

## Information Sharing, Trust and Commitment: Perception of Brazilian Autoparts on Automakers of Various Ethnic Groups

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### ABSTRACT

The objective of this work is to verify the perception of managers of Brazilian manufacturers companies of auto parts on the information sharing, trust and commitment in the relationship with some automakers (assemblers), in function of their ethnic origin. In quantitative research, inferential analysis and non-parametric statistical test of Mann-Whitney (U) were developed. It was found that, in terms of information sharing, the suppliers identify differentiated forms in the treatment of information technology, providing significant differences regarding the information systems used in eastern and western groups. Other evidence has been obtained that the trust of autoparts modifies-if as the assembler and the information sharing is weak with respect to the autoparts and automakers. Statistically, it was not possible to view trait that characterizes relations of trust between assembler and supplier of auto parts, since the lack of trust or information sharing occurred even between intense relationships, which included large numbers of items marketed and high frequency of delivery of materials.

**Keywords:** Information sharing. Commitment. Confidence. Ethnicities. Automotive industry.

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## 1 INTRODUCTION

The automotive industry is an important sector of the economy, as car production is immense and highly diverse worldwide, as well as having important productive chains on other sectors according to Casotti and Goldstein (2008), 50% of rubber, 25% of glass and 15% of the total steel produced globally, are intended for that industry; Apart from that, more than 8 million workers are directly employed in this sector, which has attracted several studies, such as the recent Vanelle and Salles (2011) and Sacomano Neto and Pires (2012), being benchmarking in their processes , activities and development of their products.

The supply chain of the automotive industry is one of the most competitive in the world, as markets are large, dynamic and highly globalized (SCAVARDA; HAMACHER, 2001). An analysis of products development in various automakers in the world is a rich source of information about contrasting approaches to management. This wealth, both in management and in the competitive environment, makes the automotive industry a fertile arena for high performance analysis of sources in product development (CERRA; MAIA, 2008).

The challenge posed by the Japanese model makes the North American and worldwide automakers work more than companies in other segments, and also adopt different styles of relationships with their suppliers, as their Asian rivals (DYER, CHU, 2000).

The Brazilian automotive industry, for example, brings together a diverse ethnic spectrum in the nationalities of their makers, and here are gathered manufacturers from no less than nine different countries; Germany, Brazil, South Korea, United States of America (USA), France, India, Italy, Japan and Sweden. There is no record of this ethnic diversity in any other major vehicles producer on the planet (SCAVARDA; HAMACHER, 2001; ANFAVEA, 2011).

The relationship among suppliers to automakers located in the United States, Japan and Korea, considering the relationship between the buyer-supplier trust, the transaction costs and the information sharing, showed that trust and broad information sharing are directly related to the reduction of transaction costs (DYER, CHU, 2003).

As such, the Eastern automakers are recognized for having a business relationship of high reliability level, in which trust between firms is a key factor that facilitates the exchange

and establish competitive advantages (HELPER; SAKO, 1995; LAAKSONEN; JARIMO; KULMALA, 2009).

Jeffrey and Yu Chun (2000 apud DYER; CHU, 2003) developed a summary that reflects the characterization of the Japanese automaker in the face of the Western origin ones, emerging as the Secret of Success Provider: Japanese automakers operating in the United States are working with their suppliers to develop Lean Manufacturing training, aiming at their assembly plants service, transfer the stability of their own production in order to avoid peak demand and enable suppliers to work with smaller inventories (NARASIMHAN; NAIR, 2005).

Japanese practices establish greater discipline in deliveries during slots through which, all parts must be received at the plant; develop Lean transportation system, for example, for the treatment of mixed loads and deliveries in small lots, in addition to worry about the reduction of inventories (LIKER; YU 2000;. HOLWEG et al, 2005).

The North American suppliers that attend both North American plants as much as the ones of Japanese origin located in the United States maintain lower inventory levels of materials for the Japanese plants, comparing to stocks of materials intended for American automakers. These suppliers attend an inventory turn of 38.3 (ratio of annual sales by average inventory) that compared to a turn of 25.4 that maintain to attend North American customers (STURGEON; BIESEBROECK; GEREFFI, 2008).

