

POSSIBILITIES OF THE CPFR IMPLEMENTATION BETWEEN FOOD COMPANIES AND THEIR SUPPLIERS

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Abstract

In today's highly competitive environment, one of the ways for food industry companies to achieve success is by deepening cooperation with their suppliers and, within it, by applying methods such as CPFR (Collaborative Planning, Forecasting and Replenishment). This method can significantly contribute to streamlining material flow between the food industry company and its suppliers. Its implementation, however, requires the interest of both partners, i.e. the supplier and customer, as well as their subsequent cooperation in setting the form of supplies and their realization. The paper deals with opportunities to implement the CPFR method between companies of the food industry and their suppliers. It presents the results of both quantitative and qualitative research carried out at the purchasing departments of the food industry companies.

Quantitative research in 101 food industry companies examined the importance of various elements CPFR methods (i.e. the importance of collaborative forecasting, planning and automatic replenishment) in the purchasing process of the main raw material and consumer chemicals. In accordance with the theoretical approaches, this part of the research demonstrated that the application of the collaborative forecasting, planning and automatic replenishment has a greater importance in procuring the main raw material than indirect material. However, subsequent qualitative research in two deliberately selected food companies showed that there are lower barriers to implementation of the method in the purchase of consumer chemicals as the selected indirect material.

Keywords: Supply chain management, CPFR, food company, collaboration, purchase

1. INTRODUCTION

In recent years, the food market has undergone tremendous changes, including a change in customer buying behaviour. Consumers have shown a hybrid and smart buying behaviour demanding highest quality at the lowest price [1]. Thus, it becomes a necessity "to guarantee the provision of safe and healthy products that are fully traceable from farm to fork" [2] in an effective way. This requires a change in the management of supply chains that are created to deliver food to end customers. The former isolated management of single firms must be replaced by a vertical comprehensive management encompassing each individual member of the supply chain [1]. A new way of the interconnected management of material flows within a chain allows for streamlining business processes of the individual firms that make up the chain. The main purpose of collaboration is two-fold: one is to make internal functions effective and efficient, and the other is to retain/expand market share or to make market oriented strategies [3]. Collaboration should aim to fulfil the idea that closer inter-enterprise relationships and enhanced information exchange will improve the quality of decision-making, reduce demand uncertainty, and, ultimately, improve supply chain performance [4].

Collaboration in the chain involves sharing information, creating the same goals, synchronizing decisions, sharing resources, and co-ordinating independent partners in the supply system [5]. It usually requires the sharing of human, financial and technical resources [6,7,8]. From the last decade onwards, issues related to supply chain collaboration (SCC) have been of great interest to researchers in the field [3]. It was found that companies in accordance with their requirements try to collaborate with supply chain partners to retain what they have and to generate what they do not have [3]. Firms that have high-quality partnerships (collaborations) with suppliers are better equipped to adapt to unforeseen changes, to identify and produce well-crafted

solutions to organizational problems, and to reduce logistics and inventory costs, all of which help improve economic outcomes [9, 10].

Collaboration in the chain built for the production and delivery of food products can be developed through an appropriate material flow management strategy. Efficient Consumer Response (ECR) is seen as a successful supply chain strategy for the grocery industry [11]. ECR promises lower operating costs, higher sales and especially a higher value for the consumer. But it is assumed that the degree of implementation of individual ECR strategies is still quite low [11]. The ECR promoted various types of partnerships such as vendor managed inventory (VMI), continuous replenishment (CR), and collaborative planning forecasting and replenishment (CPFR) [12]. CPFR is one of the most developed supply chain collaboration practices [1] [13]. In CPFR, the jointly developed business activities create an agile supply chain that can better capture demand uncertainties in the market [14].

And it is the area of CPFR implementation among food industry enterprises and their suppliers that has become the subject of primary quantitative and qualitative research. Both surveys were conducted at the purchasing departments of food industry enterprises. Quantitative research took place in 101 food businesses. The importance of individual elements of the CPFR method (i.e., the importance of collaborative forecasting, planning and automatic replenishment) in the provision of the main raw material and consumer chemistry was studied. Subsequently, qualitative research was carried out in two deliberately selected food companies focused on the in-depth understanding of the current method of cooperation between the enterprises and their suppliers and the opportunities for implementing the CPFR method.

