Automaker in Brazil: integration of small business operations as suppliers

Hamilton Pozo*

State Faculty of Technology of São Paulo – Fatec Rubens Lara,
Av. Bartolomeu de Gusmão, 110 – Santos/SP., 11045-908, Brazil
Email: hprbrazil@hotmail.com
*Corresponding author

Takeshy Tachizawa

Centro Universitário Campo Limpo Paulista,
Rua Guatemala, 167, Campo limpo Paulista, SP, Brazil
Email: usptakes@uol.com.br

Getulio Kazue Akabane

State Faculty of Technology of São Paulo,
CEETEPS,
Rua dos Bandeirantes, Brazil
Email: getulio@akabane.adm.br

Abstract: The objective of this research is to present the elements of integration of small business suppliers with the automotive sector, focused on their importance. It is a qualitative and quantitative research, applying multivariate statistical techniques to analyse the data collected in structured interviews, in order to reduce the bias and facilitate a deeper understanding through the collection and analysis of this data. The results indicate that there is a positive and significant correlation between the relationships that integrate micro and small companies that participate in the supply chain of the automotive industry through the supply of parts and components. The expected study contributes to the construction of a functional model of integration of these suppliers with automakers.

Keywords: automaker; supplier integration; collaborative relationship.

Reference to this paper should be made as follows: Pozo, H., Tachizawa, T. and Akabane, G.K. (2019) 'Automaker in Brazil: integration of small business operations as suppliers', *Int. J. Logistics Economics and Globalisation*, Vol. 8, No. 1, pp.1–24.

Biographical notes: Hamilton Pozo holds a Post-Doctor in Administration, PhD and Master's in Business Administration, Graduate in Mechanical Engineering and degree in Industrial Administration. He is Professor and Researcher at State Faculty of Technology of São Paulo – Fatec Rubens Lara – Brazil. He was Director of operations, industrial and commercial in several national and multinational companies. He is an academic author and his current research is about operating systems, and also about the relationship and improvement of the supply chain industries, especially with Just In time.

Takeshy Tachizawa has a degree and PhD in Business Administration. He has experience in the area of operations strategy and sustainable management, working on the following topics: operation and management system, and supply chain sustainable. He is Full Professor of Micro and Small Business at Master and Doctored Program in Administration at Centro Universitário Campo Limpo Paulista.

Getulio Kazue Akabane has a degree and PhD in Business Administration. He has experience in the area of operations strategy and sustainable management, working on the following topics: operation and management system, and supply chain sustainable. He is Full Professor at CEETEPS-SP.

1 Introduction

The objective this research sought to contribute to building a theoretical model of the integration of micro and small business (MSB) suppliers that make up the supply chain of the Brazilian automotive industry and to indicate issues with supply volume and other points that need to be seen as opportunities for improvement within this context. Using data collected from multiple-case studies among companies in Jundiaí (Brazil) resulting model seeks to fill a gap in supply chain studies that previous researchers have not addressed. This research examined the nature of policies in the chain of automotive parts suppliers to automakers of Brazilian vehicles, the ways in which MSB make their purchases of input products and components, and the effect auto part buyers' leadership has on the integration of suppliers into this chain. The objective is to indicate issues with supply volume and other points that need to be seen as opportunities for improvement within this context. The resulting model seeks to fill a gap in supply chain studies that previous researchers have not addressed.

Adaptation and interaction are typically presented as notions of thought, which, according to Teixeira (2004), ensure linkages between order, disorder and the organisations established. As supply chain activities become more dispersed among customers, suppliers and service providers and problems can be minimised, in particular, with the development of competencies in research processes and suppliers, consolidating partnerships in the supply network. As supply chains mature, their complexity increases. Managers are asked to improve productivity while increasing customer service thus, adapting to changing markets is a challenge, exacerbated by the constant novelties that appear in everyday business environments and that, in turn, function in this context as a kind of stronghold for sources of conflict.

These conflicts include two important facets to consider: bad conflicts produce disorder and good conflicts – if this disorder is carefully crafted in order to transform its elements into sources of ingenuity – generate timely, new aspects of creativity aimed at increasing competitiveness. In this way, the supply of components to larger intermediary firms can be done competently, and the spare parts market can be satisfied, even while meeting the challenges of finding significant competitive advantages in this market (Eberhardt et al., 2004). Therefore, where logistics chain processes are interconnected, dealing with conflicts well is a way for organisations to develop competitive differences successfully so that clients are satisfied with results, increasing the quality of services and products offered to customers and decreasing warehouse and inventory costs by means of

distribution channels. When searching continuously for ways to integrate providers and purchase processes, supply chain members must also consider important internal constraints and cultural factors in the development of suppliers (Pozo et al., 2010).

Figueiredo et al. (2003) introduced scholars to the new concept that purchasing functions within companies should emphasise strategies aimed at more competitive management. Actions and interactions are intrinsically connected in companies' internal daily business, which needs to be responsive to research to remain competitive. Therefore, the present study's choice of topic was motivated by the intention to conduct a search for factors that may impede or facilitate integration within the universe of suppliers that operate in business environments and, more specifically, these factors in the internal environments of MSB.

Based on this focus on relevant aspects, this study addressed questions about characteristics of the integration of MSB in the supply chain of automotive parts to Brazilian automakers and the way these suppliers make their purchases of input products and components. This research also sought to consider the role that the leadership of buyers has in the integration of suppliers within this context. The proposed model can benefit these MSB by helping to minimise problems through the development of research and suppliers' skills, thus consolidating partnerships in this supply chain. The first goal of this study was to contribute to the theoretical construction of a model of the integration of MSB suppliers in the Brazilian automotive industry, comparing this to the model used by major suppliers in the same industry and to the techniques applied in the domestic auto industry. To this an empirical analysis was done of data collected from a series of interviews and questionnaires, in order to generate a global model for this supply chain.

According to Bowersox et al. (2014), it is also important to examine the organisation of supply chains and their logistics, in which there is a constant exchange of information on master plans for production. In some cases, advanced concepts such as just-in-time manufacturing, efficient responses to customers, and warehouse management systems, among others, are transparently and accurately applied.

After a review of the relevant research, a minimum of six cases were found that describe the phenomena that the present research sought to investigate. According to Eisenhardt (1989), although an ideal number of cases has not yet been defined, researchers customarily use four to ten cases when applying this methodology. In the present study, a survey was conducted with those responsible for purchases – mostly supervisors and managers in 17 MSB in the auto parts industry, in Jundiai, Brazil, and the surrounding region, as well as other leaders in the change process such as project managers, logistics analysts, and technical leaders.

The results support conclusions about the integration of MSB suppliers in the Brazilian car industry, including that the development of skills within the industry's suppliers is a positive process, increasing trust in the supply chain and encouraging a greater exchange of information and greater transparency.

2 Literature review

The process of achieving and maintaining higher levels of integration is complex and may demand unwarranted resources. To add structure to the relationship of supply system to firm performance, researchers have grounded their studies in a variety of

organisational theories. In Pyke (2002) study, small businesses targeted a variety of qualities in their development efforts, such as diversity of customer products and services, level of quality, personalised service, and a simple and dynamic structure to allow market responsiveness. Porter (1998) research, in turn, focused on business interrelationships and their ability to exploit them, a finding that should not be limited to the corporate world of business units. The cited author believes that "the search for interrelations by some competitors is compelling others to do the same or to risk losing their competitive position" (Porter, 1999).

