TOOLS FOR DEVELOPING COLLABORATION IN THE FIELD OF SUPPLY CHAIN MANAGEMENT

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Abstract

The supply chain management application requires that members of the supply chain or network work together. Typically, this collaboration starts at the level of two neighbouring links, and other businesses are gradually involved. The maximum effect is achieved when all links are involved and the material flow can be optimized at the supply chain level. Such collaboration in the field of material flows can be built with various tools, but it is important that business partners agree to apply the tools. Aim of the article is to identify appropriate tools for the development of cooperation within the supply chain. To achieve this goal, primary research was carried out. Its first part took place in the selected company, the second part in the group of its key suppliers. The first part of the research has identified the tools that the company itself considers to be the most beneficial for the development of collaboration in the field of material flows. The second part of the research revealed the opinion of the key suppliers of the company. The analysis of the results of both parts of the research has shown that it is the conclusion of framework contracts, a joint demand forecasting and also the provision of information that influences the planning of the business partner, what contributes most to the development of collaboration in the field of material flows.

Keywords: Supply chain management, collaboration, demand forecasting, supply chain planning, contracts

1. INTRODUCTION

At present, most companies have already realized that cooperation with their own suppliers and customers brings a number of benefits. They are therefore striving to develop this cooperation gradually [1]. They are developing it in a range of areas. However, the basis for cooperation is usually in the field of material flows. The term collaboration has taken on many interpretations when used in the context of supply chain management [2]. If you asked 100 supply chain executives for a definition, you'd likely get 100 different answers. However, few executives would be able to offer a clear, unambiguous definition [3]. However, we can accept the view that the term supply chain collaboration refers to those activities among and between supply chain partners concerned with the cost effective, timely, and reliable creation and movement of materials to satisfy customer requirement [2,4]. The main goal is to improve their firms' agility, reduce cycle times, achieve higher efficiencies, and deliver value-laden products to customers in a timely fashion [3,5,6]. In the collaborative supply chain, actors may share some resources [2], usually there are also environmental benefits [7].

The supply chain cooperation it is possible to developed with one or several partners as suppliers and one or more customers. In an effort to improve their competitive position in a rapidly changing market, many companies are replacing their traditional supply chains with extended supply chain networks based on supply chain cooperation [3].

In the development of material flow cooperation, suppliers and their customers use a range of tools and technologies to ensure the sharing of resources-information, people, and technology-among members to create synergies for competitive advantage [8]. To be successful, it is necessary to identify the most suitable tools and technologies and to implement them together. Previous research has shown that, in general, the most effective tools are those where the two sides are engaged in [9]. However, the literature has not indicated

yet which of the tools these are supposed to be. Aim of the article is to identify appropriate tools for the development of cooperation within the supply chain. To achieve this goal, primary research was carried out. The research was conducted both on the side of the customer company and its key suppliers. In the framework of the evaluation of the results of the research, a confrontation of the opinions of both parties was carried out and the most suitable tools for the development of cooperation in the field of material flow management were selected.

2. THEORETICAL BACKGROUND - TOOLS FOR COOPERATION DEVELOPMENT ON THE FIELD OF SUPPLY CHAIN MANAGEMENT

In managing supply chain cooperation and development, Danloup et al. [2] recommend deciding on the intensity of cooperation, i.e.

1) with which business partners cooperation will be developed and developed,
2) in which activities the partners will cooperate,
3) how (i.e. it includes a decision on whether cooperation will only be at the tactical-operational level or also on the strategic level and which specific tools will be used).

When deciding on specific instruments for developing cooperation, it is clear that the goal is to gain the benefits of cooperation, but there is usually uncertainty about how to achieve this [3].

According to research conducted by Vereecke and Muylle [10] in a multi-country study of European engineering and assembly industries, cooperation in the chain generally focuses on collaboration during the installation of the planning systems, and collaboration during the performance of collaborative activities. It can be inferred that the cooperation includes strategic planning (cooperation agreement and planning of the way activities are to be carried out) and the implementation of the planned activities, or cooperation in the information field and in the field of material flow activities.