Automakers of various ethnicities, globally, have continuously outsourced processes, which definitely changed the architecture of the traditional Supply Chain typically vertical in previous decades, to the modular format (PROCHNIK, 2002; SALERNO et al., 2002). The modular architecture requires closer relationships between the actors, partnerships, Information Sharing, Trust and Commitment (LAAKSONEN, JARIMO; KULMALA, 2009).

In this business model, suppliers are also co-investors of a great part of the new development and there is sharing of profits and losses between all the protagonists Supply Chain (DYER, CHU, 2003). These actors must act with confidence and commitment in their relationships.

The link between trust and commitment gets a lot of attention and has been identified as a great differential in the relationship in the supply chain. Trust is essential prerequisite for commitment between partners of the same supply chain. Commitment is built through the grounds of mutual trust. Finally, the development of trust and commitment through

interaction between two companies fosters collaboration between business and supports the maintenance of collaborative chain (SOONHU; CHULMO, 2009).

With all this entanglement of new connections between manufacturers and suppliers, with uniting ties, not only processes, but also common service providers, industrial new unit installation and large investments, it is natural that the levels of trust and commitment between the protagonists of Supply chain should be strongly encouraged (NYAGA; WHIPPLE; LINCH, 2010).

In this context, the question that guides this research is: What is the perception of managers of auto parts manufacturers, located in Brazil, on the Sharing Information, Trust and Commitment in the automotive supply chain?

It was intended to achieve the following overall objective to answer the question: To verify the perception of managers of manufacturing companies of Brazilian auto parts on Sharing Information, Trust and Commitment some manufacturers, due to their ethnic origin.

This subject deserves proper attention, since the impacts of mismanagement in the supply chain can cause losses to all members of the automotive industry.

## **2 THEORETICAL BACKGROUND**

### **2.1 THE SUPPLY CHAIN (SC) OF THE AUTOMOTIVE INDUSTRY**

The partnership in the supply chain is a relationship formed between two independent members in supply channels, by increasing the levels of information sharing, in order to achieve specific goals in terms of reducing the total costs and inventories (HARLAND et al., 2007).

In this sense, in the view of Myers and Cheung (2008), managers want to know if they can establish equity through collaborative activities, as there is a competitive environment. At the very least, they want a fair share of the share to be paid to each member of the chain concerning employees resources. When individual margins are small, the Information Sharing and true partnership can be reverted to a more traditional "adversity" in the relationship between supplier and buyer (MYERS; CHEUNG, 2008).

It is important to clarify that different forms of information sharing and knowledge help buyers and suppliers to benefit in the Supply Chain (SAHIN; ROBINSON, 2002). Businesses engaged through collaborative inter-organizational processes require information sharing to increase the knowledge base of partners and competitiveness (TALLMAN et al., 2004; ZHOU; BENTON, 2007).

Additional benefits of the Information Sharing added to the resources of knowledge can reduce the cost of total inventory (LEE et al., 1997; HULT; KETCHEN; SLATER, 2004; RAI et al., 2006) and extend the operational efficiency enhanced through coordination of allocated resources, activities and functions in the value chain (LEE et al., 2000).

Helper (1991) claimed that the complexity and the long automotive manufacturing lead-time, and the application of a hardship policy in dealing with widespread suppliers in the past, made the transition to the new methods much more turbulent. Consequently, suppliers, original parts manufacturers and vehicle manufacturers are facing competitive pressure in many ways (ZHANG; YUE, 2007).

The delivery process of products is controlled by the information flow, both on the incoming orders as on materials stocks. All these factors influence the behavior and performance of members of the supply chain, which implies that the automotive chains remain in a state of constant change (CHILDERHOUSE et al., 2003; ZHOU; BENTON, 2007). This requires that there is effective information sharing between the members of that chain (HOLWEG et al., 2005).

## 2.2 INFORMATION SHARING

Businesses engaged in interorganizational collaboration processes continue to face security and stability problems in the information flow and knowledge in Supply Chain (TOMAÉL; ALCARA; DICHIARA, 2005). These problems arise due to lack of a integration of information process and knowledge exchange about products and services, business processes and security policies, and difficulties in integrating heterogeneous systems inside and outside of organizations (D'AUTEBERRE; SINGH; IYER, 2008).