In related research, Carter and Rogers (2008) define supply chain management (SCM) as "the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key interorganizational business processes for improving long-term economic performance." Given the potential for differences in perceptions between buyers and suppliers, it is important to include both parties' perceptions when studying collaborative efforts. The underlying assertion is that SCM creates value for organisations, which has led to years of research seeking greater understanding of the link between sustainable practices and performance (Tate et al., 2011).

The MSB can be viewed as collections of resources, some of which can be considered strategic resources (Wernerfelt, 2014). Strategic resources are valuable, rare and imperfectly imitable and substitutable and can be distributed equally across enterprises and allow in a competitive advantage (Peteraf, 1993). The theory focuses not just on resources per se, but more specifically on advantageous resources, which give firms a competitive advantage (Hunt and Davis, 2012). This contribution in producing a market offering that has value as perceived by customers and the degree to which they are available are used to create a competitive advantage (Priem and Swink, 2012).

When the supplier postulates that enterprises can benefit from inter-enterprise integration and strengthen the strategic partnerships, then to acquire valuable resources (Dyer et al., 2004). The win-win result can be inter-enterprise integration can have obtained by situations where the total supply chain benefits are increased due to the use of hard to imitate specialised assets, skills and information as an internal strategic resource that could result in a competitive advantage and improved firm performance (Barney, 2012).

According Sillanpää and Sillanpää (2014) that developed a strategy framework explaining supply chain which combines corporate strategy, supply chain demand strategy, and business environment together. While the framework by Sillanpää et al. (2015), explains the analysis of supplier development and buyer-supplier relationship strategies (supplier assessment, competitive pressure, supplier incentives, and direct involvement) influencing the business performance. Therefore, several researchers have highlighted the important role of supplier selection, and supplier's involvement in strategic decision-making process (Song and Di Benedetto 2008; Nouira et al., 2016) to achieve effective supply chain.

When constructs of interest entail multiple stakeholders – as is the case with social capital – dyadic data provide benefits over single-sided or non-dyadic research, given that all parties' perspectives on relationships need to be considered (Roh et al., 2013). Higher performance leads to improved operational efficiency and cost reduction, quality, compliance, risk mitigation, supply chain security, improved company image, health and safety standards for workers, market growth, and revenue generation (Golicic and Smith, 2013; Hollos et al., 2012; Pagell et al., 2010; Zhu et al., 2013).

The meta-analysis can be utilised effectively not only to examine narrow, well-defined constructs, but also to assess relationships involving more broadly defined constructs (Crook et al., 2008). As mentioned earlier, integration among companies within the supply chain can be complex and requires unique capabilities that may be difficult or costly to imitate (Barney, 2012). Being able to manage these integrative relationships better than the firm's competitors is a valuable internal strategic resource.

The linkage between integration efforts and firm performance is a central effort of this research. Because supply integration requires investment, the objective of management is to see a return on that investment. While most empirical studies find a significant positive association between supply's integration and enterprise performance, some also reveal significant negative effects, and the magnitude of the association varies considerably. One of the advantages of a meta-analysis is that it enables the researcher to examine theoretically relevant measurement characteristics that may explain the variability in effect sizes (Hunter and Schmidt, 2004).

Focusing on solving supply chain coordination problems with endogenous downstream innovation, Gilbert and Cvsa (2003) examined mechanisms that stimulate downstream innovation in supply chains. They analysed the effect of price commitment for upstream suppliers. Periodic evaluation of supplier quality is carried out to ensure the meeting of relevant quality standards for all incoming items (Jain et al., 2004). In the absence of market-based control mechanisms, the supply exchange could be subject to opportunistic temptations. An accurate rating system can restore competitive pressure within the pool of suppliers by monitoring and comparing the supplier's improvement over time (Duarte et al., 2011).

A further study by Stock and Lambert (2001) defines logistics as the process that encompasses the planning, implementation, and control of flows to enhance the efficient and economical storage of raw materials, semi-finished materials, and finished products, as well as related information. This process handles products from their origin until their final consumption, continually seeking to meet customer requirements.

The importance of the above concept was extended further when Christopher (2011) included the question of value for customers, as an integrated logistics system provides greater reliability in delivery, adding benefits to the products offered. This added value is perceived by customers. Research has shown empirically that these benefits are highly noticeable for intangible products such as services (Bienstock, 2002). McDuffie et al. (2001) claim that excellence in logistics has become a powerful source of competitive advantage.

Companies started to pay attention to logistics in the 1980s and 1990s, seeing this no longer as a simple cost-cutting mechanism but as a source of improvements to products and services offered to customers, which, in turn, generated more concern about SCM as a way to manage differential costs. They are multi-attribute decision making processes that require a consideration of a variety of attributes regarding the target domain and specific issues. As seen in the literature review, there is a strong interest in coping with the weaknesses of traditional techniques in supplier selection and evaluation (Guo et al., 2009; Keskin et al., 2009; Sanayei et al., 2009).

There are several settings in which SCM needs to be considered because, as approaches to all business standards are constantly changing, it is risky to propose a definitive conceptualisation. However, in terms of objectives, it can be said that "SCM is a management philosophy that seeks to unify the core competencies, resources and gifts

business functions both within the organization and outside it in order to add value in the services offered to their consumers" (Ross, 1998).

In general, the production of automotive vehicles requires efficient processes and innovative products subject to reactive processes, in order to be able to meet customer demands consistently and safely. In view of the necessary balance of production and comaker ship that, according to Martins and Laugeni (2012), shows how companies' approach to the supplier-customer relationship has evolved, effectively meeting customers' needs is the ultimate goal. The choice of suppliers goes through different levels of assessments to obtain the needed input in product design, analysis, and improvement of production processes, thereby ensuring quality.

A win-win situation becomes a big advantage since clients' increased purchases can have a major impact on profits. Use of the neural network technique in the supplier selection process is a new approach. Incorporation of both quantitative and qualitative supplier attributes by using the neural network technique e is a suitable method for manufacturers, especially for those who outsource a significant part of their business. The processes of supplier selection and evaluation are multiple criteria decision-making problems that are affected by several conflicting factors under varying situations. Although many methods have been used for supplier performance evaluation, the neural network technique is a new approach for supplier performance evaluation. The neural network-based supplier performance evaluation system includes the same steps defined in the supplier selection system. The construction of the neural network technique-based supplier performance evaluation system includes the following stages:

- Quality level: Percentage of rejected parts.
- Index of performance: The index of performance is related to performance penalty points.
- Result of process audit: Suppliers are divided into two categories according to results of OEM audits.
- Performance of sample: The performance of sample relates to how much time is spent in properly producing the sample.
- Authority of non-supervised delivery: Suppliers are classified into two groups according to their authority of non-supervised delivery.

Bowersox et al. (2014) argue that, when combined, the postponement of both logistics and production is possible to reduce the anticipatory nature of any business. However, cooperation and information sharing is necessary between the members of supply chains. The two types of delaying tactics reduce the risks involved – otherwise, this approach can be problematic. The postponement of production is concentrated in the format of the product, moving unfinished items forward in the logistics system for modification just before delivery.

