

## **Automotive Brazilian industry: a supply chain integration**

Industria automotiva Brasileira: a integração da cadeia de suprimentos

Hamilton Pozo  
CEETEPS/Fatec Rubens Lara/BR

### **Abstract**

The objective of this work is to analyze the integration process within the Brazilian automotive sector, involving the supply chain along with large, micro, and small enterprises in this industry. The automotive industry is one of the most complex and globalized in terms of industrial processes. This study adopts a mixed-methods research design, with qualitative approaches to explore the integration of large and micro/small companies in the automotive supply chain in Brazil. The qualitative approach includes in-depth interviews with key stakeholders, including suppliers, manufacturers, and industry experts. The results present an important analysis that needs to be addressed to improve the integration of this supply chain.

**Keywords:** Integration, supply chain, large and micro companies.

### **Resumo**

O objetivo deste trabalho é analisar o processo de integração existente no setor automotivo brasileiro envolvendo a cadeia de suprimentos junto com as grandes e micro e pequenas empresas desse setor. A indústria automotiva é uma das mais complexas e globalizadas no processo industrial. Este estudo adota um desenho de pesquisa de métodos mistos, com abordagens qualitativas para explorar a integração de grande e micro e pequenas empresas na cadeia de suprimentos automotiva no Brasil. A abordagem qualitativa envolve entrevistas em profundidade com as principais partes interessadas, incluindo os fornecedores, montadoras e especialistas do setor. O resultado apresenta uma análise importante para ser solucionada para melhoria da integração dessa cadeia de suprimentos.

**Palavras-chave:** Integração, cadeia de suprimentos, grandes e micro empresas.

## **1. INTRODUCTION**

The automotive industry is one of the most complex and globally integrated sectors, characterized by intricate supply chains that span multiple countries and involve a wide range of suppliers. In Brazil, the automotive sector is a significant contributor to the national economy, with a well-established network of suppliers that includes both large corporations (LC) and micro and small businesses (MSB). The integration of these suppliers into the supply chain is crucial for the overall efficiency and competitiveness of the automotive industry. However, the integration at the automotive industry presents unique challenges for the MBS in relation to LC, due to their limited resources, lower bargaining power, and often less sophisticated operational capabilities compared to larger suppliers.



The integration of suppliers in the automotive industry is not a new concept according to Teixeira (2004). It has been widely discussed in the literature, with a focus on large suppliers and their relationships with automakers. However, the integration in this context has received less attention, despite their importance in the supply chain. The MSB, often serve as secondary or tertiary suppliers, providing specialized components or services that are critical to the production process. Their integration into the supply chain can lead to improved efficiency, reduced costs, and enhanced innovation, but it requires a collaborative approach that addresses the specific challenges faced by these smaller entities.

The primary objective of this research is to explore the factors that influence the integration of the automotive supply chain in Brazil. This study contributes to the existing literature on supply chain management by focusing on the integration of LC and MSB in the automotive industry. While much of the existing research has focused on large suppliers and their relationships with automakers, this study provides a unique perspective by examining the challenges and opportunities associated with the integration of MSB. The findings of this study have important implications for both theory and practice. Continuously searching for the integration of suppliers and methodologies of purchase leads to a consideration of internal constraints, cultural factors and an understanding of the importance of suppliers (Pozo et. al. 2010).

From a theoretical perspective, the study contributes to the development of a framework that explains the integration process of MSB in the automotive supply chain. This framework can be used to guide future research on the topic and to develop new theories that address the specific challenges faced by MSB. From a practical perspective, the study provides valuable insights for automakers on how to enhance their collaborative relationships and improve supply chain performance. The recommendations provided in this study can help automakers to better integrate into their supply chains, leading to improved efficiency, reduced costs, and enhanced innovation. Christopher (2002) affirm that such methods are used to study the phenomenon in its context and when it is necessary to explore variable or partially understood phenomena to a certain degree of depth. For MSB, the study offers practical guidance on how to overcome the barriers they face in integrating into the supply chain and how to leverage their strengths to become more competitive.

