

**FACILITATING FACTORS OF SUPPLY CHAIN MANAGEMENT:
A Study in the Automotive Industry in Brazil**

Bruno Cecconi Fulginiti

PUCRS - Pontifical Catholic University of Rio Grande do Sul, School of Business, Brazil

E-mail: brunofulginiti@ig.com.br, profulginiti@ig.com.br

Jane Lucia S. Santos

PUCRS - Pontifical Catholic University of Rio Grande do Sul, School of Business, Brazil

E-mail: janejlss@gmail.com, jane.santos@pucls.br

Peter Bent Hansen

PUCRS - Pontifical Catholic University of Rio Grande do Sul, School of Business, Brazil

E-mail: peter.hansen@pucls.br

ABSTRACT

The objective of this work is to identify and analyze facilitating factors of the supply chain management in the automotive industry in Rio Grande do Sul/Brazil. For this purpose, a qualitative research has been carried out with a study of multiple cases in four supply chains. Data were collected through semi-structured interviews and twenty analyzes were conducted based on the categorization guided by the literature. Based on the analysis of the results, nine key factors were identified that contributed to the implementation of the supply chain management studied and that generated benefits, such as cost savings and an increased productivity of the chain.

Keywords: *Supply chain management. Facilitators. Automobile industry*

1. INTRODUCTION

The increasing competition and the search for competitive advantages have underlined the need for companies to take shape and view their businesses in different ways. One of these ways is the Supply Chain Management (SCM) - reported by many scholars as a means that affects the survival and organizational competitiveness from a collective strategic configuration (Pozo, 2010; Casotti & Goldenstein, 2008; Pozo & Torricelli, 2013).

In this context, the management of the supply chain aims to develop and make the production process more flexible through a joint analysis of its processing stages (Simon & Pires, 2006; Dias & Pedrozo, 2009). In the industrial sector the management of the supply chain appears as a form of integration between companies of a given production chain. Furthermore, when analyzing the production process in a joint and integrated way, it is possible to boost the competitiveness of companies involved by obtaining various gains. This is where the management of the supply chain plays an important role within the industry, as it facilitates the integration of its production processes (Casotti & Goldenstein, 2008).

In this environment, the automotive industry has reorganized themselves worldwide over the past decades, going through a transition process from the production model to a gradual adaptation of a model of networks and alliances. This reformulation of the production system allows automakers to delegate part of the production process and responsibility to their suppliers (Torres, 2011; Simon & Pires, 2006) and it requires a differentiated management.

Studies related to the development of the automotive sector highlight the importance of this sector and indicate its influence in the Brazilian economic scenario. In 2011, for example, companies related to the production and marketing of vehicles invested 5.339 billion dollars in the country, with growth forecasts as a result of the increased sales and domestic production (Anfavea, 2012).

In different scenarios, several studies on factors that may hinder or facilitate the implementation of the supply chain management were conducted (Miguel & Brito, 2010) however, scientific studies could explore this issue further. Moreover, the scenario involving the automotive industry in Brazil is presented as a promising context

for conducting research. Thus, this study aims to identify and analyze the risk factors of the supply chain management in the automotive industry based in the state of Rio Grande do Sul/Brazil.

The general structure of this article includes five sections. Section 2 presents a brief literature review on the topic. Section 3 presents the methodological aspects used for this study. Section 4 presents a discussion of the main results. Section 5 presents the final considerations, followed by the list of references.

2. THEORETICAL BACKGROUND

Globalization and the increasing participation of emerging markets in the global economy led companies to seek new alternatives to stay alive and competitive in their markets. In this sense, the creation of strategic alliances through the implementation of supply chains arises as an alternative that aims to pool the strengths of independent companies around the joint development of competitiveness (Dias & Pedrozo, 2009).

It is worth mentioning that the supply chain has been characterized in a different way from that of logistics. According to Ayers (2006), in logistics, unlike the supply chain, each functional area is treated as a single focal point in the company or around it. This centralized view is not compatible with a supply chain in which other companies are seen as part of a production process integrated with their activities. Trying to manage this process between organizations in an individualized way may not generate the expected results, when viewing the entire chain.