The quality of services provided by manufacturers of motor vehicles to customers is a performance variable currently seen as a key measure of companies' competitiveness (Greenberg, 2009). The chains to which companies belong, when properly structured, support the adoption of best practices to meet demands not only for products generated by particular business processes but also for all other input originating at any interfaces with other associates.

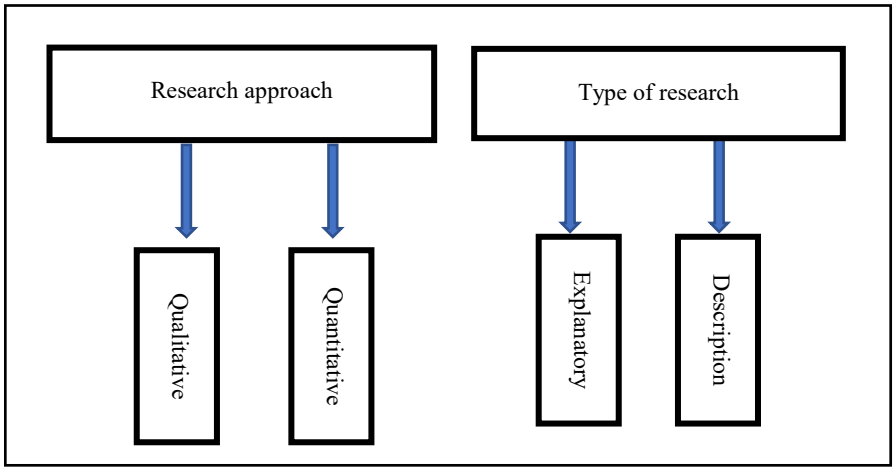
The greater the clarity with which the functions in each chain process are defined, the easier it becomes to make operational decisions, especially those aimed at fine-tuning and synchronising internal operations. Most of the time, these adjustments consist of standardisation of data formats for use in information systems or internal operating procedures designed to run tasks seamlessly (Laudon and Laudon, 2005). Fiala (2005) states that the structure of supply chains is a composite system of potential suppliers, manufacturers, distributors, retailers, and consumers. These units are connected to each other through two-way flows of material, financing, and information. Marquez et al. (2001) also highlight three streams in supply chains: information, material, and financial flows. These are clearly identifiable in networks of automotive parts suppliers.

From the perspective of Cox et al. (2004), there is a correlation between the alignment of business relationships and performance of suppliers. When power positions are dominated by buyers, there is a tendency towards pro-activity in regard to the approach to, and development of, new products and suppliers, facilitating integration efforts and SCM.

3 Methodology

The components of the method used in this research are the approach, the type of research based on overall objectives, and the strategies used. Figure 1 summarises these components.

Figure 1 Research method (see online version for colours)



Source: Adaptation of Gil (2007)

The present research sought to contribute to building a theoretical model of the integration of MSB suppliers that make up the supply chain of the Brazilian automotive industry, using data collected from multiple-case studies among companies in Jundiaí (Brazil). This research examined the nature of policies in the chain of automotive parts suppliers to automakers of Brazilian vehicles, the ways in which MSB make their purchases of input products and components, and the effect auto part buyers' leadership

has on the integration of suppliers into this chain. According to Gay and Airasian (2003), the research approach best adopted for this study combined quantitative and qualitative methods, since there was a considerable degree of interaction between researchers and participants. Multiple-case studies, for Eisenhardt (1989), consist of a research strategy focused on participants' perceptions of dynamics in the context of natural scenarios, combining various methods including interviews, documents, questionnaires, and theoretical considerations.

Voss et al. (2002) argue that this method is best used when researchers seek to study phenomena in context and when they aim to explore unknown variables or only partially understood phenomena. This approach leads to questions with responses that address what happens and how this occurs in some depth. Furthermore, studies involving multiple cases can minimise the lack of robustness associated with the results of a single case study, since the evidence from multiple cases is considered more empirically convincing (Yin, 2001).

The size of the sample was determined by considering a desired confidence level of 90% and allowing for a margin of error of ± 10%. The formula adopted to determine the appropriate sample size has been used for small populations (Rea and Parker, 2000), according to Formula 1 below:

$$\text{Response rate} = \frac{Z^2[p(1-p)]N}{Z^2[p(1-p)]+(N-1)C^2} \quad (1)$$

where:

C = accuracy or maximum permissible error in terms of proportions (10%)

Z = confidence level in standard deviation units (1.645)

p = proportion of the universe (50%)

N = number of elements in the population (i.e., 17 total companies in the area surveyed).

This resulted in an ideal number of 14 companies to be surveyed. However, after a closer examination of the businesses in question, the actual number became 15 companies, thus achieving more than the minimum required for a 90% confidence level in the results.

Among the different types of validity used in this study were content or face validation, due to the absence of a standard with which the measurement instrument developed could be compared. After preparation, the questionnaire was sent to four experts who, using an Excel spreadsheet, linked each issue with the other issues and found that these were in accordance with the propositions used to measure the data, in order to obtain answers to the research objectives proposed.

After the approval of these experts was obtained, the instrument used for data collection was subjected to a validation phase involving 20 respondents who were postgraduate students in logistics and quality, working in the field of automotive parts supply. Their responses were analysed in order to reduce bias in answers, which might result from expectations of desired responses to each question. In this way, the data analysis was able to portray the reality of the researched phenomena.

We conducted in-depth, semi-structured interviews ranging between 35 and 55 minutes. All interviews were audio recorded and transcribed for further analysis. In formulating our interview guideline, we drew on existing integration and SCM research. Prior to the interviews, we sent the interview guideline together with an overall

description of the research project to each interview participant. This process ensured that interview participants had a shared understanding about the research objective by the time the interview took place.

To control for any misinterpretation of interview data, we sent the verbatim transcripts to each interview asking for potential revision and clarification after the interview; in six cases, interviewees slightly revised the wording in their transcripts. Before and after the interviews, we collected secondary information about each company. This background information on the firms and the interviewees reinforced and provided orientation for the statements made by the participants (Miles et al., 2014). Finally, we shared a summary report on the findings with all interviewees and collected their feedback (Fugate et al., 2008). After analysing the questionnaires filled out by the respondents, two questions were deleted from the questionnaire. The resulting data collection instrument was sent to 15 companies in the region in order to get answers corresponding to the research objectives proposed.

3.1 Data analysis

According to Yin (2001), there are six types of data collection sources: documents, log files, interviews, direct observations, indirect observations, and physical artefacts. In this research, the method of data collection used was a structured questionnaire and interviews. We followed rigorous grounded theory guidelines as we collected and analysed the data. This involved the continuous contrasting of substantive theory and data gathered throughout companies' interviews (Denk et al., 2012; Kaufmann and Denk, 2011). We began data analysis with respect to all the companies' integration practices and the challenges they experienced in implementing this.

For Shah and Corley (2006), interviews are important because they allow a closer relationship and proximity to individuals involved daily in the phenomena under study. These data sources require instruments that support and guide the process of applying existing theory about the phenomena studied (Voss et al., 2002). A questionnaire with objective items was used for data collection, each item being measured by respondents on a scale of 1 to 5. The questionnaire was designed so that item topics were arranged to contradict each other in order to minimise the bias resulting from respondents' personal interpretations.

