can satisfy customers' dynamically changing needs faster and more exactly, or can provide the customers with their needs regularly and in a reliable way. The objective of the paper is to determine the most important participants of the supply chain and the opportunities for their relationships and cooperation.

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KEY WORDS

added value creation, supply chain, competitive market, management.

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Introduction

Nowadays neither products nor enterprises, but the whole supply chains rather are competing in the market which can be interpreted as criteria to reach competitive advantage since the main objective of the supply chain is to maximise the value produced and to satisfy the customers' need maximally. This supply chain extra value is generated by the supply chain's efficient operation.

The association with key partners and the adaptation of information technology make possible for people involved in the supply chain to share accurate information in time; this is how they can become the bases of efficient and reacting supply chain activity. The cooperation with key partners is based on mutual trust. Trust and information technology hold the supply chain together. Both the functional areas within the company and business partners share data and use common database since the accuracy, fastness and availability of data as factors

are crucial for the supply chain to reach efficient performance (Russel 2007).

According to former studies analysing the criteria for market participants that provide logistics services (e.g. Bujdosó et al. 2009), the confidence factor was found to be the most important criterion, which is hard to be expressed numerically. However, it basically determines planning the supply chain and the risk of its operations. In turn, according to Sankowska (2015: 47), trust can arise in a network in the form of a result or as a consequence. In practical terms, it implies that trust may be achieved through common fate and the stimulation of interactions that facilitate trust, so trust can be regarded as the basis for network performance.

In the current economic environment, relatively few companies are able to compete effectively without taking into account the direct or indirect external relations. Complex processes take place in the course of

globalization when specialized companies engage in networks, and there are countless new challenges which are still waiting to be answered. At present, the most important question is how to provide a new competitive advantage for companies for which strategies and network concepts or management tools are available. Effective management and the coordination of paradigms given by new perspectives can enhance corporate efficiency and affect the current corporate practice, the tools required, and the leadership/management reform.

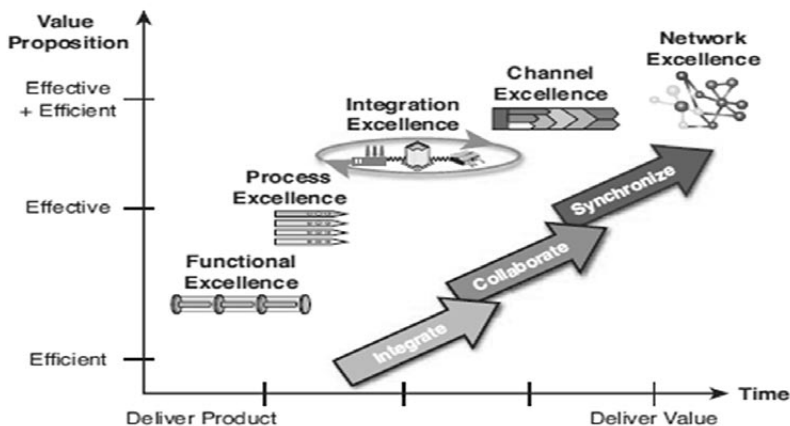
Given the facts presented, the objective of this study is to examine the practical application of the supply chain management as a leader's management tool and to ex-

plore the cooperation between the participants of the supply chain. In addition to the systematic analysis of Hungarian and international literature related to the topic, this study is based on primary research.

1. Review of the literature on supply chain networks

Although the area of the supply chain management has developed rapidly over the last 20-30 years, many organizations are at the early stages of supply chain development although some have already completely implemented the state they wanted to achieve. This way of development is emphasized by Figure 1.

Figure 1. The development of the supply chain management



Source: Gibson et al. 2013: 15.

It is worth emphasizing that Bain, an American consulting company every two years makes a survey on the leadership tools that are applied by company executives in practice (Management tools...2016). Compared to the TOP 10 leadership tools, it can be stated that:

- strategy is always in the top three,
- benchmarking holds the ranking,
- TQM is ranked further,

- supply chain management has become the 'focus of thinking' as today companies can be successful in cooperation with others if they get into an advantageous position as opposed to others. This kind of management tool helps to compete and is required in long-term success.

It is presented in Table 1.