In this sense, it is also important to make the distinction between the concepts of the supply chain and the value chain. The term value chain is directly related to the financial success and the strategic positioning of the companies involved in a given chain. While with the supply chain, there is concern about its physical changes, flow of knowledge and information. However, changes in the value chain can be associated with changes in the supply chain (Ayers, 2006; Pires, 2007).

Pires (2007) argues that there are several definitions for the supply chain management and that, generally, the settings are complementary because different authors design them. From this, it can be said that the management of the supply chain is clearly multifunctional, as it can be considered as a point of convergence between various areas in the business environment, as shown in Figure 1.

Figure 1: Supply Chain Management



Source: adapted from Pires (2007, p. 62).

Although the concept of supply chains exists for over twenty years, the configuration process of the supply chain needs further study. Many companies are currently seeking to understand how this production integration approach may be accompanied by a configuration that achieves better results (Ashayeri, Tuzkaya, & Tuzkaya, 2012). Thus, it is important to understand how this configuration happens based on the supply chain management.

The literature in this area (e.g. Lambert, Cooper, & Pagh, 1998; Pires, 2007) points out that there is a lot of confusion about what the supply chain management means. Several studies use the term supply chain when, in fact, they want to refer to other business processes, such as logistics, purchasing and operations, or a combination of all three. However, the supply chain management itself refers to more strategic issues, such as the integration of processes between different businesses and within the company itself (Lambert *et al.*, 1998). In this work, it is understood that the supply chain management refers to a systemic and strategic vision of management that coordinates activities and allocates efforts and resources aimed at implementing a single strategy in the chain;

leading to competitive advantage and benefits, such as cost savings and improvements to all its participants (Mentzer *et al.*, 2001; Naslund & Williamson, 2010).

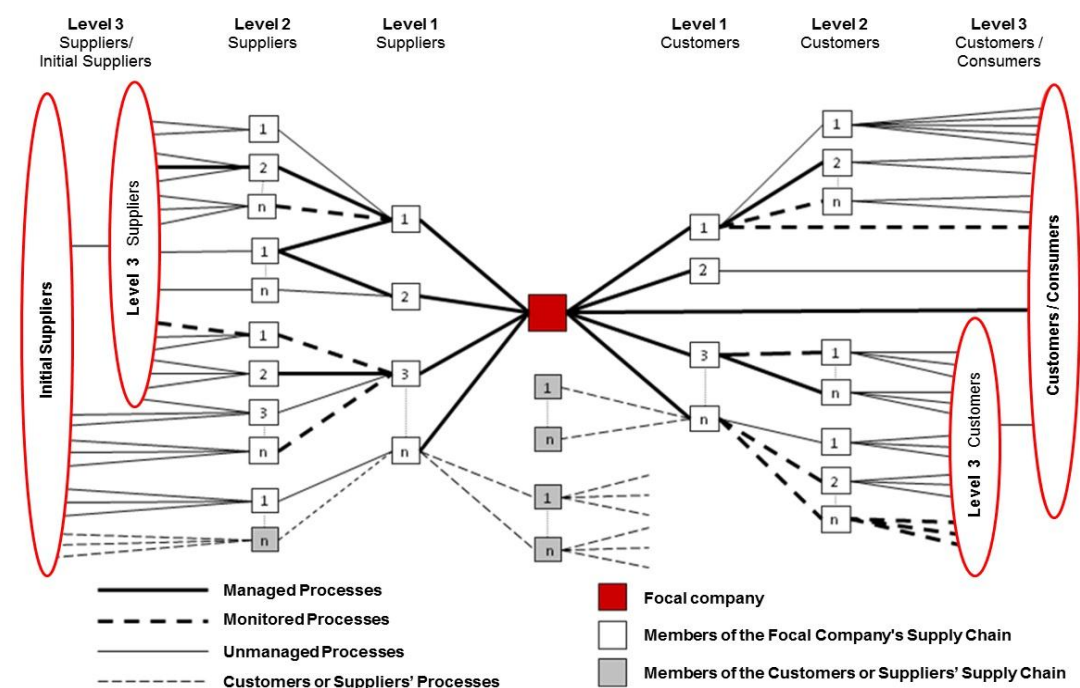
Managing the supply chain is a difficult and challenging task because there is a high degree of complexity around the management of processes involving from the suppliers of products (goods and services) to the delivery of the product for use by the end consumer. The supply chain management requires process integration within the company and the network of companies that make up the supply chain (Lambert, 2006; Cerra, Maia, Alves Filho, & Nogueira, 2014).