2. THEORETICAL BACKGROUND

In the early 1990^s, a collaborative initiative, called efficient consumer response (ECR), emerged in the grocery and consumer packaged goods (CPG) industries [4]. In practice, ECR is often only tailored to IT concerns [1] but ECR should mean a philosophical shift from holding information internally to sharing strategic information, developing trusting relationships, and searching for efficiency improvements that would deliver enhanced customer value [15].

ECR was expanded and adapted by other industries and served as the launch pad for additional collaborative approaches - including VMI, CR, and CPFR [4]. CPFR programs is viewed by many research participants as an outgrowth of the ECR movement [16]. Seifert [17] considers CPFR to be the second generation of ECR. ECR is a building block for CPFR because ECR created a strong foundation on which to build CPFR programs. With ECR, manufacturers and retailers started to work together to attack supply chain uncertainty [4]. CPFR programs, attempt to create supply chains that are more demand driven [16]. Therefore, it is suitable for the food industry, which is associated with specific features, especially a high product variety and fierce price competition, which causes volatile sales. The volatility in demand is not only affected by promotional campaigns, but also seasons, the weather and more flexible opening hours of grocery [14]. The grocery industry needs efficient planning and replenishment practices, because multiple decision-making points in complex grocery supply chains create inefficiencies in inventory management and replenishment [14]. The necessity to increase food safety and quality, to reduce costs and waste, to build customer and stakeholder value, and to achieve social and environmental stewardship requires the whole food chain to act jointly [18].

CPFR, which was proposed by the Voluntary Inter-industry Commerce Standards (VICS) in 1998, was a three-stage and nine-step procedure for companies who desired implementation of a collaborative project [19, 20]. CPFR is a common process of planning that uses an accurate and timely information flow between enterprises [21]. The objectives of CPFR include improving the accuracy of collaborative planning, collaborative forecasting, and collaborative replenishment, and dealing with exceptional events through cooperative partnering [20]. The CPFR method can be implemented in a part of the supply chain, with at least two chain members having entered into an agreement, but the best results can be achieved by involving all chain

members [22]. The implementation initiative can be made by any link of the chain, but in any case it is necessary to respect the wishes, needs and requirements of the direct buyer, to which the supplier has to prepare an individualized offer including the required delivery system. The biggest barriers to the implementation of CPFR is the reluctance of the partners in the chain to cooperate, share information, and share the benefits of cooperation with the partners in the chain [23].

3. RESEARCH RESULT AND THEIR DISCUSION

3.1. Research Methodology

Primary research focused on the application of the CPFR method among food industry businesses and their suppliers took place in two successive steps. In the first stage of the research, primary quantitative research was carried out. The main objective of the research was to determine the importance of the individual elements of the CPFR method (i.e. the importance of collaborative forecasting, planning and automatic replenishment) in the provision of the main raw material and consumer chemistry products (detergents, cleaning agents and personal hygiene products) in the food industry businesses. Data collection was conducted during January and February 2017 by electronic questioning in the purchasing departments of 101 food businesses (mainly bakers and confectioners and meat processors), whose products are intended primarily for the Czech market. The importance of the individual elements of the CPFR method was measured on a seven-point scale 1-7 (where the importance grew with the increasing value on the scale). During the research, the classification features were also observed: the area of the company's expertise, the respondent's job and the length of respondent's practice. The data obtained was processed using the IBM SPSS Statistics software. In data processing, methods of descriptive statistics and inferential statistics were used. The results were first processed in the entire sample, and then a difference analysis was carried out according to the observed classification features. The difference in the empirical distribution of respondents' responses was tested using the Kruskal-Wallis test (for independent samples) or the Friedman test (for related samples) at a 5% significance level.