The integration of the automotive supply chain is fraught with challenges. These include limited access to technology, lack of financial resources, and difficulties in meeting the

stringent quality and delivery requirements of automakers, mainly into MSB. Additionally, the automotive industry often faces barriers in establishing and maintaining collaborative relationships with larger firms in the supply chain. These challenges can hinder their ability to contribute effectively to the supply chain, leading to inefficiencies and increased costs for all parties involved Krajewski, Ritzman and Malhotra (2016).

Despite these challenges, there is a growing recognition of the importance of the automotive supply chain. Their ability to provide specialized components and services, coupled with their flexibility and innovation potential, makes them valuable partners for automakers. However, for these benefits to be realized, it is essential to develop strategies that facilitate the integration of the supply chain. This requires a deep understanding of the factors that influence the integration process, as well as the development of tools and methodologies that can support in overcoming the barriers they face.

## **2. THEORETICAL FRAMEWORK**

Based on the literature review, a theoretical framework is proposed to explain the integration process of the automotive supply chain. The framework identifies the key factors that influence the integration process, including collaborative relationships, trust, and commitment, and the challenges faced by regular, and MSB. The framework also identifies the strategies that MSB can adopt to overcome these challenges and enhance their integration into the supply chain.

The framework is based on the premise that the successful integration of MSB into the automotive supply chain requires a collaborative approach that addresses the specific needs and constraints of these firms. By building strong, collaborative relationships with automakers, MSB can gain access to valuable resources and expertise, which can help them to overcome the barriers they face and improve their competitiveness. Additionally, by investing in resource development and operational improvement, and the companies can enhance their ability to meet the stringent requirements of automakers and contribute to the overall efficiency and competitiveness of the supply chain.

### **2.1 Supply Chain Management and Supplier Integration**

Supply chain management (SCM) is a critical aspect of modern business operations, particularly in industries characterized by complex production processes and global supply



networks. The automotive industry is a prime example of such an industry, where the efficient management of the supply chain is essential for maintaining competitiveness and meeting customer demands. Supplier integration, which refers to the process of aligning and coordinating the activities of suppliers with those of the focal firm, is a key component of SCM. Effective supplier integration can lead to improved supply chain performance, including reduced costs, increased efficiency, and enhanced innovation.

The literature on supplier integration has largely focused on large suppliers and their relationships with automakers. The approach taken by Porter and Kramer (2011), to inter-business relationships and the ability to exploit them, should not be limited to the corporate world of business units. The author believes that *...the pursuit of interrelationships by some competitors is compelling others to do the same or risk losing their competitive position.*

However, the integration of the MSB into the supply chain presents unique challenges that require a different approach. The MSB often lack the resources and capabilities of regular, and larger suppliers, which can make it difficult for them to meet the stringent requirements of automakers. Additionally, most of companies may face barriers in establishing and maintaining collaborative relationships with larger firms in the supply chain. These challenges highlight the need for a deeper understanding of the factors that influence the integration of into the automotive supply chain.

## **2.2 Collaborative Relationships in Supply Chains**

Collaborative relationships are a key factor in the successful integration of suppliers into the supply chain. Collaboration involves the sharing of information, resources, and risks between firms, with the goal of achieving mutual benefits. In the context of the automotive industry, collaborative relationships between automakers and their suppliers can lead to improved supply chain performance, including reduced costs, increased efficiency, and enhanced innovation. According to Merli apud Martins and Laugeni (2006), the sample for relationship of the supplier and the customer evolved because of the necessity for customers to reach their final objective efficiently.

For both kind of companies, LC and MBS establishing and maintaining collaborative relationships with automakers can be particularly challenging. The lack the bargaining power and resources of larger suppliers, which can make it difficult for them to negotiate favorable terms with automakers. Additionally, MSB may face difficulties in meeting the stringent quality and delivery requirements of automakers, which can strain their relationships with these firms.

Fiala (2005) affirms that the structure of the Supply Chain is composed of suppliers, manufacturers, deliverers, retailers and consumers.

Despite these challenges, collaborative relationships are essential for the successful integration of regular, and MSB into the supply chain. By working closely with automakers, they can gain access to valuable resources and expertise, which can help them to overcome the barriers they face and improve their competitiveness.