Table 1. TOP 10 Management tools

	2000	2006	2010	2012	2014
1.	Strategic Planning	Strategic Planning	Benchmarking	Strategic Planning	CRM
2.	Mission and Vision Statements	CRM	Strategic Planning	CRM	Benchmarking
3.	Benchmarking	Customer Segmentation	Mission and Vision Statements	Employee Engagement Survey	Employee Engagement Survey
4.	Outsourcing	Benchmarking	CRM	Benchmarking	Strategic Planning
5.	Customer satisfaction	Mission and Vision Statements	Outsourcing	Balanced Scorecard	Outsourcing
6.	Growth Strategies	Core Competencies	Balanced Scorecard	Core Competencies	Balanced Scorecard
7.	Strategic Alliances	Outsourcing	Change Management Programs	Outsourcing	Mission and Vision Statements
8.	Pay-for-performance	Business Process Reengineering	Core Competencies	Change Management	Supply Chain Management
9.	Customer Segmentation	Scenario and Contingency	Strategic Alliances	Supply Chain Management	Change Management
10.	Core Competencies	Knowledge Management	Customer Segmentation	Mission and Vision Statements	Customer Segmentation

Source: Management tools... 2016.

It is important to understand that not all tools are suitable for all situations and circumstances. The analysis also indicates that if the satisfaction with a tool is high, but its efficiency is low, its application is expected to increase. In turn, if its utility is high but its satisfaction is low, its application is expected to decrease.

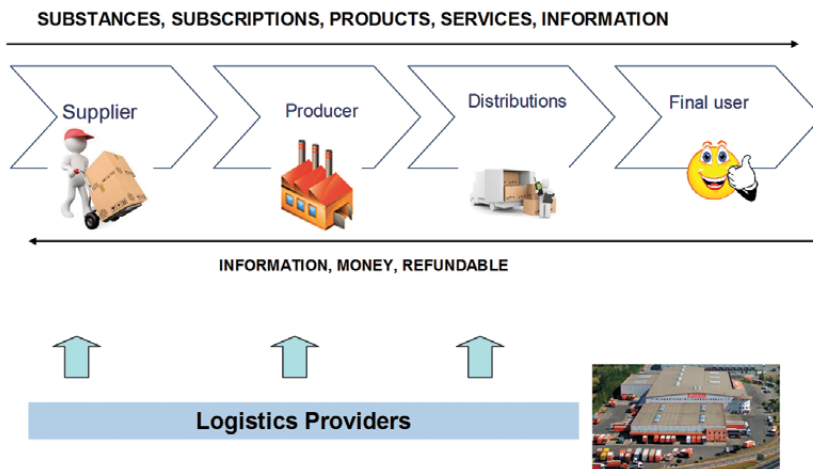
It is also worth mentioning that Gartner, the world's leading IT research and consulting company annually publishes global supply chain rankings. The companies are ranked based on the opinion of this business and different financial indicators such as revenue growth, asset and return on inventory. European supply chain leaders in 2016 were: 1). Unilever, 2). McDonald's, 3). Amazon, 4). Intel, 5). H&M, 6). Inditex, 7). Cisco Systems, 8). Samsung Electronics, 9). The Coca-Cola, 10). Nestlé (Gartner 2016).

The current globalized business environment offers widespread market opportunities and, at the same time, it causes a huge competitive constraint and makes the supply chain structure more com-

pound and complex. The supply chain transforms and transports everything needed to satisfy customer needs. It can be represented as a chain along which materials, products, services, information, and financial resources are moved in a system that creates and delivers products and services. Movement along the chain is a downstream process. In the opposite direction (upstream) of the supply chain, from the customers to the suppliers the information flows on consumer preferences and final orders that control the planning process and the financial performance of the customers.