The conclusion of a long-term cooperation agreement is often seen in practice as a tool for developing cooperation in the supply chain [11]. As a rule, it provides for general agreement about volume of deliveries and time of their realization, the distribution of responsibilities and powers of the company of both customers and suppliers at the order fulfilment, the scope and forms of technical assistance to customers, the way of mutual exchange of information, etc. [11]. These agreements have undeniable positive effects, especially for suppliers. They contribute significantly not only to increasing their certainty but also to further product and technology innovation [11].

According to Petersen et. al. [12] cooperation between suppliers and customers often involves some degree of collaborative planning. Collaboration in tactical-operative planning has been dealt with in several sources of specialist literature. Some address the issue of collaborative demand forecasting (e.g. [13]). Some authors consider the collaboration in planning of supply chain [2]. Zhang et al. [14] develop an integrated production planning model to simultaneously manage the supply, fabrication, assembly, and distribution of materials, components, and final products, Selim et al. [15] consider a collaborative production-distribution planning, Jung and Jeong [16] propose a decentralized production-distribution planning system using collaborative agents. Jung et al. [17] propose the same methodology between a manufacturer and a third party logistic provider. Nenadál [11] adds that plans jointly created or shared within the supply chain are further specified in three main directions: planning the technical quality of the products supplied, planning innovations in order to increase the value of the products supplied and reduce costs, and planning a way to measure the performance of ongoing processes.

Some authors point out that appropriate tools for developing supply chain cooperation include resource pooling, such as consolidation hubs or warehouse sharing [2]. It is thus about cooperation in selected activities carried out in the interest of a successful material flow. The effort to develop a number of such jointly co-ordinated or shared activities, or efforts to improve material flow within a chain or network, usually lead to the

application of one of many SCM initiatives such as Vendor Managed Inventory (VMI), Efficient Consumer Response (ECR), Continuous Replenishment and Accurate response [18] and The Collaborative Planning, Forecasting, and Replenishment (CPFR). Especially CPFR is an increasingly popular paradigm [19]. CPFR provides a framework that covers a broad range of issues including demand forecasting, inventory management, production and replenishment planning, and order fulfillment. According to Seifert (2003, p. 30) [20], CPFR is "an initiative among all participants in the supply chain intended to improve the relationship among them through jointly managed planning processes and shared information."

Since almost none of the collaboration tools can do without sharing information, it is necessary to more or less link the information systems of the partners in a chain or a network. Information interconnection can then be perceived as a tool supporting the use of various other cooperation tools, or as one of them.

Finally, it is also the application of managerial approaches, such as SRM or CRM, that can be considered a supply chain collaboration tool, generally contributing to consolidating relationships between individual chain or network links.

3. METHODOLOGY OF RESEARCH

In order to identify the appropriate tools for the development of cooperation within the supply chain management, primary research was carried out in two successive stages. The first stage took place in the selected company (producing nonwovens) and allowed to identify the tools the company itself considers to be the most beneficial for the development of material flow cooperation. The second stage of the research was carried out in a group of its key suppliers, which made it possible to learn about the other party's opinion.

The first stage of the research was realized through qualitative research at the purchasing department of the selected company. The respondent was the head of the purchasing department.

In the second phase, all the main suppliers of the company were sent an electronic questionnaire. The results of qualitative research carried out by the authoring team in 2015 were used in the questionnaire, which made it possible to understand what tools for developing cooperation can be deployed [8]. For the tools thus identified, we examined their importance in the present research.

The following tools were examined in terms of their importance:

- collaborative demand forecasting;
- joint planning of material flows;
- a long-term cooperation agreement concluded through framework agreements and long-term contracts;
- sharing information about facts that could cause changes in material flow plans;
- collaborative search for inventory replenishment mechanism (such as automatic replenishment);
- collaborative adaptation of information systems for the smooth transfer of data and information between both parties;
- collaborative optimization of the physical transport of the product to the customer's enterprise;
- collaboration in inventory management (joint decision-making, e.g. about the placement of inventories and the quantity of items stored);
- joint development of appropriate packaging for supplied products.