Subsequently, qualitative research was carried out in two enterprises of the food industry. The main objective of this research was to find out how the company is currently cooperating with suppliers in supplying the main raw material and whether the purchase process is any different from purchasing consumer chemicals. Another goal of the research was to find out whether the purchasing processes show elements of the CPFR method and whether it would be appropriate to implement this method in order to improve the purchasing processes. The collection of primary information took place in the first quarter of 2017 in the purchasing departments of deliberately chosen businesses. The first enterprise (Enterprise A) is medium-sized (employing approximately 100 employees) and manufactures dried coffee substitute drinks and colonial products. It is oriented towards the market of the Czech Republic while exporting products to neighbouring countries as well. Its annual revenue is approximately CZK 300 million. The respondent in the company was the Purchase Executive. The second enterprise (Enterprise B) is small-sized (the approximate number of employees is 30). It manufactures bakery and basic confectionery products and supplies them to customers in the local market. Its annual sales volume is about CZK 10 million. With regard to the size of the company and its organizational structure, the respondent was the owner of the company.

The respondents in both enterprises were interviewed on the basis of a prepared interviewing scenario (which included six thematic series of questions). After each interview, the completeness and logical accuracy of the information gathered was checked and the incomplete information was refined or completed in the next session. After the collection of information was over in both enterprises, the content analysis of the information obtained and the comparison of the information found in the two enterprises took place. Subsequently, conclusions were drawn regarding the current implementation of the CPFR method in the investigated purchasing processes and the possibility to improve these processes by implementing the method.

3.2. Results of quantitative research and their discussion

Responses of 101 respondents were included in the processing of quantitative research results. The respondents used the full scale to evaluate the importance of individual elements of the CPFR method. The average value for all evaluated elements (in the purchase of both the main raw material and consumer chemistry products) is approximately in the middle of the scale used. It is obvious that the evaluated elements are of medium importance (see **Table 1**).

Table 1 Importance of elements of the CPFR method in the purchase of the main raw material and consumer chemistry products

Type of stocks	Element of the CPFR method	Importance ^{*)}			
		Mean	Median	Minimum	Maximum
Main raw material	Automatic replenishment systems	3.8	4	1	7
	Collaborative forecasting	4.4	5	1	7
	Collaborative planning	4.6	5	1	7
Consumer chemistry products	Automatic replenishment systems	3.5	3	1	7
	Collaborative forecasting	3.7	4	1	7
	Collaborative planning	3.9	4	1	7

^{*)} Used scale from 1 = the lowest importance to 7 = the highest importance

Primary quantitative research has shown that food businesses do not consider all the elements of the CPFR method equally important. In the provision of both raw materials and consumer chemistry products, cooperation in forecasting and planning material flows is of greater importance than automatic replenishment. The differences are statistically significant in the purchase of the main raw material ($\chi^2 = 8.671$; $df = 2$; $Sig. = 0.013$). At the same time, it has been demonstrated that the application of CPFR elements observed (i.e. collaborative forecasting, planning, and automatic replenishment) has a greater importance in providing the main raw material than the overhead material. The differences are statistically significant in collaborative forecasting ($\chi^2 = 5.453$; $df = 1$; $Sig. = 0.020$) and collaborative planning ($\chi^2 = 7.043$; $df = 1$; $Sig. = 0.008$). Logically, food businesses are more committed to collaborating in forecasting, planning, and replenishment of the main raw material where possible supply outages endanger customer retention or, on the contrary, excess inventory reduces the efficiency of business. As for consumer chemistry products, this importance is also assessed as lower because potential shortcomings in the process of supplying consumer chemistry products can be relatively easily and quickly remedied, given the high competition in supplying this type of product and the territorial proximity of the suppliers. Finally, the further analysis did not show any statistically significant differences in opinions based on the classification features (the size of the enterprise, the length of practice).

The relatively low importance of individual elements of the CPFR method formed the basis for the preparation and implementation of qualitative research, which focused on the simultaneous application of these elements and the possibility to implement the given method.

3.3. Results of qualitative research and their discussion

Qualitative research in two deliberately selected food industry enterprises has shown that the purchasing process implemented both for the provision of the main raw material and consumer chemistry products does not show the principles of supply chain management. There are no elements of the CPFR methods either. The purchasing process in both enterprises has the nature of traditional business operations.