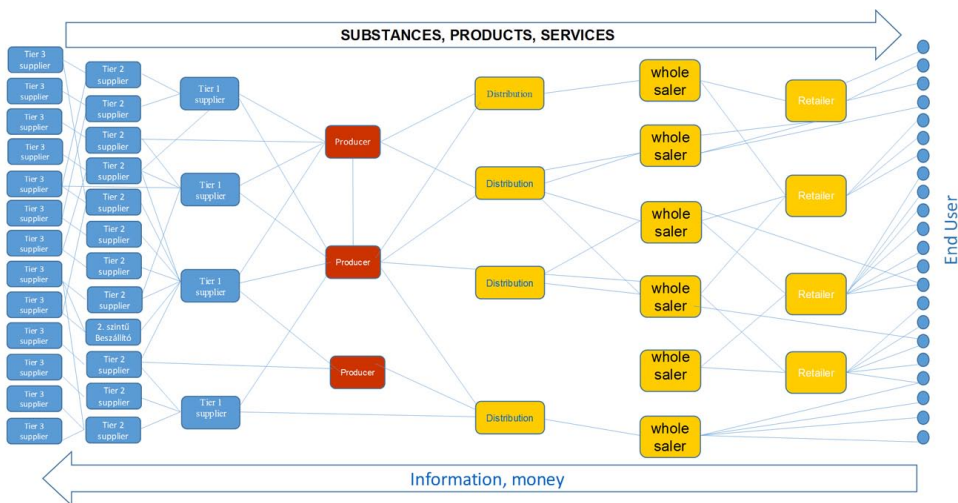
The linear supply chain (Figure 2) shows only the main players in the process which are parts of a broader system (Figure 3).

Figure 2. Members of the supply chain



Source: Own elaboration based on Based on Kozma, Pónusz 2016: 39.

Figure 3. Network process structure



Source: Own elaboration.

The participants in the supply chain are basically present in the micro environment of businesses. In the supply chain, the product or service reaches the final user by the participation of several players, namely suppliers, producers, distributors, wholesalers and retailers, logistics providers, final users. Everyone in the chain has multiple mutually dependent relationships

with suppliers and customers who also have countless suppliers and buyers. Each of these groups creates different networks of internal and external connections. The essence of the model is to look at the supply chain as a system and not as a group of separate entities (Kozma, Ponusz 2016: 39-40).

2. Cooperation, transparency and efficiency

In a global and turbulent environment, when a sharp competitive environment is created by speed, production and scheduling problems, low inventory JIT environment, companies have begun to recognize the potential benefits of strategic and cooperative buyer- supply relationships. In case of the supply chain, the concept of cooperation can be interpreted as cooperative relations in the supply chain, formal or informal, between companies and their suppliers, supply chain partners or customers that have been made to improve business performance for all parties in this process comprehensively. There are, however, some barriers of this cooperation: barriers to technology and data transmission, difficulties encountered in measuring performance, not clear value offers, data protection concerns and lack of trust (Blanchard 2010: 170). On the other hand, there are some guidelines which can help to get the most out of these relationships (Blanchard 2010: 170):

- adjust the relationship to the strategy. Define the interface between overall strategy and cooperation options, determine the purpose of each cooperation and be ready to respond quickly to changes in strategy or the environment;
- find the best partners. Use a variety of sources to find and evaluate potential partners;
- optimize your relationship portfolio. Develop systems for timely reporting, enabling faster and more accurate information based decision-making. Learn how to recognize the new opportunities that are based on your current portfolio activity. If needed, be willing to make reasonable compromise with your partners;

- maximize your daily performance. Use performance metrics that reflect the overall business goals of your organization so that people involved in cooperation can tell how and why each partner / cooperation they are involved in and share their own experience;
- manage relationships. Communicate and maintain permanent personal contact with key partner organizations;
- use the social capital. Find and apply the best practices. Share the information and use the relationship benefits at the parent company.

Supply chains have been developing rapidly in recent times, and due to this they change at a very rapid pace. It is not a simple task to be successful and competitive in global, rapidly changing market conditions in the long term. From these companies in networks, this complex external environment requires cost-effective and flexible operation. The success of a participating company is not (only) dependent on what is happening in a given business but also on the conditions under which purchasing, production and full operation take place. The more intense the cooperation is between the partners, the more transparent each supply chain work phase is. If a transparent, positive image is created, with an efficient analysis of the network as a whole and exploring opportunities, it is possible to identify weaknesses in time including the elimination of threats.

Transparency requires permanent, always competent and effective leadership. Cooperation within the supply chain is a combination of collective interactions among the members of the supply chain, which are designed to achieve a mutually beneficial goal. Collective interaction means that members communicate with

each other, share information, take part in joint planning and decision-making, and coordinate their activities. In the context of mutual benefit we mean that it is important for every member to benefit from joint work. Cooperation within the supply chain is an important part of the efficiency of the supply chain, which is particularly critical in today's dynamically changing global economy. To succeed, reducing costs and creating competitive advantage is vital. Cooperation between supply chain participants is an approach that contributes to both objectives. Cooperation will definitely help eliminate unnecessary costs from the supply chain but it means far more. When people, corporate units, or even whole corporations work together, connections are more about value than price. Value can be shared and passed to the customer to achieve a competitive advantage. Close cooperation also has a positive impact on risk management. How much the members of a supply chain cooperate can vary from simple activities to very complex integrated processes (McKeller 2014: 24).