The questionnaire was divided into three sections. The first sought to characterise the respondents' demographic profile, including gathering information about their job or position occupied in their company, the time spent in this position or function, and their level of education. The second section sought to characterise the respondents' company, identifying aspects such as

a the number of employees

b the annual revenue range

c the main lines of products

d the professional practices involving tools and techniques used by the company in its ongoing projects.

The third section was the items addressing the research objectives. The remainder of the study is organised as follows. The theoretical background and research hypotheses are

developed in the following section. Following that section, the research methodology is described, and results of the meta-analysis are reported. Last, conclusions are presented, including theoretical implications, managerial implications, limitations and recommendations for future research.

The survey was conducted with employees responsible for purchases, quality, or production in 15 MSB in the auto parts industry in Jundiaí (Brazil). Reliability tests were carried out on the data, yielding an average Cronbach's alpha coefficient of 0.8012 for all the proposed variables. These values provide evidence of the acceptable reliability of the constructs used (Hair et al., 1995), since internal consistency can be measured directly by Cronbach's alpha. Typically, a questionnaire is considered reliable if the coefficient is higher than 0.75.

3.2 Analysis and search results

The correlation results for the questionnaire are presented in Table 1 below. The proposed variables are significantly correlated, which presupposes the existence of interactions between the issues studied, as noted in the literature review above. The research question, therefore, was answered. That is, there is evidence of relationships revealing interactions between companies' strategies in the supply chain studied. For this research, an approval parameter for 0.75 of Cronbach's alpha was applied.

Table 1 Cronbach's alpha coefficients for issues

Variables		
Questions		*Cronbach alpha*
Q1	Those involved in the company's production share the same production processes and/or an understanding of how much information to supply in order to avoid deviations in the information flow that can cause deficiencies in the production flow.	0.7983
Q2	Communication creates an efficient supply chain of which I am a part, from the supplier to the end customer.	0.7878
Q3	Purchases are made after competition between suppliers based on technical aspects and cost.	0.7952
Q4	Prior to the acquisition of inputs, negotiations are held between parties in order to verify the technical adequacy of the product and/or service.	0.7812
Q5	The company's risk control plan meets needs in material procurement and service delivery.	0.7953
Q6	The company provides complete assemblies (i.e., parts assembled with the specific purpose of becoming a product) for the end customer.	0.7871
Q7	Improvement processes applied to products are meeting customer requirements.	0.7882
Q8	There is concern shown that suppliers participate in process improvements of products alongside my company.	0.8018
Q9	The company constantly reacts positively to the challenges of long-term customer requirements.	0.7964
Q10	The responsibility for the development of new products is exclusively the clients.	0.7861

Source: Authors

Table 1 Cronbach's alpha coefficients for issues (continued)

Variables		
Questions		*Cronbach alpha*
Q11	Before production starts, customers share technical information about the products being produced.	0.8036
Q12	Clients share control of software production and/or supply in my company.	0.8011
Q13	Production requests are accompanied by information such as drawings or standards provided by customers.	0.7999
Q14	The primary result of interactions among the companies that make up my supply chain is trust.	0.7957
Q15	I am involved in the development of suppliers to meet my clients' needs.	0.7992
Q16	There is concern shown for the integration of participating suppliers in the supply chain.	0.7974
Q17	There is an efficient production processes management program in my company.	0.7843
Q18	Quality indicators give me an overview of production processes.	0.7932
Q19	Customers periodically acknowledge due diligence in my production.	0.7957
Q20	Costs are monitored, and my company constantly works on reducing jobs.	0.7959
Q21	Internal interference from procurement procedures are barriers to trading products used in production.	0.7957
Q22	Planning purchases is important for the company.	0.7829
Q23	There is concern shown for maintaining the quality of products and inputs provided to my clients.	0.7917
Q24	My company cares about the consistent quality of suppliers of inputs and services.	0.7878
Q25	Strategic alignment meetings are held with suppliers.	0.8184
Q26	I consider my firm to be a highly competitive company in our market segment.	0.7897
Q27	There is concern shown for investing in development to meet changing business expectations.	0.7974
Q28	Innovative approaches are considered during the supplier registration process.	0.8093
Q29	Purchases are made by e-mail.	0.8016
Q30	My company's production is monitored by our clients.	0.7858
Q31	There is concern shown for developing alternatives to input suppliers in order to avoid overdependence.	0.7969
Q32	There is concern shown for participating in industrial clusters in order to reduce logistics costs.	0.7914
Q33	The buyers' effective leadership is a factor in all negotiations.	0.8024
Q34	Decisions about my company are meant to increase competitiveness.	0.8131
Q35	There is concern shown over the high or low supply of some components to customers.	0.8219
Q36	There are problems with unfavourable terms generated by inefficient providers.	0.7975

Source: Authors

3.3 Participants

The names of the companies are not disclosed below at the respondents' request, since, when asked to participate in this research, they were assured that the information collected would be kept confidential. Thus, the companies' names are not shown in Table 2, which lists the automotive supply chain to which each company belongs, the head of the MSB who answered the questionnaire, and the city in which the business is located.

Table 2 Identification of respondents

Identification of MSB' respondents			
Company	*Supply*	*Responsible*	*City/state*
R01	Locks, frames, mirrors, and door handles	Purchases	Valinhos/SP
R02	Reservoirs and covers	Quality	Jundiaí/SP
R03	Door locks	Purchases	Valinhos/SP
R04	Spare parts for motors	Purchases	Jundiaí/SP
R05	Seat belts and finishing parts of panels	Quality	Jundiaí/SP
R06	Automotive packaging	Logistics quality	Cabreúva/SP
R07	Surface treatment using the following procedures: KTL, zinc, nickel, anodising, organometallic, alkaline copper, chromium, tin, phosphating, and oxidation	Purchases	Várzea Paulista/SP
R08	Traction springs, compression springs, and twist springs; metal artefacts (e.g., rods); general printing services (up to 150T)	Purchases	Campo Limpo Paulista/SP
R09	Metal heat treatment services	Purchases	Jundiaí/SP
R10	Press shop, welding, and assembly of subcomponents	Purchases	Jundiaí/SP
R11	Press shop	Quality	Jundiaí/SP
R12	Plastic painting from panels to shocks	Quality	Jundiaí/SP
R13	Automotive (i.e., plastic tanks)	Purchases	Jundiaí/SP
R14	Automotive: cushion covers, diaphragms, bellows, folding, and blown gaskets for injection systems	Quality	Jundiaí/SP
R15	Hinges, locks, and components for benches; door limiters, components for safety belts, and assemblies and components for brake systems	Quality	Jundiaí/SP

Source: Authors

4 Data processing result

The tests used to analyse the research propositions described below were the chi square, Kruskal-Wallis, and Mann-Whitney tests, which are non-parametric or free distribution

tests that provide alternatives in this type of research. The term 'free distribution' is used to indicate that a method is applicable regardless of the shape of the distribution.

Non-parametric statistics are a set of tools more appropriate for use in research in which the population distribution and its parameters are not well known. The chi square test was applied in the analysis of all the proposals together in order to verify all situations, including if there is a statistically significant difference between the groups ($p > 0.05$ in all cases). This test is applied to compare more than two independent groups that are not necessarily of the same size.

The Mann-Whitney test was used to analyse Proposition 2, as discussed further below, in order to compare two independent groups. In this research, groups were identified using data collected with questions in the questionnaire, and the proposition was developed based on ordinal variable measurement.