### **2.3 Trust and Commitment in Supplier Relationships**

Trust and commitment are critical components of collaborative relationships in supply chains. Trust refers to the belief that a partner will act in a manner that is consistent with one's expectations, while commitment refers to the willingness to invest in and maintain a long-term relationship. In the context of the automotive industry, trust and commitment are essential for the successful integration of suppliers into the supply chain.

However, many companies tend to choose to continue to work in isolation, Iacono and Nagamo (2009) and Sawik (2013) identified some factors that can inhibit collaboration among a integration of supply chain: lack of information, lack of capital or lack of financial resources, low-skilled labor, resource constraints with machinery and equipment, lack of confidence, organizational culture, capacity constraints of companies, conflict of interest between companies, lack of holistic view of the business, obsolete technology and interest rate. This lack of information in the supply chain is along-standing problem. Katunzi (2011),

The mainly problem is how MSB, can building trust and commitment with automakers can be particularly challenging. MSBs often lack the track record and reputation of larger suppliers, which can make it difficult for them to establish trust with automakers. Additionally, MSB may face difficulties in demonstrating their commitment to the relationship, particularly if they lack the resources to invest in long-term partnerships. Despite these challenges, trust and commitment are essential for the successful integration into the supply chain. By building trust and commitment with automakers, the companies can establish strong, long-term relationships that provide them with access to valuable resources and expertise.

### **2.4 Challenges Faced by MSB, and LC in Supplier Integration**

The automotive industry faces several challenges in integrating into the automotive supply chain. These challenges can be broadly categorized into three main areas: resource constraints, operational challenges, and relational challenges.



**Resource Constraints:** often, the companies lack the financial, technological, and human resources of larger suppliers, mainly MSB. This can make it difficult for them to invest in the necessary infrastructure, technology, and training required to meet the stringent requirements of automakers. Additionally, MSB may face difficulties in accessing financing, which can limit their ability to invest in growth and innovation.

**Operational Challenges:** often, the companies face operational challenges that can hinder their ability to meet the quality and delivery requirements of automakers. These challenges can include limited production capacity, lack of access to advanced manufacturing technologies, and difficulties in managing complex supply chains. Additionally, MSB may face challenges in implementing quality management systems and meeting the regulatory requirements of the automotive industry.

**Relational Challenges:** often, the companies face relational challenges in establishing and maintaining collaborative relationships with automakers. These challenges can include limited bargaining power, difficulties in negotiating favorable terms, and lack of access to information and resources. Additionally, MSB may face difficulties in building trust and commitment with automakers, particularly if they lack the track record and reputation of larger suppliers.

## **2.5 Strategies for Enhancing Supplier Integration**

To overcome the challenges faced by an integrating into the automotive supply chain, it is essential to develop strategies that address the specific needs and constraints of these firms. These strategies can be broadly categorized into three main areas: resource development, operational improvement, and relationship building.

**Resource Development:** companies need to invest in the development of their financial, technological, and human resources to improve their competitiveness and ability to meet the requirements of automakers. This can include accessing financing, investing in advanced manufacturing technologies, and providing training and development opportunities for employees.

**Operational Improvement:** The companies need to focus on improving their operational capabilities to meet the quality and delivery requirements of automakers. This can include implementing quality management systems, adopting lean manufacturing practices, and improving supply chain management processes.

**Relationship Building:** The companies need to focus on building strong, collaborative relationships with automakers to gain access to valuable resources and expertise. This can

include developing trust and commitment, improving communication and information sharing, and participating in joint initiatives and projects with automakers.

### 3. METHOD

This study adopts a mixed-methods research design, with qualitative approaches to explore the integration of LC and MSB into the automotive supply chain in Brazil. The qualitative approach involves in-depth interviews with key stakeholders, including MSB suppliers, automakers, and industry experts, to gain a deeper understanding of the factors that influence the integration process. The qualitative approach involves a survey of LC and MSB suppliers to collect data on their experiences, challenges, and strategies for integrating into the supply chain.