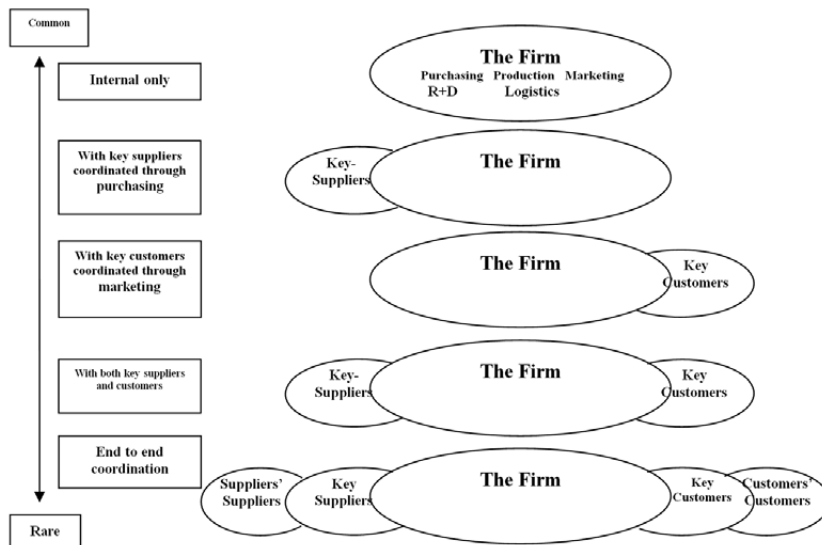
One should also add that though networks are increasingly visible in a growing number of sectors, only the ones which are able to build and maintain their competitive edge will succeed. According to the primary research, network managers are the prime determinant of whether the network will succeed (Sroka, Gajdzik 2015: 132).

A supply chain cooperation consists of one or more process integrations: internal integration, background integration, primary integration, or complete primary and background integration. Most companies integrate internally while improving supplier and customer relationships. That is true within the company and throughout the chain. Effective cooperation is rare and most often occurs with the company's most important customers and suppliers. Different studies have shown that more than 95% of the cooperation efforts target the first level. Different levels of supply chain integration include (Fawcett et al. 2013: 9):

- internal process integration. The goal is to increase cooperation between the company's functional groups;
- background process integration with valuable first level suppliers. Leading companies extend this form of integration to second level suppliers (suppliers' suppliers);
- primary process integration with valuable first level suppliers. Some companies aim at integrating with buyer's customers;
- complete primary and background process integration from supplier to buyer's customers.

This is a complete theoretical ideal (Figure 4).

Figure 4. The levels of supply chain integration



Source: Fawcett et al. 2013: 9.

3. Technology – driven management concepts used in the supply chain

There are a lot of management concepts used in the supply chain, which can support the operation of supply network in practice. The most important and recent management concepts include:

- **Vendor Managed Inventory (VMI):** VMI is a method (system) used in business life when a vendor, or a material supplier, keeps and manages materials as well as product parts for the customers. The vendor is fully responsible for maintaining the inventory which is normally situated at the buyer's, or consumer's location (Simchi-Levi et al. 2003; Mishra, Raghunathan 2004). The objective of this management technique is the integration of key customers in supply chain planning. The customer sends data on stock and sales on a regular basis to the vendor, on the basis of which the vendor determines on the replenishment requirements. VMI offers a competitive advantage, generates higher product availability and lower inventory monitoring as well as ordering cost and it results in reduced bullwhip effect (Disney, Towill 2003a, b).
- **Lean supply chain management:** the objective of application of this type of management form is to maximise value for customers and maximise profit for corporations by eliminating waste (Womack, Jones 1996, 2009). It is also about applying business strategies that ensure sustainable improvement by meeting each customer's demand the first time, at the lowest cost, every time. This is how „flowing“ the product through the chain is fulfilled

(Kozma, Pónusz 2016). The reason for Lean's 'popularity' is that its adaption improves several dimensions of creating customer value at the same time (Gyenge et al. 2015);