However, for Lambert, Cooper and Pagh (1998), the establishment of a network of relationships within a supply chain, by itself, is not sufficient to guarantee a competitive edge for the manufacturer. The supply chain can also generate negative results beyond expectations. Thus, the management of relationships of a supply chain becomes an important element. A supply chain is therefore regarded as being more than a group of companies; it refers to a business network and relationships with capacity for integration between different companies (Lambert, 2006; Cerra *et al.*, 2014.).

The supply chain can be seen as a network of connected and interdependent organizations, working together in mutual cooperation to control, manage and improve the flow of raw materials and information from suppliers to end customers (Christopher, 2007). Some of the main components of a supply chain are the integration of organizations and the coordination of material flows, information and financial costs. Thus, the establishment of a supply chain requires the choice of suitable partners to set up a cooperation between organizations that are legally separate but have an interest in improving their efficiency and competitiveness when relating to other organizations (Stadtler, 2005).

Figure 2 illustrates a typical supply chain, with its various levels of suppliers and customers, and its business processes. The structure of a supply chain is composed of companies and their links. In this case, these links are business processes that coordinate the activities responsible for producing a specific value for the customer. The management methods are applied to these processes in order to allow for integration and management of the entire chain (Lambert *et al.*, 1998). Hence, the importance of managing systemically this complex network of processes, to add the greatest possible value for the customer and thereby achieving the best result from it. It is also noteworthy that the center point of Figure 2 represents the focal company of the supply chain. In this paper the definition of the focal company used is that of a central company, from which the supply chain is analyzed and has links with suppliers and customers (Lambert *et al.*, 1998).

Figure 2: Representation of a supply chain



Source: adapted from Lambert *et al.* (1998, p.7).

The management of the supply chain must occur for the entire structure of the companies that provide the raw materials to end customers/consumers. Therefore, it is important that several factors be considered in its management, such as product complexity, the number of available suppliers and the availability of raw materials. The obligations of each company will be different depending on the position in which each one of them is inserted into the supply chain (Lambert *et al.*, 1998). Oliveira and Leite (2010) believe that to manage the structure of a supply chain is a very important activity for its development, not only by the ability to view all the actors involved in the chain, but also to understand the role of each of these actors in the context of supplies. By analyzing how the chain and its links are structured, it is possible to reduce production costs, manage processes and add greater value to the product by a focused management process throughout the length of the chain (Pires, 2004; Oliveira & Leite, 2010).

In this context, we can find through literature that several factors have been found to facilitate the supply chain management. Several works have mentioned the use of information and communication technologies as being facilitating aspects of the implementation of the supply chain management, since it promotes the integration of various links in the supply chain (Dangayach & Deshmukh, 2001; Quayle, 2003). In addition, it is believed that by developing the sharing and the visibility of the information through technological mechanisms, the evaluation, performance and overall growth of the chain will be facilitated (Fugate, Sahin, & Mentzer, 2006; Katunzi, 2011). According to Vogt (2010), the speed at which the goods move through the supply chain prevents the use of manual systems, except in very simple operations, such as unloading cargo, for example. Therefore, it is important that the chosen information system provide the necessary data to integrate and manage the supply chain as a whole.

According to Di Serio, Sampaio and Pereira (2007), information technology has played a highly important role within supply chains and it is able to bring about the following benefits: (i) it allows users to capture and collect information about the manufacturing process, (ii) it allows better monitoring of the production process, (iii) it facilitates decision making, (iv) it allows you to modify activities during the production process and (v) it allows the integration of tasks and processes of customers, suppliers and the focal company of a supply chain.

Although information and communication technologies are recognized as key facilitating elements to the supply chain management, other factors such as trust, collective actions and internal policies have been identified by scholars as being critical to the supply chain management (Fawcett, Magnan, & McCarter, 2008; Miguel & Brito, 2010; Katunzi, 2011). The building of trust is something that occurs over time and high levels of trust can facilitate the commitment and the realization of collective action (Lambert, 2006). It is very important, therefore, to establish a relationship based on trust, in which all participants in the supply chain benefit from, even if it seems impossible (Katunzi, 2011).