The Kruskal-Wallis test was used for Propositions 1, 3, and 4, since this is a test that is applied when comparing three or more independent groups and when the variables should be subjected to ordinal measurement. Callegari (2007) states that, in the parametric testing of studied variables, values must be normal or a normal approximation to the distribution. Non-parametric tests – also called free distribution tests – have no requirements as to knowledge of the variables' distribution in the population. The value of 3 on the questionnaire used in this study was supplied in this analysis because it is a null value, when respondents choose 'No opinion/does not apply'. This method, thus, decreases any bias that might arise during data analysis. The hypotheses tested in this study received a proposition name, and they were referred to by the letter 'P'.

With the above discussion in mind, it is clear that the integration of MSBs in the automotive sector requires a particular set of skills. This led, therefore, to the four propositions discussed below, starting with:

Proposition 1 (P1) The formation of collaborative relationships has a positive impact on the integration of suppliers.

The P1 scale consisted of four groups of 18 questions, which were divided into these groups in order to clarify whether, among the groups, there was any group of items that would be more significant. After analysing the data using SPSS 20 software, it was noted that, in all situations, there was no statistically significant difference between the groups, as shown in Table 3 ($p > 0.05$). This indicates that all the issues considered need to be analysed for the observed groups of MSBs, as these are all essential in the formation of collaborative skills.

Table 3 P1 test statistics[a,b] results

	P1
Chi-square	1.872
DF	3
Asymp. sig.	599

Notes: [a]Kruskal-Wallis test; [b]Grouping variable: Group_P1

Source: Authors

Groups of issues considered in this research that form the basis of collaborative relationships were:

P1-1 – Strategic alignment.

P1-2 – Quality and customer orientation.

P1-3 – Product development.

P1-4 – Reliability in the buyer/supplier relationship.

Data were obtained by analysing the proposition using SPSS 20 software and the Kruskal-Wallis test.

MSB engage in the creation of collaborative skills as a basis for their creation and development of differential advantages. Quality is another challenge MSB face because, with the advent of software that monitors customers, there has been greater sharing of information between supply chain components, thereby generating larger product collections by attracting investment clients and technology providers.

Strategic alignment also shows that those suppliers who are involved in successful collaboration projects with clients are highly motivated. This motivation is manifested in various ways. First, highly motivated suppliers turn out to be extremely willing to accept the changes and adjustments necessary to implement strategies, processes, and reorganisation in order to cultivate a strong working relationship with clients.

Second, these suppliers, in particular their leadership, appear to have decided that customer relationships are beneficial to their companies and, therefore, have lined up their business operations in accordance with these relationships. According to the data obtained in this study, it is difficult to build and nurture the same kind of thinking throughout an organisation unless this process is strongly supported by management as a market differentiator ensuring the company's survival.

The quality of MSB is noted as important, but quality indicators have been recently deployed by customers in order to ensure their deadlines are met. For this information to be disseminated quickly and accurately, many large customers provide the software for online monitoring of MSB production, and these clients have initiated due diligence procedures for its first-tier suppliers, as part of these manufacturers' practices.

Product development is usually performed on behalf of end customers. This is restricted by the MSB only to the creation of individual products (i.e., auto parts) to be used in final assemblies mounted by large suppliers of automotive manufacturers. The reliability of the buyer-supplier relationship is characterised by a high degree of integration of suppliers. The data show that there is a high level of trust among suppliers due to the improved quality of information with the advent of shared software and communication systems.

Purchases in most cases are carried out by e-mail, which can be seen in the case of quality system audits. There is a degree of delay in shipping supplies, but to prevent this delay extending over the entire chain, this study found a prevailing trend among the companies surveyed toward show concern for positive interactions and increased loyalty among suppliers, while their intention to develop supply alternatives is less important.

The second proposition was formulated as follows:

Proposition 2 (P2) The readiness of suppliers to collaborate increases the level of their collaborative expertise.

P2 was based on a group of questions composed of two issues. After analysing the data using SPSS 20 software, it was noted that there was no statistically significant difference

within the group's items, as shown in Table 4. Therefore, the entire group needs to be regarded by MSB as essential in the formation of collaborative readiness.

Table 4 P2 test statistics[a,b] results

Test statistic[b]	
	P2
Mann-Whitney U	52,500
Wilcoxon W	130,500
Z	–.953
Asymp. Sig. (two tailed)	.341
Exact sig. [2*(one-tailed sig.)]	.413[a]

Notes: [a]Not corrected for ties.
[b]Grouping variable: Grupo_P2.
Source: Authors

The group of questions considered in this research dealt with how MSB respond in terms of collaboration readiness:

P2-1 – Improvement and reactivity processes.

Analysed data for this proposal produced results obtained by analysing P2 with SPSS 20, using the Mann-Whitney test. MSB easily accept improvements in both processes and products suggested by their customers. These companies demonstrate a high favourable index in meeting new challenges suggested by customers, with a high flexibility index in meeting new production requests.

Another aspect that emerged was the leading role of purchasers in MSB in terms of their suppliers. Most recent research on leadership has focused on the ability of leaders to influence a group of people to achieve a common objective within organisations (Northouse, 1997), by virtue of formal power and authority. The data analysed for this study indicate that leaders can also actually cross company boundaries. When treated as an aggregate, a number of factors are identifiable among respondents. They have a positive attitude toward their work in general. An atmosphere of participation and commitment has been developed by buyers' leadership, involving negotiations on the acquisition of inputs and services used in their products. Competition among suppliers and prior planning have increased the trust index between all parties. Purchases are often regional, involving suppliers near facilities or, if possible, in the city where these are located.

The third proposition was developed as follows:

Proposition 3 (P3) Effectiveness in buyers' leadership in the development of suppliers has a positive impact on the integration of suppliers.

P3 was measured with two groups of seven questions and analysed using SPSS 20 software. It was noted that, in all situations, there was no statistically significant difference between the groups, as shown in Table 5 ($p > 0.05$). Therefore, all the analysed issues need to be regarded by MSB as essential in shaping the interactions of suppliers.

Table 5 P3 test statistics[a,b] results

	P3
Chi-square	815
DF	1
Asymp. sig.	367

Notes: [a]Kruskal-Wallis test; [b]Grouping variable: Group_P3

Source: Authors

The issues considered in the groups that form the basis of leadership effectiveness are:

P3-1 – Buyers' leadership

P3-2 – Supplier development.

Data analyses of this proposition produced results obtained through analysis of the items related to this proposition using SPSS 20 software and the Kruskal-Wallis test. Another construct that emerged during the coding of the survey data was previously found present only in top-level companies: the continued development of suppliers. As a concept, this construct involves organisations' relevant training of suppliers on many levels, namely, failure mode and effect analysis, just-in-time manufacturing, total quality management, and activities monitoring and evaluating suppliers' premises, among others.

MSB show increased efficiency in that buyers' leadership seek to consolidate suppliers' development – a common practice cultivating supply chain loyalty and reducing delivery times, which is quite evident in the automotive industry. Supplier development activities must take place on an ongoing basis. MSB care about developing suppliers in their supply chain, which makes sure part flows do not stop, and a need to develop supply alternatives was indicated by the companies surveyed as being of paramount importance.