Based on the literature review, a theoretical framework is proposed to explain the integration process of the automotive supply chain. The framework identifies the key factors that influence the integration process, including collaborative relationships, trust, and commitment, and the challenges faced by LC and MSB. The framework also identifies the strategies that MSB can adopt to overcome these challenges and enhance their integration into the supply chain.

The framework is based on the premise that the successful integration of LC and MSB into the automotive supply chain requires a collaborative approach that addresses the specific needs and constraints of these firms. By building strong, collaborative relationships with automakers, mainly what the MSB can gain access to valuable resources and expertise, which can help them to overcome the barriers they face and improve their competitiveness. Additionally, by investing in resource development and operational improvement, MSB can enhance their ability to meet the stringent requirements of automakers and contribute to the overall efficiency and competitiveness of the supply chain.

#### 3.1. Data Collection

**Qualitative Data Collection:** In-depth interviews were conducted with 20 key stakeholders, including LC and MSB suppliers, automakers, and industry experts. The interviews were semi-structured, allowing for flexibility in exploring the key themes and issues related to supplier integration. The interviews were recorded and transcribed, and the data were analyzed using thematic analysis to identify the key factors that influence the integration process.



A survey was conducted with 30 LC, and 60 MSB suppliers in the Brazilian automotive industry. The survey was designed to collect data on the experiences, challenges, and strategies of integrating into the supply chain. The survey included questions on resource constraints, operational challenges, relational challenges, and strategies for enhancing supplier integration. The data were analyzed using descriptive and inferential statistics to identify the key factors that influence the integration process.

### **3.2. Data Analysis**

**Qualitative Data Analysis:** Thematic analysis was used to analyze the qualitative data collected from the in-depth interviews. The analysis involved identifying and coding key themes and patterns in the data and developing a narrative that explains the integration process of the automotive supply chain. The analysis focused on identifying the key drivers and barriers to integration, as well as the strategies that MSB can adopt to overcome these barriers.

## **4. ANALYSIS AND RESULTS**

The thematic analysis of the qualitative data revealed several key themes related to the integration of the LC and MSB into the automotive supply chain. These themes included the importance of collaborative relationships, the role of trust and commitment, and the challenges faced a integration into the supply chain management.

### **4.1. Mainly factors**

**Collaborative Relationships:** The interviews highlighted the importance of collaborative relationships in facilitating the integration of MSB into the supply chain. Participants emphasized the need for close collaboration between LC an MSB with automakers, including the sharing of information, resources, and risks. Collaborative relationships were seen as essential for overcoming the barriers faced by MSB and for achieving mutual benefits.

**Trust and Commitment:** Trust and commitment were identified as critical components of collaborative relationships. Participants emphasized the importance of building trust and commitment with automakers, particularly for MSB that lack the track record and reputation of larger suppliers. Trust and commitment were seen as essential for establishing long-term relationships and for gaining access to valuable resources and expertise.

**Challenges Faced by MSB:** The interviews also highlighted the challenges faced by MSB in integrating into the supply chain, because is different the LC. These challenges included

resource constraints, operational challenges, and relational challenges. Participants emphasized the need for MSB to invest in resource development and operational improvement to overcome these challenges and to enhance their competitiveness.

**Resource Constraints:** The survey data indicated that resource constraints are a significant barrier to the integration of MSB into the supply chain. Most respondents reported difficulties in accessing financing, investing in advanced manufacturing technologies, and providing training and development opportunities for employees. These resource constraints were seen as limiting the ability of MSB to meet the stringent requirements of automakers.

**Operational Challenges:** The survey data also highlighted the operational challenges faced by MSB and LC in integrating into the supply chain. Most respondents reported difficulties in implementing quality management systems, adopting lean manufacturing practices, and improving supply chain management processes. These operational challenges were seen as hindering the ability of MSB to meet the quality and delivery requirements of automakers.

**Relational Challenges:** The survey data indicated that relational challenges are a significant barrier to the integration of MSB and LC into the supply chain. Most respondents reported difficulties in building trust and commitment with automakers, negotiating favorable terms, and accessing information and resources. These relational challenges were seen as limiting the ability of MSB to establish strong, collaborative relationships with automakers.