Suppliers, as individual respondents, could identify up to 3 most important tools for developing cooperation, and there was also an option of adding an unlisted tool. The survey also included the characteristics of individual respondents, namely: the size of the supplying company (the number of employees and annual turnover of the company), the country from which the supplier comes and the length of the respondent's practice.

The research involved 32 key suppliers from a total of 38 key suppliers of the company. 6 key suppliers who are internal suppliers had not been approached.

Only the "number of employees" criterion was used to classify enterprises into one of the size categories (as the turnover could not be identified in a number of cases). 54 percent of micro and small enterprises (up to 50 employees) and 46 percent of medium and large enterprises (with more than 50 employees) participated in the survey. 42 percent of the respondents came from domestic enterprises and 58 percent of the respondents were from abroad. The vast majority of the respondents (88 percent) had more than 5 years of experience, i.e. they were experienced employees of supply companies.

The answers obtained in the second phase of the research were statistically processed using the IBM SPSS Statistics programs and, based thereon, main conclusions of this part of the research were made. Subsequent confrontation with the results of the first stage then allowed the authors to specify which supply chain tools are the most beneficial in terms of developing the relationship.

4. RESEACH RESULTS

The first stage of the research revealed that the company as a purchaser considers the following to be the most important activities to develop a mutual relationship in the field of logistics: collaborative demand forecasting, a long-term cooperation agreement concluded through framework agreements and long-term contracts; sharing information about facts that could cause changes in material flow plans, collaborative search for inventory replenishment mechanism (such as automatic replenishment), collaborative optimization of the physical transport of the product to the customer's enterprise. In the follow-up phase of the research, the supplier's opinion was surveyed.

During the second stage of research, the suppliers' opinion was surveyed on the importance of individual logistics activities for the development of mutual relations. The results are shown in **Table 1**.

Table 1 Importance of activities to develop a relationship in the field of logistics from the point of view of suppliers

Activity	Responses	Percent of Cases
Collaborative demand forecasting	20	77 %
A long-term cooperation agreement	17	65 %
Sharing information about facts that could cause changes in material flow plans	13	50 %
Collaborative search for inventory replenishment mechanism	6	23 %
Collaborative adaptation of information systems	5	19 %
Collaborative optimization of the physical transport of the product	5	19 %
Collaboration in inventory management	5	19 %
Joint planning of material flows	4	15 %
Joint development of appropriate packaging for supplied products	3	12 %
Total	78	x

Table 1 shows that there are three most important tools for developing a relationship from a supplier perspective. Each of these tools were mentioned as an important tool by at least half of the respondents. These are collaborative demand forecasting, concluding long-term contracts, and informing each other about changes in plans. All three of these most important tools are also considered to be important by the customer's company. Applying these three tools will make it possible to develop the mutual relationship between the two partners in the chain.

In the next stage of processing the research results, the classification characteristics were considered, namely the size of the business according to the number of employees and the region from which the supplier comes from. The results of the analysis are shown in **Figures 1 and 2**.