Another relevant factor in the implementation of the supply chain management noted was the joint product development in the supply chain. There is a belief that the development of new products and services in an integrated manner in the supply chain allows us to develop new solutions to the market together with customers and suppliers (Lambert, García-Dastugue, & Croxton, 2008; Pires & Sacomano, 2010).

The capacity for a closer coordination with customers/suppliers has also been recognized as a facilitating factor that is relevant in promoting interactions between companies that are part of the supply chain management (Tomas & Alcantara, 2013). Depending on the common goals established in the implementation of the supply chain management, the type of relationship maintained by the focal company and its partners reflects the level of integration and coordination between enterprises (Pires, 2004).

Vieira, Yoshizaki and Ho (2009) suggest that the technical visits can be critical for the company to learn and understand the difficulties and partners' strategies, and can facilitate the sharing of information. Through technical visits, it is possible to know some aspects or limitations of suppliers, such as: the location and distribution capacity of its facilities; other important customers with dedicated production; production information concerning the flexibility, capacity and scale for the supply during periods of high demand or urgent requests; issues relating to transport and storage, such as the movement area, storage equipment, modes and transport volumes and types of vehicles.

In order to link the demand of end consumers with the company's production activities and their suppliers, an engagement between companies of the chain is required, which can be facilitated by a proper management of the manufacturing flow (Lambert, García-Dastugue, & Croxton, 2008). In short, to develop a framework for maintaining relationships with customers and suppliers is an aspect that can affect the success of the supply chain (Fawcett *et al.*, 2008). Understanding the factors that facilitate the management of the supply chain can be a

promising avenue for studies in this area of research. The next section of this article describes the methodological procedures applied for the conduct of the field study.

3. METHOD

This field study carried out was targeted from a qualitative research method, as it gives depth to the data, dispersion, interpretative wealth, and environmental context through a description-based method. In this sense, the research is considered exploratory, since the issue is approached based on new prospects to expand existing studies. For that purpose, studies were performed in multiple cases, mainly based on open perceptions about the phenomenon analyzed (Sampieri, Collado, & Lucio, 2006).

In terms of timing, this research is cross-sectional. For Hair *et al.* (2005, p.87) research using a cross-sectional study “may give the user an overview or a description of administrative elements at a given point in time.” This study collected data on supply chains in one moment in time, between the end of 2012 and 2013.

The primary data sources were interviews conducted about supply chains and their respective focal companies. Four supply chains that are part of the automotive industry in Rio Grande do Sul, Brazil, were researched. These chains were chosen based on their interest in the issue and because they are implementing or have already implemented the supply chain management. As the main research instrument, we used a checklist, through which an attempt was made to identify evidence based on the perceptions of respondents. Initially, the questions asked sought to understand the context under study, the chain as a whole and the role of businesses as participants in the supply chain studied. Next, the second block of questions asked had the aim of identifying the main results/benefits obtained from the implementation of the supply chain management. From these realized gains, questions were asked with the intention of identifying the factors perceived as facilitating the management of the supply chain being studied (the latter issues were the main focus of the interviews), in order to be subsequently compared with the theoretical findings raised by literature on this subject.

Twenty people participated in the interviews, who claimed to have capacity and expertise to provide information and opinions about the subject in question. The position held by respondents was one of the main criteria to define their participation or not. We sought to define the number of respondents regarding suppliers and customers in accordance with the characteristics of each of the chains. The same occurred in relation to the number of women interviewed at the focal companies under study. According to the framework for the existing supply management in each company, a greater or lesser number of respondents were interviewed. Table 1 shows the total number of respondents and their distribution within the different supply chains under study.

Table 1: Number of research participants

Respondents	Supply A	Supply B	Supply C	Supply D	Total
Focal Company	2	3	2	3	10
Suppliers	2	1	3	2	8
Customers	1			1	2
Total	5	4	5	6	20

Source: Elaborated by the authors.