The information sharing is an important requirement for the successful management of the supply chain, in the view of Lee and Whang (2000); Premkumar (2000) and Sawaya (2002); It is the basis for coordination between the members of that chain, allowing that good decisions are taken to improve profitability of the whole chain (SIMATUPANG; SRINDHARAN, 2005).

The main barriers to the integration of information in the supply chain are: the lack of information strategy alignment between the different actors of the chain, the lack of knowledge of the potential benefits of e-business, lack of motivation and the disparity in the level of the technological development of companies (SHORE; VENKATACHALAN, 2003).

In order to facilitate the information management involving trading partners of the same supply chain, it is important to use mechanized tools that often do not only operate in facilitating communication between actors from both sides of the chain, but also, and especially, between applications; from machine to machine (ZHENXIN; HONG, EDWIN, 2001).

In a supply chain, the demand behavior suffers with increasing oscillation market, causing the demand information to be distorted to the extent that it is interpreted, processed and passed to the partner downstream of the chain (SHORE; VENKATACHALAN, 2003). The distortion is accentuated when the intervals for information sharing are increasing the amount of chain (CARVALHO; SILVA, 2009).

This effect makes it difficult to balance supply and demand, and causes companies to make decisions without knowing what is the real need of the end consumer. A consequence of this effect is the inadequate performance of the production system with companies, generating the so-called Bullwhip Effect, increasing their stocks and aiming to ensure better service levels, action that raises the cost of their operations (HENRY, 2007).

Nevertheless, some managers consider that information sharing between buyers and suppliers can bring some concerns that can eliminate their benefits (VILLENA; REVILLA; CHOI, 2011). A common concern is that the dissemination of information on technology, price program, customer base and processes can be shared with competitors.

Another concern is that trusting in the information flow from other organizations may impair the flexibility of a company and leave it vulnerable to changes as the priorities of their partners (SHORE; VENKATACHALAN, 2003). Despite these concerns, the information sharing between partners in a supply chain offers more positives than negatives points, as long as the information flows in all directions (JOHNSTON et al., 2004).

The selective sharing of information enables the alignment of political and business investments, from systems to the shared machinery and equipment between the agents of this chain, and mainly nourish Trust and Commitment, permeating business and operational relationships of the Supply Chain (PAULRAJ; SIDE; CHEN, 2008).

### 2.3 TRUST AND COMMITMENT

Confidence can be credited for an individual to another individual or a group of individuals, such as in a partner organization. However, individuals in an organization can share an orientation directed to individuals who are part of another organization. From this

perspective, the inter-Trust describes the extension of an existing collective orientation with respect to a partner company (DYER; CHU, 2003).

In theory, to occur an analysis for a risky investment, there needs to be trust. In this case, the Trust is required only in a risky situation. The automotive industry, the main focus of this study, is characterized by a high degree of uncertainty in the market, which increases both the risk associated with the transactions, as the importance of information sharing (LYKER; YU, 2000). Therefore, the supplier Trust in the automaker is particularly important in the automotive industry due to investments in assets of a single customer and market uncertainty, factors that put the supplier in an extremely vulnerable position (DYER; CHU, 2000).

In addition, it is expected that reliable partners are committed to long-term relationships in resource investment. In this sense, it is expected that the Trust will influence the commitment because this implies vulnerability, and there should be some trust to encourage partners to place themselves in a vulnerable position (MORGAN; HUNT, 1994).

According to Dwyer et al. (1987, p. 19), "the commitment refers to the implicit or explicit promise of relational continuity between the partners." In the view of Ellram (1991), a partnership must be built on a strong commitment of both parties, since what is especially important is the commitment of senior management, as well as a philosophy that encourages partnership. The performance improvements are feasible when companies undertake and make commitments to be developed in the long run (KRAUSE; HANDFIELD; TYLER, 2007).

In this context, it is important to check the hypothesis that the perception of auto parts manufacturer managers, located in Brazil, about the Trust, the Commitment and the Information Sharing is connected to the ethnic origin of the automakers.