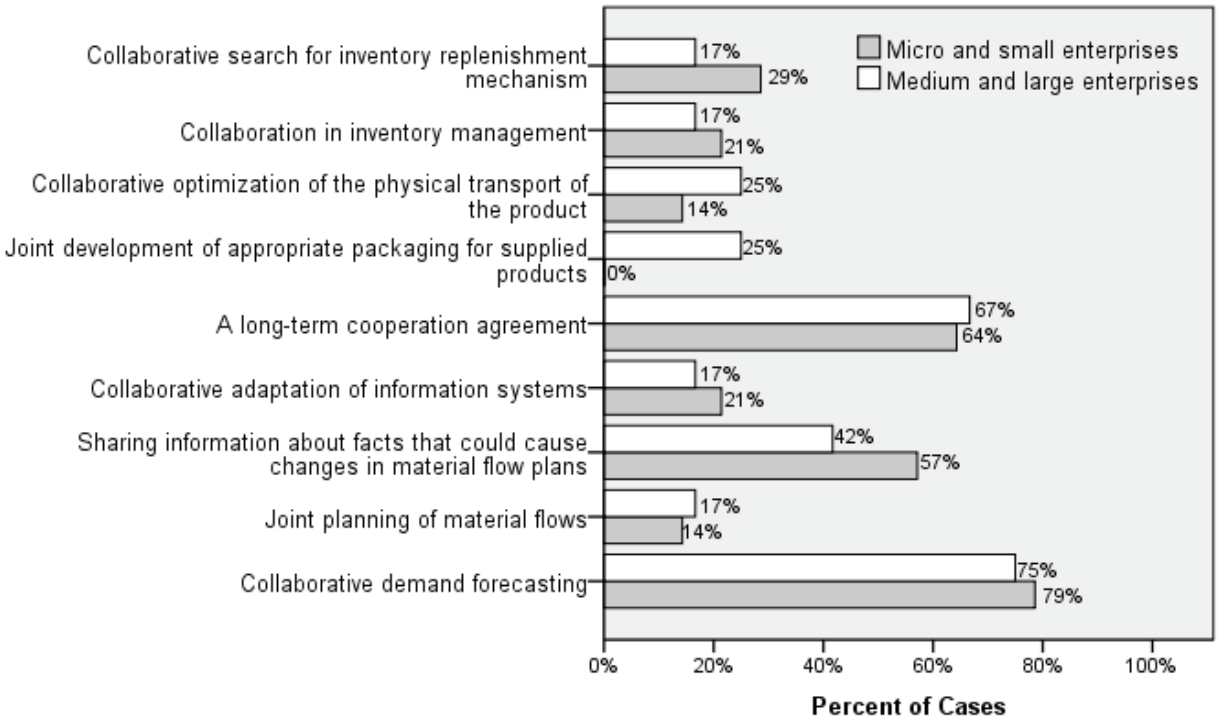

Figure 1 Supplier's views on the importance of tools to develop the relationship depending on the size of the business

The size of the customer's company does not affect the perception of which tools are the most important, or the order of the tools by importance (for all businesses, regardless of size, the 3 most important tools are the same, the order of importance of the same is consistent with the analysis results in the whole set of data). The frequency found for the category "micro and small enterprises" and the category "medium and large enterprises" is also comparable. Interestingly, however, there is a difference in the perceived importance of "sharing information about facts that could cause changes in material flow plans." Micro and small suppliers consider this tool to be slightly more important (57 percent of the suppliers) compared to medium and large suppliers (42 percent of the suppliers). Also, with the tool "joint development of appropriate packaging for supplied products", there is a lack of consistency in opinion. This tool was identified as important only by medium and large businesses (25 percent of the respondents). It can be assumed that micro and small businesses do not consider this tool to be important because they do not engage in this activity at all (they only probably purchase the appropriate packaging).

Also, the analysis of the differences according to the territory from which the supplier comes revealed no difference in the content of the most important tools (both domestic and foreign suppliers consider 3 same tools to be the most important). However, there is a significant difference in the perception of the importance of the "collaborative demand forecasting" tool. Foreign suppliers consider it to be much more important than other tools (13 out of 15 foreign suppliers, i.e. 87 percent, identified the tool as one of the three most important tools). Domestic suppliers perceive the tool to be similarly important as "long-term contracts" (64 percent of the respondents). It is also worth noting the different perception of the importance of collaborative search for inventory replenishment mechanism (such as automatic replenishment). Foreign suppliers mentioned the importance of this tool only marginally (in 7 percent of the cases), but it is important for more than a third of

domestic suppliers (36 percent). By contrast, foreign suppliers (27 percent of the cases) considered collaborative optimization of the physical transport of the product to the customer's enterprise to be more important, compared to domestic suppliers (9 percent).