The interviews were conducted individually and audio-recorded. To perform the analysis of research data, the recorded interviews were transcribed and then were categorized and analyzed with the help of the MAXQDA software. Thus, using the literature review previously conducted as support, categories were created based on the responses of respondents (a total of nine categories that describe the “facilitating factors” and seven categories related to “gains perceived/results obtained” with the supply chain management). It is worth mentioning that the analyses carried out were not intended to compare the studied chains (it is not a question of comparative case studies). For each category, the parts of the transcribed interviews that served as evidence for the analyses were linked. The main results of these analyses are presented in the next section of this article.

4. RESULTS

This section is structured in three parts: (i) first, we contextualize the four supply chains in the automotive industry in Rio Grande do Sul/Brazil; then (ii) the facilitating factors for these supply chain management are identified, according to the perception of the respondents; and in the last part (iii) some perceived benefits with the implementation of the supply chain management are presented.

4.1 Characteristics of the Supply Chains

As mentioned in the previous section, this paper studied four supply chains in the automotive sector in Rio Grande do Sul, Brazil. In Table 2, the main features of these supply chains are summarized and, as it can be seen, three of the four cases studied have implemented the supply chain management - SCM) more than ten years ago.

Table 2: General characteristics of the supply chains of the automotive industry under study

Chain	Main business	SCM Deployment time	Important milestone
A	Manufacture of Parts	6 years	Implementation of a computerized management system
B	Manufacture and Assembly of Engines	More than 10 years	Implementation of a computerized management system
C	Manufacture of Automobiles	More than 10 years	Manufacture and launch of a new product
D	Manufacture of Parts	More than 10 years	Joint product development

Source: Elaborated by the authors (study data).

The main business of Chain A is the manufacture of automotive parts, focused on light automakers and on the replacement parts sector in the national and international market. When compared with the other chains studied, this chain is the one that performs supply chain management in less time, and its implementation was 6 years ago. In any case, there is a recognition of the importance of the supply chain management for the automotive sector, as illustrated by the words of one respondent: “Today, the entire automotive sector is a network of automakers and suppliers, and it is very hard to see the sector through a company.” At the time of this study, it was found that one of the main actions (milestone) taken recently was the implementation of a computerized system of supply management, which according to the respondents, has collaborated significantly to the development of the SCM process.

In Chain B, the main business relates to the manufacture and assembly of diesel engines for use only in the national automotive industry. In this supply chain, the SCM has been established for over 10 years and, according to respondents, one of the actions that have stood out in the last two years is the implementation of a computerized supply management support system.

With regard to the type of business in Chain C, the respondents highlighted the large-scale light vehicles assembly (car manufacturing) as the main business of the chain, focused on domestic and international markets. According to respondents, the implementation of SCM occurred more than 10 years ago and one of the main facts that demanded such implementation and which has been the reason to improve it further is the manufacture and launch of new products (car). Unlike other chains studied, Chain C is organized/structured in an industrial condominium, which promotes geographical proximity, reduction of logistical costs and inventory, and the sharing of some services between the main links involved in the supply chain. For previous studies, the setting up of a supply chain has a significant importance to facilitate their management, because among other things, it allows you to identify who are the members who have a closer or farther link to the focal company (Oliveira & Leite, 2010).

Regarding the Chain D, it is common ground among respondents that its business is the manufacture of automobile parts, with its most concentrated performance in the domestic market and South America, as stressed by a respondent: “we serve all automakers in Brazil, with the exception of one. And outside the country, 80% of vehicles assembled in South America use our axle shafts.” Respondents in this chain indicated that the implementation of SCM occurred more than 10 years ago, and in the last year, a recent and significant milestone was the joint product development, bringing the different links in the chain closer (focal company, customers and suppliers) to generate joint solutions from the interaction between them.

The next section presents and discusses some of the facilitating factors for the SCM, identified in the case studies undertaken in this research work.

4.2 Facilitating Factors for the Supply Chain Management in the Automotive Sector in Rio Grande do Sul

Factors that may contribute to the development of the supply chain mapped in this study are shown in Table 3.