**Strategies for Enhancing Supplier Integration:** The survey data also revealed several strategies that MSBs can adopt to enhance their integration into the supply chain. These strategies included investing in resource development, improving operational capabilities, and building strong, collaborative relationships with automakers. Respondents emphasized the importance of these strategies in overcoming the barriers faced by MSB and in enhancing their competitiveness.

#### **4.2. Implications for Theory and Practice**

The findings of this study have important implications for both theory and practice. From a theoretical perspective, the study contributes to the development of a framework that explains the integration process of MSB and LC into the automotive supply chain. The framework identifies the key factors that influence the integration process, including collaborative relationships, trust, and commitment, and the challenges faced by MSB.

From a practical perspective, the study provides valuable insights for automakers, LC and MSB on how to enhance their collaborative relationships and improve supply chain



performance. The recommendations provided in this study can help automakers to better integrate with MSB into their supply chains, leading to improved efficiency, reduced costs, and enhanced innovation. For MSB, the study offers practical guidance on how to overcome the barriers they face in integrating into the supply chain and how to leverage their strengths to become more competitive.

## 5. CONCLUSION

This study explored the factors that influence the integration of the automotive supply chain in Brazil. The findings highlighted the importance of collaborative relationships, trust, and commitment in facilitating the integration process, as well as the challenges faced by LC and MSB in integrating into the supply chain. The findings also identified several strategies that MSB can adopt to overcome these challenges and enhance their integration into the supply chain like the LC.

The study contributes to the development of a theoretical framework that explains the integration process into the automotive supply chain. The framework identifies the key factors that influence the integration process, including collaborative relationships, trust, and commitment, and the challenges faced by:

- **Collaborative Abilities:** Strategic alignment, quality orientation, product development, and trustworthiness positively impact integration, enhancing motivation and commitment across the supply chain.
- **Supplier Responsiveness:** Promptness in contribution and reactivity extend collaborative capabilities, crucial for meeting customer demands.
- **Leadership Effectiveness:** Purchaser leadership influences supplier development, though some MSB lack formal risk management, affecting delivery times.
- **Barriers:** Internal restrictions (bureaucratic processes) and cultural factors hinder development, causing delays and stress.

## 6. REFERENCES

CHRISTOPHER, M. (2016). *Logistics & Supply Chain Management*. Pearson.

FIALA P. (2005). *Information sharing in supply chains*. Omega.



- IACONO, A. and NAGANO, M.S. (2009) Interação e cooperação em arranjos produtivos locais: Identificação e análise dos fatores inibidores. XII Simpósio de administração da produção, logística e operações internacionais, São Paulo.
- KATUNZI, T.M. (2011) ‘Obstacles to process integration along the supply chain: manufacturing firms perspective’, *International Journal of Business and Management*, Vol. 6, No. 5, pp.105–113.
- KRAJEWSKI, L. J.; RITZMAN, L. P.; MALHOTRA, M. K. (2016). *Operations Management: Processes and Supply Chains*. Pearson, 2016.
- MARTINS, P. G.; LAUGENI, F. P. (2006). *Administração da Produção*. São Paulo: Saraiva.
- PORTER, M. E.; KRAMER, M. R. *Creating Shared Value*. Harvard Business Review, 2011.
- POZO H., TACHIZAWA T., TEODORO R. A. F, (2010). Integração de fornecedores na indústria automobilística brasileira: Uma abordagem de múltiplos casos, SIMPOI, 2010.
- Pyke, F.,(1992). *Industrial development through small-firm cooperation: theory and practice*. Geneva: International Institute for Labour Studies.
- SAWIK, T. (2013) ‘Selection and protection of suppliers in a supply chain with disruption risks’, *International Journal of Logistics Systems and Management*, v. 15, n. 2/3, pp.143–159.
- TEIXEIRA, R. F. (2004). *Discutindo o terceiro setor sob o enfoque de concepções tradicionais e inovadoras de Administração*. Caderno de Pesquisas em Administração, 11(1), 1-15.