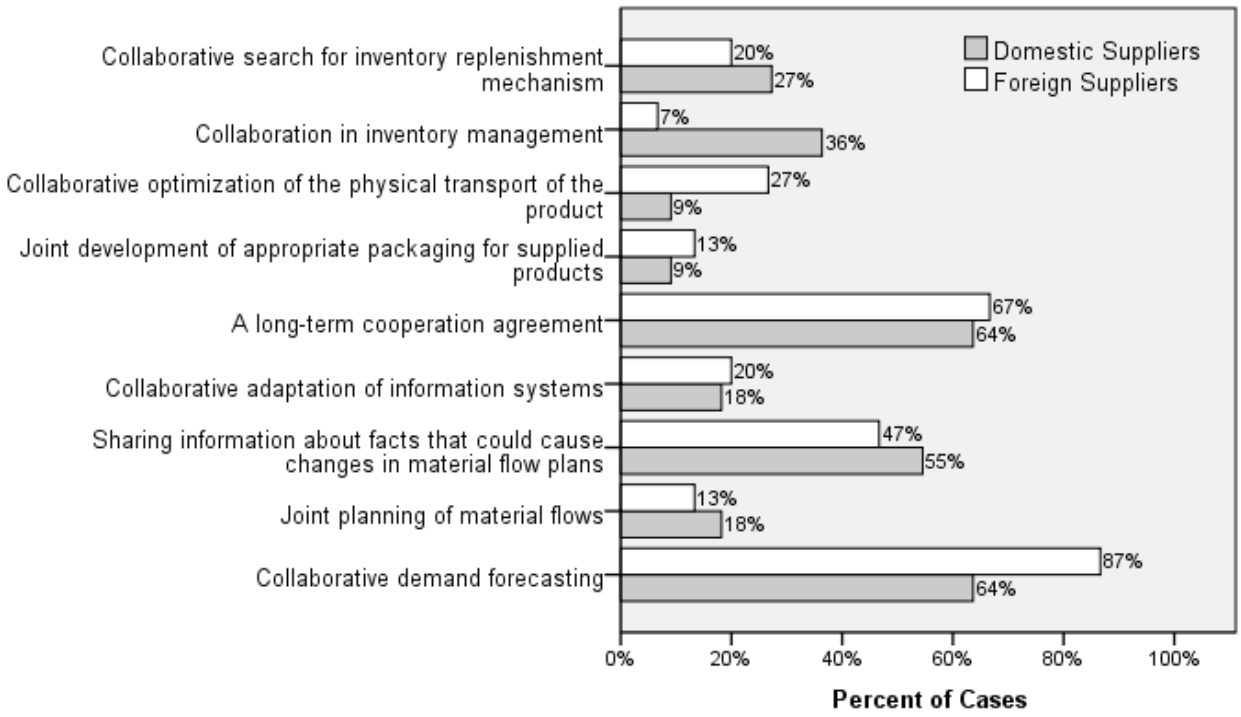

Figure 2 Supplier's views on the importance of tools to develop the relationship, depending on the region from which the supplier comes from

5. CONCLUSION

The primary research made it possible to identify which logistical tools most contribute to consolidating the relationship. The relationship between the two (or more) partners in the chain will most likely be strengthened if a long-term contract is concluded and a system of collaborative forecasting and planning is in place. In the case of micro and small enterprises, it is also important to provide detailed information allowing changes to the plans. It is likely because that micro and small businesses have small production and storage capacities and their ultimate success is more dependent on the possibility of flexible changes in their plans.

An interesting conclusion is that foreign customers, compared to the Czech ones, prefer collaborative forecasting. This trend can therefore be expected sooner or later have an impact on the preferences of the importance of individual tools from the point of view of domestic enterprises. This could also directly affect the interest of domestic suppliers in collaborating in replenishment. If there is a better preparation for future replenishment, replenishment itself will be easier. At the same time, it is also possible to anticipate the development of cooperation in follow-up activities, e.g. the management of transport activities. It can be summed up that cooperation in the management of material flows contributes to the development of mutual supplier-consumer relations not only today, but it will also contribute thereto in the future.

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