Table 3: Facilitating Factors for the Supply Chain Management under Study

Facilitating Factors	Evidence from interviews (examples found in the supply chains under analysis)
Adoption of collective action (e.g. staff training)	“We have worked hard toward training our internal staff (...), in the last two years in a more intensive way, our own resources have been used to qualify our internal team along with our suppliers.” - (Respondent from Chain D)
Adoption of internal policies (integrated policy)	“The existence of an integrated policy between suppliers, customers and even within different areas of the company itself has been something important for the management chain.” - (Respondent from Chain A).
Joint development of new skills	“The joint development of technical skills is a way to facilitate a speedy response and joint problem solving: any problem in the line and the quality team, suppliers and engineers are called upon and they immediately come into the plant to avoid a production downtime.” - (Respondent from Chain C).
Joint development of new products	“Yesterday I was with supplier x for the development of our product and what I can see is that they understand much more of their rubber products than we do.” - (Respondent from Chain D).
Confidence-building	“In general, the establishment of confidence between the members of the chain facilitates the adoption of collective actions among them (...) it is important to develop a long-term relationship with confidence-building” - (Respondent from Chain A).
Relationship management with customers and suppliers	“The implementation of a more efficient management arises from the challenge of managing the relationship with customers and suppliers.” (Respondent from Chain A). “In fact, supplies, in general, is the art of knowing how to program clients, suppliers, involving logistics.” - (Respondent from Chain B).
Partnership relationship (close coordination)	“(…) A close relationship with suppliers is a strategic factor that one should always be aware of, because it is essential for the management of the supply chain.” - (Respondent from Chain B). “(…) So the importance of the relationship between the different areas of the company (...) relationships inside and outside the company are important for chain management.” - (Respondent from Chain A).
Selection of customers and suppliers	“Through a selection of strategic partners in the market, suppliers and customers became part of this joint management with the operation of the production process requirements.” – (Respondent from Chain C).
Use of information technology (integrated management system)	“The use of an electronic system enables the deployment and the very management of the supply chain (...) these integrated systems used are extremely important, because they interfere directly in operations (...) is a fully operational issue: if the system goes down, nothing works, we do not weigh a bar without information technology.” - (Respondent from Chain A).

Source: Elaborated by the authors (study data).

In the cases under study, the auto industry in Rio Grande do Sul was identified among the main factors facilitating the adoption of SCM: **adoption of collective actions** (Table 3). The conduct of joint training sessions between the various participating organizations of the chain was identified as one of the factors that contributed to the improvement of the supply management and its implementation process. It was also pointed out that the training can take place in conjunction with customers and suppliers. In Chain D, for example, it was indicated that the realization of collective actions aimed at training has sought to train and educate employees and suppliers about the importance of the supply management. As identified in the interviews, in essence, the conduct of training allows employees to understand what their roles are and their importance in the management and the delivery of a similar training with customers and suppliers also provides significant benefits within the chain.

The **adoption of internal policies** was reported as one of the main factors contributing to the management of the studied chains. For Chain A, for example, the existence of an integrated policy between suppliers, customers and even within different areas of the company itself has been an important factor for the supply chain management.

Development of new skills was pointed out as another facilitating aspect. In Chain A, this has been achieved in conjunction with other companies in the chain and out of it. The required learning for the development of a product and the very implementation of management ends up developing the company itself even in customer service out of the chain.

The **joint development of new products** has been identified as another facilitating factor. In Chain C, for example, the supplier's technical knowledge about the raw material has been tapped to develop joint solutions.

The **confidence** was one of the factors that stood out among the rest, mentioned by respondents from all four chains studied. The establishment of confidence between the entities of the supply chain is recognized as the main facilitator of the supply chain management.

The **close relationship** is another facilitating factor. For Chain A, it has been relevant to foster closer links between the different areas involved in the supply management within the company, as well as among its customers and suppliers. For Chain B, the proper **relationship management with customers and suppliers** are factors that contributed to the supply chain management. On the issue of customers, the aim is to understand the needs, both related to the quality, and mainly to demand.