The MSB surveyed did not indicate a delay in risk control planning in terms of supply to suppliers or commercial pressures to sustain practices. The surveyed companies are betting more on partnerships between the companies that make up their supply network. This approach leads to delays in most companies. The most relevant aspect in the research results proved to be leadership behaviour and the ease with which MSB adjust to new process or product requests – both important factors in the increased level of collaborative skills.

The fourth proposition was formulated as follows:

Proposition 4 (P4) Internal constraints and cultural factors are retarding elements in internal development processes.

P4 items comprised two groups with nine issues, in order to clarify whether, among the groups, there was any that would be more significant. After analysing the data using SPSS 20 software, it was noted that, in all situations, there was no statistically significant difference between the groups, as shown in Table 6 ($p > 0.05$). This supports the conclusion that all issues analysed in these groups should be regarded by MSB as key to their internal development processes.

Table 6 P4 test statistics[a,b] results

	P4
Chi-square	3.196
DF	1
Asymp. sig.	0.74

Notes: [a] Kruskal-Wallis test; [b]Grouping variable: Group_P4

Source: Author

The groups considered for the issues that form the basis of internal development were:

P4-1 – Internal constraints

P4-2 – Cultural factors.

The results of analyses were obtained by analysing the proposition using SPSS 20 software and the Kruskal-Wallis test. The standardisation of the data also revealed that challenges related to the integration of suppliers in the automotive sector are not related only to domestic suppliers, which was unexpected.

In many of the companies, some of the greatest points of restrictions were registered as related to the internal affairs of companies. One of the most pressing challenges that was identified is client participation, which generates unrealistic expectations of supply chains. Restrictions on MSB in product development, bureaucracy when supplying first-tier companies, and constant monitoring carried out by clients are considered elements that cause delays and stress for all parties.

The explanation for this is simply that the gap in the level of power held by buyers and suppliers increases as complexity increases, due to the stringent requirements of the products. On the other hand, innovative attitudes of providers and a mentality of increased competitiveness in the market of which MSB are a part are noted as extremely important by the companies surveyed.

The need for greater proximity to the companies that provide parts and services to automakers is urgent. In this study, this concern is present among those surveyed, creating a tendency to participate in industrial clusters as a part of cost reduction processes.

4.1 Some implications

4.1.1 Theoretical implication

As a result, the concept of availability, helpfulness, and collaboration, as well as ongoing development processes among suppliers, can become a factor of great importance to the MSB supply chain of Brazilian automakers. Collectively, the four propositions discussed, after analyses using SPSS 20 software, provide a framework by which to identify the relative importance of the main factors leading to the integration of MSB suppliers in the automotive industry. An overview of the conceptual development of this approach is shown in Tables 7 and 8 below.

Table 7 Summary of research data

Assertions	*Propositions*				*Total*
	1	*2*	*3*	*4*	
1	10	4	4	2	20
2	32	0	18	13	63
4	123	14	57	25	219
5	60	5	41	26	132
Total	225	23	120	66	434

Source: Authors

Table 8 Classification of proposals

Proposition	*N*	*Mean Rank*
1	225	211.64
2	23	199.41
3	120	225.73
4	66	228.83
Total	434	

Source: Authors

Tables 7 and 8 present the results of data analyses used to fulfil the goals of this research. The columns indicate the statements for which respondents had to choose an alternative option, indicating the reality of their business for each issue. The columns of the propositions indicate the number of assertions by proposition, and the last column shows the totals for all assertions.

4.1.2 Managerial implication

The results of this research specifically contribute by creating a specific perspective on the integration of supply chains, analysing the background factors to this integration in the automotive sector. In addition, MSB participating in this context do not appear to be limited to formal leadership patterns, and an analysis of the present study's data suggests that leadership, good relationships, and collaboration seem to exist in all the companies surveyed and, in all functions, involved in cooperative activities within the network components that supply the Brazilian automotive industry.

Thus, although the formal responsibilities involved in the process of providing parts generate a priority placed on strong leadership, the individuals involved, and the means used in negotiations constitute a more organisational style of leadership. The implications of integration negotiations with customers are providing the basis for suppliers gradually moving from providing simple parts and components production processes to producing higher value-added elements in customers' products and production strategies, including modules and systems to make vendors more successful.

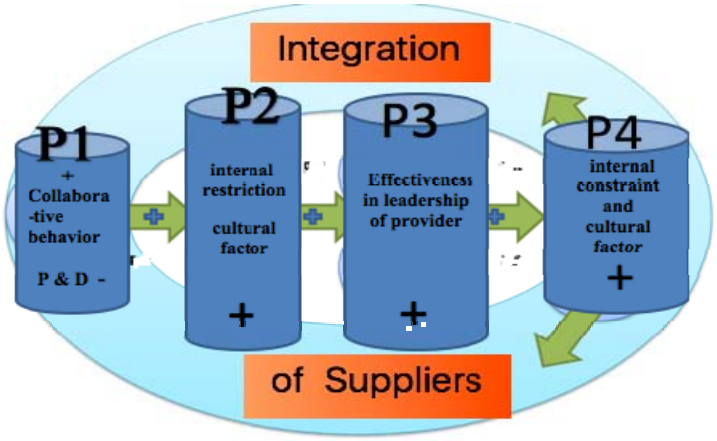
Customers, in turn, require process improvement skills and innovative capabilities. (Hult et al., 2007). The successful integration of buyers/suppliers is, therefore, a key element in making the Brazilian system of high-performance automotive products more competitive in the global market.

The performance of the MSB that make up this network, as well as larger companies considered to be first level components, needs to be guided by indicators such as cost, quality, production, delivery, and flexibility. Therefore, more attention should be given to procedures based on the following criteria: potential for development of innovation, integration with the top management level of middle managers, process development, quality, SCM mentality, collaborative activities, and expertise in organisational learning. In addition, MSB need to raise the level of trust between buyers and suppliers in order to integrate them into the automotive supply chain and to achieve the level of performance required by the world market.

As the current suppliers' market in the global automotive sector is becoming more competitive, this study is considered of interest to both academics and professionals from various fields, both in the automotive sector and in other sectors. The elements identified in the data analysis and their direct and indirect links provide a solid foundation for further research and add value to the development of theories in this specific area (Malhotra et al., 2008).

The verification of the propositions contributed to an analytical model of the attributes and variables integrating the researched supply chain (see Figure 2). This model shows how MSB must present themselves to customers and develop in order to meet the demands of supplying auto parts in this national supply chain.

Figure 2 Analytical model (see online version for colours)



Source: Authors

The model also indicates which primary aspects should receive attention in the development of the collaborative skills needed to create partnerships in this chain, considering the increasing development of collaborative promptness, buyers' leadership, and management of problems generated for customers in product development and by internal constraints.

5 Conclusions

The results of this research allowed the construction of an analytical model based on attributes and variables that characterise SCM dynamics. After an analysis of the results, the main focus of this study was on the following question: What are the attributes and key variables that characterise the integration of MSB suppliers?

Having generated an analytical model after analysing the data, a positive sign (+) was identified for the variables that are considered favourable to MSB integration processes, as major Brazilian automotive suppliers in this supply chain are improving their supply structure continually. Negative signs (–) were found for the variables that must be managed so as not to interfere with collaboration and good relationships among supply chain members, as indicated in Figure 2.