- *Supply chain controlling (SCC)*: SCC consists of processes that support the leaders of the organizations alongside the supply chain with creating several controlling reports, methods for planning and controlling, as well as collecting and processing information (Westhaus 2007; Hahn, Hungenberg 2001). Information flow is ensured in company together with increased trust and fluent communication. SCC also assists management by collecting and coordinating information on the basis of which fast and flexible strategic decisions can be made (Winkler 2015).
- *Electronic commerce supply chain management*: for this form, the Internet can enhance supply chain management by disclosing real time information encouraging collaboration between partners. It also promotes the optimization in business processes by use of e-business concepts and Web technology to manage enterprises, both upstream and downstream (Ross 2016; Giménez, Lourenço 2008) .

Generally one should emphasize that management concepts used in supply chain management have a positive impact on the effectiveness and efficiency of the whole supply chain. It is worth highlighting the organizational, technological and co-operation areas, which are the ones where the greatest progress can be observed. The use of management concepts plays an important role in maximizing the ultimate consumer's utilization.

4. Methodology

To achieve the objectives of the research, critical analysis of the literature on the topic (both national and foreign) with a systematic approach based on secondary data was done firstly. I mainly based on the work of Fawcett et al. (2013), Gibson et al. (2013), Göpfert (2005), Chopra and Meindl (2016), as well as Szegedi and Prezenszki (2010). Comparisons, document analysis, comparative analyses and model creation were applied.

As primary research with in-depth interviews processed in case studies and questionnaire surveys, I have been analysing the place and role of the Hungarian enterprises in their industrial supply chain for almost 3 years. My analyses cover the following areas: the role of logistics in the company, its relationships with customers and suppliers, the presence of green logistics; expansion strategies along the supply chain, business supply chain management. When planning the scope of the companies involved in the survey, I have used a wide range of companies included in my previous studies and the one carried out by Szent Istvan University Department of Operations Management and Logistics. I visited a specific part of the examined companies personally and conducted the in-depth interviews on my own. I also had the opportunity to gain an insight into the operational and strategic issues that affect the business. An online questionnaire was also compiled, which gave me the opportunity to popularise my question list. The aim was not to conduct relatively large research with general conclusions and results, which would typically be based on a questionnaire. Instead, I focused on specific features that could not be explored during the questionnaire survey so I conducted deeper research into the causes.

In the next phase of the research – based on the results of the first stage – I plan to develop further case studies to cover the companies outside Hungary.

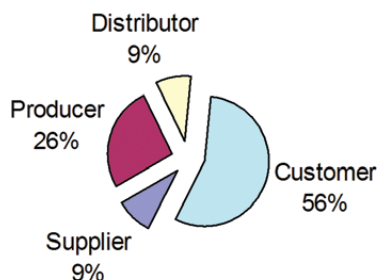
The data of the questionnaires were recorded in Microsoft Excel programme and the questionnaire database was processed (statistically analyzed) by SPSS statistic programme. Data analysis was conducted by univariate statistical methods (frequency, relative frequency, frequency distribution analysis, the mean and the standard deviation of rating scales) and multi variable analyses (crosstab analyses, relation analyses, chi-square test (nominal questions), variance analysis (rating questions), correlation calculations. In the case of groups and variables the differences were considered significant up to the value of $p=0.05$,

5. Analysis of the research results

In the present study, I examined 76 companies through processing case studies based on in-depth interviews and applying structured questionnaires. Forty five of the companies surveyed operate in the SME sector. According to the respondents, participation in the supply chain played a significant role in the company's growth. One can see a dominating role of the customer (56%), however, the producer role is also important (Figure 5). The dominance of a given member of the chain is apparent like these: it dictates the delivery terms, prices, and terms of payment. A statistically significant difference can be detected in know-how but the opposite characteristic can be demonstrated. It can be stated that according to the answers, buyers do not have the right knowledge base to play a dominant role in the process ($p = 0,000$). But they do not consider the other participants in

the supply chain to be well-prepared. The main functional area of cooperation with partners is procurement-logistics.

Figure 5. The dominance of a particular member of the chain



Source: Own elaboration.