On the suppliers' side, it is believed that the management of the supply chain has the lead role of checking the compliance of suppliers to the parameters set by the company and of allowing a closer relationship between the different links in the chain. As outlined in the literature on the subject, the efficiency of a company does not depend on its internal operations only, but also on the ability of a closer coordination with customers and suppliers (Tomas & Alcantara, 2013). In Chain C, for example, the **close relationship** between the focal company and its suppliers and customers (close coordination) was suggested as being an internal determining factor for the implementation of the supply chain management. According to respondents, this factor allows the compliance with the productive requirements of the automaker through a close coordination with suppliers and customers.

Another aspect found in the interviews was the **selection of customers and suppliers**. This aspect is also reported in previous studies, in which they highlight that the establishment of the supply chain management requires the choice of suitable partners to provide a base for cooperation between organizations that are legally separate but have a real interest in improving their efficiency and competitiveness when relating to other organizations (Stadtler, 2005; Chen, 2011).

Among the factors that were highlighted as facilitating the supply chain management, there is the **use of information technology**. All studied chains indicated that from the beginning they have used an integrated information system (software) to support the supply chain management. For Chain A, for example, this factor is one of the aspects that contributed to implement its supply management and which has helped its follow-up with suppliers and customers. In Chain D, it was emphasized that the use of technological resources has also supported the customer communication with suppliers, and vice versa; the information system is used as support for the synchronization of different data to support decision-making, the relationship and the activities developed in the supply chain.

In the next section, the main benefits perceived by respondents as to the implementation of their supply chain management are presented.

4.3 Results achieved with the Implementation of the Supply Chain Management

Table 4 presents the results/benefits obtained from the implementation of the supply chain management, which were identified in the cases studied and exemplified by the transcription of some parts of the interviews.

Among the main results achieved with the implementation of SCM are increasing chain productivity and problem solving agility. These aspects were mainly identified in Chains A and C, in which the respondents pointed out that production and agility to solve problems in the supply chain are benefits achieved throughout the implementation of SCM. It is worth mentioning here that these benefits are observed in both implementation time frames of the SCM (Chain A, 6 years and Chain C, over 10 years), suggesting that the time in which the SCM has been in place is not necessarily a determinant factor.

Another aspect pointed out as one of the results relevant to the supply chain was the better communication with the supplier. According to some participants of Chain B, for instance, this resulting factor is also associated with improvements in the management of customers and suppliers, in order to determine the most important links for the company (focal) to reduce the risk of a break in the production line, among other problems. In previous

academic studies, Pires and Sacomano (2010) had already pointed out the increased synergy between the suppliers as one of the main benefits from the deployment of the supply chain management.

In addition to the results presented, the respondents – mainly from Chain A, identified that implementing supply chain management is a way to improve in a continuous manner the product and its manufacturing flow. These benefits have been realized in both the level of service and in the production plan. That is, with the implementation of the supply chain management it was possible to develop a production plan guided by a planning system that considers the entire supply chain and not just the company. As pointed out by Lambert, García- Dastugue and Croxton (2008), the management of the manufacturing flow is focused on the determination and application of manufacturing flexibility throughout the supply chain, and this requires planning and implementing that go beyond the manufacturer's boundaries, linking the demand of end consumers with the company's production activities and their suppliers.

Table 4: Results obtained with the implementation of the supply chain management

Main Results Obtained	Evidence from interviews (examples of comments identified in the chains)
Increase in the productivity chain and fast problem solving	“(…) An improved chain productivity, improved communication, tangible and intangible cost reductions, (…) there is a faster response in resolving problems that arise (…)” – (Respondent from Chain A). (…) “We have agility in problem solving, information and a faster response from suppliers to the satisfaction or not of some generated problem, and we act in the same way with them.” – (Respondent from Chain C).
Improved communication with suppliers	“There was an improvement in the communication with the supplier, a much better communication channel. (…) We try to work a number of things to help the supplier in his production line. If he has any process failure, a problem in production, we work in his line (…)” – (Respondent from Chain A).
Improved management of customers and suppliers	“On the issue of customers, there is a closer relationship, we seek to understand the needs, both related to the quality and demand. On the suppliers' side, the supply chain management has and had a major role in verifying the compliance of suppliers with the parameters set by the company (focal), allowing a closer relationship between the different links in the chain.” – (Respondent from Chain B)
Improved product quality	“The biggest requirement is quality, if we didn't have it, we would be unable to compete. With the supply chain management, we continuously achieve a better quality product, which is helping us always (…)” – (Respondent from Chain A)
Manufacturing flow improvement (level of service, production plan)	“We have been able to maintain the proper level of service to our customers, so once I get a schedule from an automaker to deliver x engines to it per day, we must have an efficient supply chain to back us up.” – (Respondent from Chain A).
Speed of responses and the flow of information in the chain	“Speed of response is not a differentiation; it is a prerequisite. Suppliers have direct access to our factory through badges. They have access to our assembly line (…) that facilitates this process.” – (Respondent from Chain D) “Once the needs are informed and updated in a faster way, the faster we can have a supplier's response (…)” – (Respondent from Chain C).
Cost reduction (production, logistics and inventory)	“The very fact that the company is inserted into the automotive sector (...), in the very competitive market, we seek to reduce costs, and today we can achieve this with the acquisition of raw materials, logistics and a production process (...) and it depends on the supply chain management.” – (Respondent from Chain A)