The attributes identified through the analyses of results that need to be considered in the integration of MSB suppliers in the Brazilian automotive industry – fulfilling the requested requirements and ensuring these suppliers are appreciated – are:

1 The development of skills within the suppliers surveyed positively transforms these MSB's operations, through increased trust and partnerships generated in the value chains negotiated. This trend is confirmed by the results obtained in response to items related to P1 (i.e., The formation of collaborative relationships has a positive impact on the integration of suppliers.) and P2 (i.e., The readiness of suppliers to cooperate increases the level of their collaborative expertise.). Strategic alignment in the development of skills is shown to create reliable relationships between buyers/suppliers.

2 Functions such as reactivity and ease in performing process improvements are presented in the data as key strategies in producing favourable differentials for MSB, as revealed by increased competitiveness within the supply chain. Evidence for this is found in the results for P3 (i.e., Effectiveness in buyers' leadership in the development of suppliers has a positive impact on the integration of suppliers.).

3 The exchange of information, when performed based on principles of transparency and accessibility, helps to organise the entire supply chain properly. However, the present research revealed that MSBs have great difficulty overcoming the barriers generated by client companies, a fact shown in the results for P4 (i.e., Internal constraints and cultural factors are retarding elements in internal development processes.), creating unnecessary delays and stress for MSB.

This study sought to understand the background factors in MSB integration in supply chains and to demonstrate that shared product development processes, as stated in P1 (i.e., The formation of collaborative relationships has a positive impact on the integration of suppliers.) are restricted to MSB. These processes need to be emphasised in order to increase collaboration between buyers and suppliers so that business scenarios anticipate customer wishes, as well as the constant regulatory changes instigated by laws, norms, and complementary changes in the universe of regular and operational activities of MSB.

This study found that MSB that present efficient responses to the efforts of buyers' leadership to consolidate supplier development as a common practice – in terms of loyalty in supply lines and reduction of delivery times – are fully integrated into the Brazilian automotive supply chain. Supplier development activities must take place on an ongoing basis according to the management surveyed.

The findings further support the conclusion that permanent collaboration must be considered with regard to the establishment of alliances between MSB and first-tier supply companies. These last operate in various sectors and chains of suppliers to vehicle manufacturers and the replacement auto parts market. Alliances are made between these companies through the innovative and generative characteristics of good relationships within chains.

Through a focus on the development and integration of MSB as Brazilian automotive industry suppliers, based on a multiple-case approach, this research addresses the need for operational tools for MSB that seek to enter the supply chain of auto parts, offering ways to improve these companies' decision making. Companies seeking improvement in logistics need to work on the distribution of their products, so they need to understand their production flow and investigate issues providers face in their everyday business. Finally, this study helps further research in this area through the provision of relevant results, contributing to a better understanding of the integration between suppliers and management of the network of automotive parts suppliers.

The limitations of this research arise from the ability of MSB to develop new technologies. These are expected by customers, and they require an expansion of the research related to communication within the supply chain of the Brazilian automotive industry. Time constraints also meant the data collection had to be done only in the city of Jundiaí (Brazil). Future lines of research need to seek out ways to deepen the application of development attributes and the understanding of key variables in order to characterise more fully the integration of MSB suppliers in the Brazilian automotive industry, as well as MSB in other regions.

References

Barney, J.B. (2012) 'Purchasing, supply chain management and sustained competitive advantage: the relevance of resource-based theory', *Journal of Supply Chain Management*, Vol. 48, No. 2, pp.3–6.

Bienstock, C.C. (2002) 'Identifying customer need patterns for customization and personalization', *International Journal of Physical Distribution & Logistics Management*, Vol. 32, No. 80, pp.636–648.

Bowersox, D.J., Closs, D.J. and Cooper, M.B. (2014) *Gestão Logística de Cadeias de Suprimentos*, Bookman, São Paulo.

Callegari, S. (2007) *Análise da Compatibilização de Projetos em Três Edifícios Residenciais Multifamiliares*, Dissertação – Arquitetura e Urbanismo, Universidade Federal de Santa Catarina, Florianópolis.

Carter, C.R. and Rogers, D.S. (2008) 'A framework of sustainable supply chain management: moving toward new theory', *International Journal of Physical Distribution & Logistics Management*, Vol. 38, No. 1, pp.360–387.

Christopher, M. (2011) *Logística e gerenciamento da cadeia de suprimentos*, Tradução da 4ª edição Norte-Americana, Cencage, São Paulo.

Cox, A., Lonsdale, C., Sanderson, J. and Watson, G. (2004) *Business Relationships for Competitive Advantage: Managing Alignment and Misalignment in Buyer and Supplier Transactions*, Palgrave Macmillan, London.

Crook, T.R., Ketchen, D.J., Combs, J.G. and Todd, S.Y. (2008) 'Strategic resources and performance: a meta-analysis', *Strategic Management Journal*, Vol. 29, No. 11, pp.1141–1154.

Denk, N., Kaufmann, L. and Carter, C.R. (2012) 'Increasing the rigor of grounded theory research – a review of the SCM literature', *International Journal of Physical Distribution & Logistics Management*, Vol. 42, Nos. 8–9, pp.742–763.

Duarte, A.L.C.M., Brito, L.A.L., Di Serio, L.C. and Martins, G.S. (2011) 'Operational practices and financial performance: an empirical analysis of Brazilian manufacturing companies', *Brazilian Administration Review*, October/December, Vol. 8, No. 4, pp.395–411.

Dyer, J.H., Kale, P. and Singh, H. (2004) 'When to ally and when to acquire', *Harvard Business Review*, July–August, Vol. 82, pp.109–115.

Eberhardt, M., Mclaren, J., Millington, A. and Wilkinson, B. (2004) 'Multiple forces in component localisation', *European Management Journal*, Vol. 22, No. 3, pp.290–303.

Eisenhardt, K.M. (1989) 'Building theories from case study research', *Academy of Management Review*, Vol. 14, No. 4, pp.532–550.

Fiala, P. (2005) *Information Sharing in Supply Chains*, Omega, Youngston, OH.

Figueiredo, K.F., Fleury, P.F. and Wanke, P. (2003) *Logística e Gerenciamento da Cadeia de Suprimentos: Planejamento do Fluxo de Produtos e dos Recursos*, Editora Atlas, São Paulo.

Fugate, B.S., Mentzer, J.T. and Flint, D.J. (2008) 'The role of logistics in market orientation', *Journal of Business Logistics*, Vol. 29, No. 2, pp.1–26.

Gay, L.R. and Airasian, P. (2003). *Educational Research: Competencies for Analysis and Application*, Pearson Education, Upper Saddle River, NJ.

Gilbert, S.M. and Cvsa, V. (2003) 'Strategic commitment to price to stimulate downstream innovation in a supply chain', *European Journal of Operational Research*, Vol. 150, No. 3, pp.617–639.

Gil, A.C. (2007) *Como elaborar projetos de pesquisa*,:Atlas, São Paulo.

Golicic, S.L. and Smith, C.D. (2013) 'A meta-analysis of environmentally sustainable supply chain management practices and firm performance', *Journal of Supply Chain Management*, Vol. 49, No. 2, pp.78–95.

Greenberg, P. (2009) *CRM at the Speed of Light*, McGraw-Hill, New York.

Guo, X., Yuan, Z. and Tian, B. (2009) 'Supplier selection based on hierarchical potential support vector machine', *Expert Systems with Applications*, Vol. 36, No. 3, pp.6978–6985.