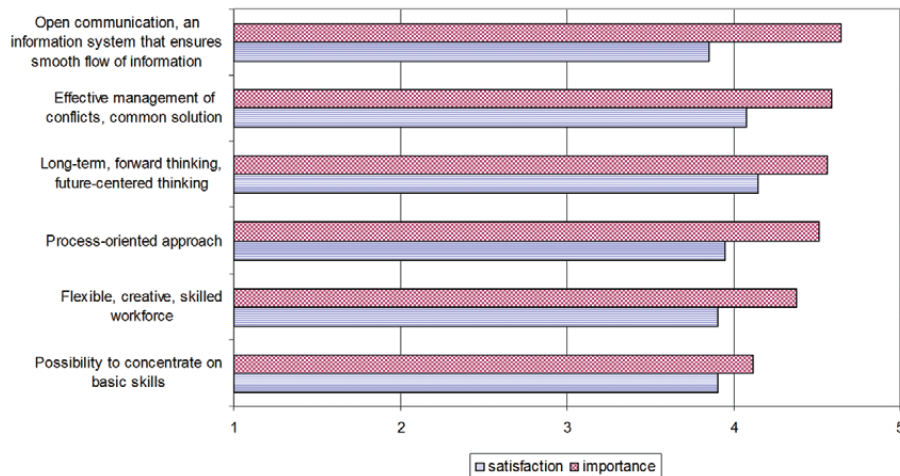
When evaluating the cooperation between supply chain members (Figure 6), one can state that almost every examined aspect is considered to be of utmost importance. The most important one is communication, i.e. the information system providing the smooth flow of information (mean = 4.64). In general it can be observed that the more important aspect is, the worse that particular chain member evaluates it and the less it is satisfied with it. Thus the player may feel that the worse it performs, the greater potential for development can be seen in it, so there is a high degree of innovation potential in cooperation between members.

Based on Chi-square test there are two significant correlation between the evaluation of the examined factors and the position of respondents in the supply chain:

- the second-party supplier evaluated the factor of possibility to concentrate on basic skills significantly high ($p = 0.005$) - grade 4 or more (68.4% of respondents). The importance of the factor was significantly evaluated by the respondents ($p = 0,000$), and 76% of them rated it high;

- the retailer evaluated the factor of open communication, an information system that ensures smooth flow of information significantly high ($p = 0,010$) – grade 4 or more (59,2% of respondents). The importance of the factor was significantly evaluated by the respondents ($p = 0,002$), and 80% of them rated it high.

Figure 6. Cooperation between supply chain members



Note: Importance: how important is the certain factor? On a scale of 1 to 5 where 1 means „none at all“ and 5 „definitely true“. Satisfaction: how satisfied are you with this factor in your own company's operation? On a scale of 1 to 5, where 1 means „I do not consider it important at all“ and 5 „I think it has highest importance“

Source: Own elaboration.

Analysing the application of cooperation between companies in practice, responses indicated that the respondents have no point of view or development alternatives since the importance values and evaluation values of the examined aspects are close to each other. The importance in case of all factors was significantly higher than satisfaction ($p = 0,000$ in each cases). Respondents analysed emphasize the importance of customer and supplier trust and sharing experience, despite the respondents considered them almost average for their company. However, there is a certain contradiction that trust can be considered as a general category because sharing stock information is moderately important. One has an impression that companies do

not have any idea how to develop cooperation in the supply chain by sharing stock information.

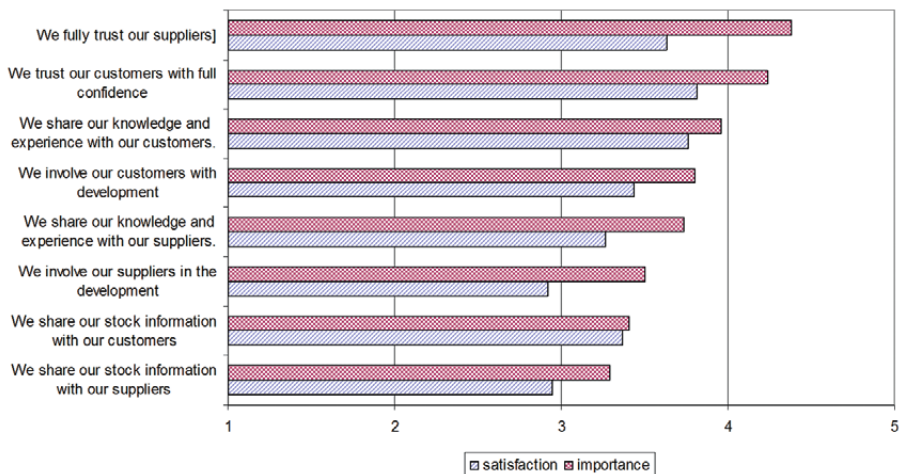
Based on Pearson's Chi-square test, statistically justifiable differences were detected in the following cases:

- it is the least important for wholesalers to share their information with their suppliers, and their responses significantly gave a lower rating ($p = 0.08$);
- the producers evaluated the factor "We shared our stock information with our suppliers" significantly low compared to other participants ($p = 0.033$). It is justifiable significantly ($p = 0.002$) that they typically involve their suppliers in development and it is important to consider the inclusion of buyer ($p = 0.020$);

- logistics providers evaluated the sharing of supplier knowledge significantly lower ($p = 0.045$), which means that typically they do not distribute their knowledge, and the importance of this factor was significantly low ($p = 0.037$);
- retailers consider the sharing knowledge with the customer significantly important ($p = 0.002$) and they evaluated it typically high ($p = 0.024$) in their own operation.

Examining the difference between the importance of the aspects and their perception by the members, mean can be considered typically higher for the aspects on the customer side. Knowledge sharing with the customer is significantly more important ($p = 0.028$) than with the supplier. It is significantly more important to involve buyers in development ($p = 0.00$) and customer confidence ($p = 0.002$) than vendors (Figure 7).

Figure 7. Relationships on the supplier and customer sides



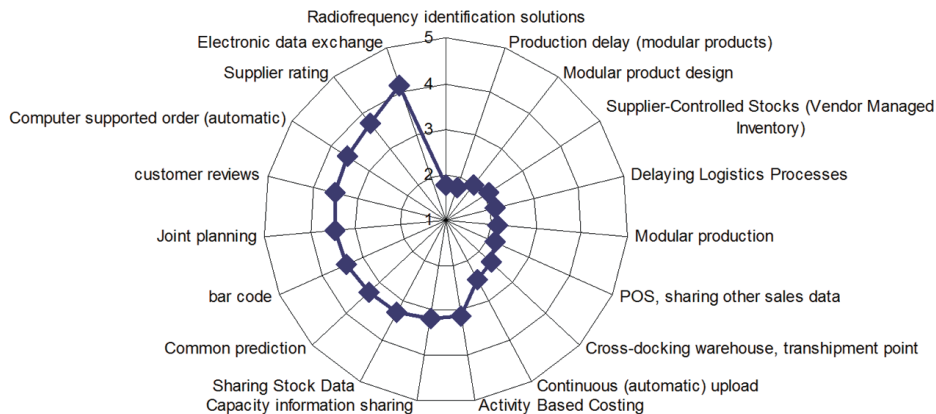
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Source: Own elaboration.

The cooperative solutions used through the cooperation in the supply chain form two definitely distinct groups. One of them includes conventional tools whose application is more typical. The industry's best practice is electronic data exchange, cus-

tomers and supplier evaluation, and computer-aided ordering. The other group includes novel solution techniques such as RFID, Production Delay, VMI, POS, cross-docking. It is presented in Figure 8.

Figure 8. Cooperation solutions for the supply chain interaction



Source: Own elaboration.

The two formed groups based on mean values (values below 2 and above 2) would deserve further examination (like component or factor rating analysis).

Conclusions

The organization and planning of supply chains have become a strategic area which requires an international overview. Supply chains consist of members or organizations with unique features doing different activities and being connected directly or indirectly, based on trust, risk and information technology. As far as the companies in my analysis are concerned, their presence in the supply chain played an important role in their growth. In case of cooperation between supply chain members the trust and the sharing experience were especially important.

Supply chain management provides many advantages to companies connected to the chain. Due to modern IT solutions (e.g. automated product identification processes), a rapid reaction time is observed along the supply chain which induces cost reduction and revenue growth, resulting in

a real competitive advantage for both the members and the whole chain. Due to organizational techniques and a high degree of coordination, work sharing and capacity utilization improve. This leads to shortening the subprocesses, reducing the product order lead times and lead product development. And, of course, risk is also spread among the members.

Decisions concerning the design of the supply chain and operations (i.e. strategic, tactical, operational) play a significant role in the success or failure of a company. Successful supply chain management requires a number of decisions related to the flow of information, products and capital. By the cooperation of the supply chain entities, performance enhancement and the realization of a higher value that determine the whole supply chain are also said to be a part of the supply chain management target system.

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