Source: Elaborated by the authors (study data).

With regard to the main positive results noted after the implementation of the supply chain management in Chains C and D, the respondents highlighted the speed of responses and information flow in the chain. According to the analysis of the interviews in these chains, these benefits are associated with physical proximity and existing relationships between the chain links. For Vieira, Yoshizaki and Ho (2009), the exchange of information on ability

and capacity of the supply, storage restrictions, inventory turnover, demand forecasts and sales data allow to bring participants closer, increase contact between businesses and generate a better environment for the establishment of new cooperation projects and agreements.

In the four chains studied, reducing costs (production, logistics and inventory) was one of the aspects perceived as the main benefit obtained from the implementation of the supply chain management. In Chain C, for example, reducing logistic and inventory costs were pointed out as being the most relevant. This is probably related to how this chain is structured, that is, the configuration of the chain in the “industrial condominium” format seems to contribute to achieving these kinds of results due to the geographical proximity between the chain links. As for the Chain B, this cost reduction occurs due to the ease in managing operational indicators and identifying areas for improvement. As for the Chain D, cost reduction is seen as a result associated with the speed of response and information flow between the links of the supply chain. In Chain A, lower costs with the acquisition of raw materials, reducing freight prices and the reduction of production costs are the main benefits highlighted.

5. FINAL CONSIDERATIONS

In this article, based on twenty interviews carried out in four supply chains in the automotive industry in the Brazilian context, we could identify nine facilitators and seven results obtained with the implementation of the supply chain management in the studied chains.

With regard to academic and managerial contributions, this study helps in identifying the main factors that contribute to the successful implementation of the supply chain management. The factors found have also been identified in the literature on the subject and the results of this research adds evidence to the findings of previous studies that point to the existence of various relevant factors that contribute to the implementation and achievement of the supply chain management. Thus, these findings may also help managers and participants of supply chains, especially in the automotive industry in Rio Grande do Sul/Brazil, improve their understanding of the behavior of the management of these types of chains and can serve as inputs for decision making focusing on the factors that can benefit and facilitate the dynamics of supply chains.

We believe that investing in the qualification process of the supply chain through the pursuit of closer ties with its suppliers, customers and different areas, is an interesting alternative in terms of competitiveness and significant results. It is important to emphasize that, due to involving a long-term relationship between the companies the results of this implementation were slow to appear in the studied chains. Therefore, it is necessary to persist during a given time seeking to develop activities related to this management process, in order for their results to appear more obviously. We therefore suggest the conduct of further longitudinal studies to ascertain which facilitators are more relevant in certain stages of implementation of the supply chain management and, consequently, what the associated benefits are.

The results presented in this study should be interpreted with caution, that is, the analysis and findings cannot be generalized for other supply chains, and it is only for the companies participating in the study in the context and time the interviews were conducted. In this sense, we recommended the conduct of future quantitative studies to look at the relationship of influence between the facilitating factors and the benefits identified in this study, as well as to evaluate the degree of importance of each of the facilitators and the results presented. In addition, we suggest the conduct of comparative studies in other chains for comparing chains from different sectors, retail or services. Therefore, this study opens a range of opportunities for the undertaking of future studies based on the conceptual framework outlined in this paper and on its findings.

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