Hair, J.F., Anderson, R.E., Tatham, R.L. and Black, W.C. (1995) *Multivariate Data Analysis*, Prentice Hall, Upper Saddle River, NJ.

Hollos, D., Blome, C. and Foerstl, K. (2012) 'Does sustainable supplier co-operation affect performance? Examining implications for the triple bottom line', *International Journal of Production Research*, Vol. 50, No. 11, pp.2968–2986.

Hult, T., Ketchen, D.J. and Chabowski, B. (2007) 'Leadership, the buying center, and supply chain performance: a study of linked users, buyers, and suppliers', *Industrial Marketing Management*, Vol. 36, No. 3, pp.393–403.

Hunt, S.D. and Davis, D.F. (2012) 'Grounding supply chain management in resource-advantage theory: in defense of a resource-based view of the firm', *Journal of Supply Chain Management*, Vol. 48, No. 2, pp.14–20.

Hunter, J.E. and Schmidt, F.L. (2004) *Methods for Meta-Analysis: Correcting Error and Bias in Research Findings*, Sage, Thousand Oaks, CA.

Jain, V., Tiwari, M.K. and Chan, F.T.S. (2004) 'Evaluation of the supplier performance using an evaluationary fuzzy-based approach', *Journal of Manufacturing Technology Management*, Vol. 15, No. 8, pp.735–744.

Kaufmann, L. and Denk, N. (2011) 'How to demonstrate rigor when presenting grounded theory research in supply chain management literature', *Journal of Supply Chain Management*, Vol. 47, No. 4, pp.64–72.

Keskin, G.A., Ilhan, S. and Özkan, C. (2009) 'The fuzzy ART algorithm: a categorization method for supplier evaluation and selection', *Expert Systems with Applications*. Vol. 37, No. 2, pp.1235–1240.

Laudon, K.C. and Laudon, J.P. (2005) *Management Information Systems: Managing the Digital Firm*, Prentice Hall, New York.

Malhotra, M.J., Saeed, K.A. and Jayaram, J. (2008) *Impact of Alliance Readiness on Supply Chain Integration and Form's Operational Performance*, China Europe International Business School.

Marquez, A.C., Ovalle, O.R. and Framinan, J.M. (2001) 'Benefits of the Internet for supply chain management: a characterization and simulation study', *International Journal of Agile Manufacturing*, Vol. 4, No. 2, pp.25–42.

Martins, P.G. and Laugeni, F.P. (2012) *Administração da Produção*, Saraiva, São Paulo.

Mcduffie, J.M., West, S., Welsh, J. and Baker, B. (2001) 'Logistics transformed: the military enters a new age', *Supply Chain Management Review*, Vol. 5, No. 3, pp.92–100.

Miles, M.B., Huberman, A.M. and Saldana, J. (2014) *Qualitative Data Analysis*, 3rd ed., Sage, Thousand Oaks, CA.

Northouse, P. (1997) *Leadership: Theory and Practice*, Sage Publications, London.

Nouira, I., Hammami, R., Frein, Y. and Temponi, C. (2016) 'Design of forward supply chains: impact of a carbon emissions-sensitive demand', *International Journal of Production Economics*, March, Vol. 173, pp.80–98.

Pagell, M., Wu, Z. and Wasserman, M.E. (2010) 'Thinking differently about purchasing portfolios: an assessment of sustainable sourcing', *Journal of Supply Chain Management*, Vol. 46, No. 1, pp.57–73.

Peteraf, M.A. (1993) 'The cornerstones of competitive advantage: a resource based view', *Strategic Management Journal*, Vol. 14, No. 3, pp.179–191.

Porter, M. (1998) *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, Free Press, New York.

Porter, M. (1999) *Competição: Estratégias Competitivas Essenciais*, Campus, Rio de Janeiro.

Pozo, H., Tachizawa, T. and Teodoro, R.A.F. (2010) 'Integração de fornecedores na indústria automobilística brasileira: uma abordagem de múltiplos casos', in *SIMPOI-2010: XIII Simposio de Administracao de Producao, Logistica e Operacoes Internacionais*, São Paulo.

Priem, R.L. and Swink, M. (2012) 'A demand-side perspective on supply chain management', *Journal of Supply Chain Management*, Vol. 48, No. 2, pp.7–13.

Pyke, F. (2002) *An Employment Strategy for the Lodz Region of Poland*, Geneva International Labour Office, Switzerland.

Rea, L.M. and Parker, R.A. (2000) *Metodologia de Pesquisa: Do Planejamento à Execução*, Editora Pioneira, São Paulo.

Roh, J.A., Whipple, J.M. and Boyer, K.K. (2013) 'The effect of single rater bias in multi-stakeholder research: a methodological evaluation of buyer-supplier relationships', *Production and Operations Management*, Vol. 22, No. 3, pp.711–725.

Ross, D.F. (1998) *Competing Through Supply Chain Management: Creating Market-Winning*, Kluwer Academic Publishers, Norwell, MA.

Sanayei, A., Mousavi, S.F. and Yazdankhah, A. (2009) 'Group decision making process for supplier selection with Vikor under fuzzy environment', *Expert Systems with Applications*, Vol. 36, No. 3, pp.393–403.

Shah, S.K. and Corley, K.G. (2006) 'Building better theory by bridging the quantitative-qualitative divide', *Journal of Management Studies*, Vol. 43, No. 8, pp.1821–1835.

Sillanpää, I. and Sillanpää, S. (2014) 'Supply chain strategy: empirical case study in Europe and Asia', *Management*, Vol. 9, No. 2, pp.95–115.

Sillanpää, I., Shahzad, K. and Sillanpää, E. (2015) 'Supplier development and buyer-supplier relationship strategies: a literature review', *International Journal of Procurement Management*, Vol.18, Nos. 1–2, pp.227–250.

Song, M. and Di Benedetto, A. (2008) 'Supplier's involvement and success of radical new product development in new ventures', *Journal of Operations Management*, Vol. 26, No. 1, pp.1–22.

Stock, J.R. and Lambert, D.M. (2001) *Strategic Logistics Management*, p.872, New York, McGraw-Hill.

Tate, W.L., Dooley, K.J. and Ellram, L.M. (2011) 'Transaction cost and institutional drivers of supplier adoption of environmental practice', *Journal of Business Logistics*, Vol. 32, No. 1, pp.6–28.

Teixeira, R.F. (2004) 'Discutindo o terceiro setor sob o enfoque de concepções tradicionais e inovadoras de administração', *Caderno de Pesquisas em Administração*, *São Paulo: FEA-USP*, Vol. 11, No. 3, pp.1–15.

Voss, C., Tsikriktsis, N. and Frohlic, M. (2002) 'Case research in operations management', *International Journal of Operation & Production Management*, Vol. 22, No. 2, pp.195–219.

Wernerfelt, B. (2014) 'On the role of the RBV in marketing', *Journal of the Academy of Marketing Science*, Vol. 42, No. 1, pp.22–23.

Yin, R.K. (2001) *Estudo de Caso: Planejamento e Métodos*, Bookman, Porto Alegre, RS.

Zhu, Q., Sarkis, J. and Lai, K.H. (2013) 'Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices', *Journal of Purchasing & Supply Management*, Vol. 19, No. 1, pp.106–117.