In Enterprise A, there are differences in the purchase of the main raw material and consumer chemistry products, both at the planning stage of the purchase and the replenishment of purchased items. The main raw

material is purchased by the company after reaching the reorder point while consumer chemistry products are ordered in single quarters and surpluses are in stocks. For both types of purchases, the enterprise prefers stable, long-term time-proven suppliers; however, a long-term supply cooperation agreement has only been concluded with suppliers of the main raw material. It is trying to deepen relations with suppliers, but it is in areas other than purchasing. It does not build a system of collaborative forecasting and planning, nor does it provide suppliers with information to help them improve their own logistics planning. The suppliers are also unable to identify the need for delivery. The partners do not have interconnected information systems and neither do they use EDI. The company solves the general form of supply with the main raw material supplier, but retains full responsibility for inventory management. It expects suppliers to be able to fully meet its shopping needs without its own special engagement. That is why it is important for it that the suppliers supply on-time, in-full and error-free, and also with high flexibility.

In Enterprise B, the purchase of the main raw material and consumer chemistry products is very similar, the only difference identified lies in complaints (the number thereof). The company has concluded long-term contracts with its suppliers and is addressing the general form of supplies, but there is no system of collaborative forecasting and planning, nor is there an information link between suppliers and purchasers. However, there is some cooperation in the field of material replenishment. The customer does not transfer responsibility for inventory management to its supplier, but it has introduced a replenishment mechanism with its suppliers that uses a stable order cycle time and stable order quantities. The risk of failure of the inventory replenishment mechanism is minimized by the customer by providing information on expected fluctuation (by telephone, e-mail, or production plan).

Examination of the possibility of implementing the CPFR method has shown that the opportunity is not great. In both enterprises, some benefits of implementing the method are perceived, but according to the respondents' statement, the barriers to the implementation of the CPFR method are significant.

In Enterprise A, the quantity supplied and/or delivery cycle cannot be properly determined, as there is insufficient information on the demand for the products of the company (as a purchaser). In addition, it considers impossible to provide its own purchasing and production plans because of the possible leakage of information (these plans are considered confidential by the company). The ignorance of the given method in the enterprise is also a barrier to successful implementation. If the company was ever considering implementing the CPFR method to improve purchasing operations, then it would be in the process of purchasing consumer chemistry products. In this case, it would not be a problem to provide information about the need. In addition, it would expect the supplier's willingness, stemming from both its territorial proximity and its efforts to increase the value of the enterprise as a customer. It would expect the supplier to perceive the implementation of the method as an effort to consolidate its competitive position by improving the service for its customer. In its opinion, the greatest problem in this case would be the right adjustment of powers and responsibilities.

In the respondent's opinion, it is not possible to implement this method in Enterprise B for reasons of time and for financial reasons. Moreover, the respondent does not consider it possible to harmonize the corporate objectives and objectives of the individual processes. The problem would also be the need to coordinate certain processes with the supplier. The respondent does not believe that it is possible to implement integrated demand forecasting as he believes that this would imply sophisticated statistical methods. The need to modify its own information system to allow the provision and transmission of necessary information (e.g. on the actual amount of inventory of individual items) is considered by the respondent a significant barrier to the implementation of the method. Other barriers to the implementation of the method identified in the company were: the need to build an electronic network, to introduce communication technologies, automatic identification of inputs, and also the need to adapt the inventory records and possibly the production technology. As in Enterprise A, ignorance of the method as well as the employees' reluctance to learn new practices would be a barrier to successful implementation in this company. If the company was considering

introducing the CPFR method in order to improve the purchasing operations of consumer chemistry products, it would expect problems in communicating with the suppliers of these products.

4. CONCLUSION

The ECR and CPFR methods are recommended in the literature for improving material flows in chains where food companies are involved. Their application in these chains has been the subject of primary research carried out in two steps, quantitative and qualitative. However, the quantitative research examining the importance of individual elements of the CPFR method has shown that their importance to purchasers of the food companies is at the medium level. Their interest as customers thus points to small opportunities to implement these methods in chains with this type of product. Subsequent qualitative research in selected enterprises of the food industry explored in depth the current way of cooperation between food businesses and their suppliers. It has shown that this cooperation is at the level of traditional business operations with a rather marginal interest in developing cooperation based on the CPFR method. The purchasers of these businesses do not have a stronger interest in implementing this method in order to improve purchasing processes, especially for financial and time-related reasons as well as because of the threat of information leaks. It is also why it is not possible to expect any vigorous implementation of these methods in chains with food products in the near future. The primary research carried out makes it possible to state that Obersojer and Weindlmaier's findings [11] concerning the insignificant implementation of these methods in food chains also apply to the Czech Republic.

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