### **3 METHODOLOGICAL ASPECTS**

This research is cross-sectional and causal-comparative type (ex post facto), based on getting answers to the question: What is the perception of auto part manufacturer managers, located in Brazil, on the Trust, the Commitment and the Information Sharing in the automotive supply chain?

From the question problem, comes the need to build a hypothesis, defined by Kerlinger (1980, p. 38) as "a conjectural statement of the relationship between two or more variables."

Assumptions are declarative sentences and relate in some way, variables to variables. The assumptions that guided this study are as follows:

| <b>Hypotheses of the research</b>  |
|--|
| H <sub>1</sub> : Perceptions of auto part manufacturer managers do not differ significantly in the degree of trust and commitment. |
| H <sub>2</sub> : Perceptions of auto parts company managers do not differ significantly in the degree of sharing of information.   |

Table 1 - Hypotheses of the research  
Source: Elaborated by the authors

The hypotheses were addressed through a data collection tool based on the theoretical framework, as Table 2:

| <b>Definition of Behavioral Dimensions</b>  | <b>Dimension Components</b>   | <b>Addressed issues</b>   |
|---|---|---|
| <b>Trust</b> - Commitment to long-term funding of investments, based on honesty (DYER, CHU, 2000)   | <ul style="list-style-type: none"> <li>✓ Fair and ethical negotiations</li> <li>✓ Contract Fulfillment</li> </ul>   | <ol style="list-style-type: none"> <li>1. The buyer is ethical and considered beyond the commercial advantages, my punctuality differentials, quality and operation.</li> <li>2. The automaker fulfills to the letter all the contractual clauses relating to the payment of fines, reimbursements and coverage of expenses and incurred damage to the supply process.</li> </ol>   |
| <b>Commitment</b><br>The exchange of belief between trading partners, characterized by implicit or explicit promise of relational continuity and senior management interaction (Dwyer et al, 1987;. Elram, 1991). | <ul style="list-style-type: none"> <li>✓ Openness to Criticism and suggestions for improvement</li> <li>✓ Easy access</li> <li>✓ Supplier Evaluation</li> </ul>           | <ol style="list-style-type: none"> <li>3. Whenever I have complaints or criticisms to make, I can do them and forward them to the right people. Even ideas and suggestions for the improvement of logistics process or product.</li> <li>4. Whenever it is necessary to "climb" a subject to higher hierarchies of the automaker can do it with ease, as the company demonstrates a true relationship of partnership.</li> <li>5. The criteria and standards applied by the automaker for their supplier evaluations are fair, consistent and accurately reflect the quality of products and services.</li> </ol> |
| <b>Information Sharing</b> - flow of information and resources, being the basis for coordination between trading partners (Simatupang; SRINDHARAN, 2005)  | <ul style="list-style-type: none"> <li>✓ Regularity of transactions (EDI)</li> <li>✓ Simple and flagged Logistic Processes</li> <li>✓ Alignment of Information</li> </ul> | <ol style="list-style-type: none"> <li>6 The EDI transactions are transmitted correctly and on time, as agreed between automaker and supplier.</li> <li>7 The automaker communicates with clarity all the procedures, signals, signs for loading /</li> </ol>   |



|  |  |  |
|--|--|--|
|  |  | unloading docks, types of packaging, labels etc. They are very clear and precise.<br>8 All people contacting suppliers in the company "speak the same language." The information is consistent and there are no discrepancies or inconsistencies in the information. |
|--|--|--|

Table 2 - Basic diagram of the analysis model  
 Source: Elaborated by the authors.

The research was conducted between September and November 2011, based on closed questionnaire with a qualitative scale, consisting of two parts:

- (a) the first section measures the level of trust and commitment from five questions; some positive and others negative, about the perception of the supplier on the buyer behavior (automaker); and
- (b) the second section consists of three other issues in order to assess whether the processes used in information sharing are efficient, involving respondents and their customers. The purpose is to assess whether the tools applied in the Information Sharing are used in a clear, objective and efficient manner, as well as the attitude of the automakers contact persons is nourished by mutual trust with consistent and accurate information.

For such, it was used the Likert scale of five points, with the following gradation: 1-strongly disagree; 2-disagree; 3-neither disagree nor agree; 4-agree; 5-strongly agree. It should be noted that, as Dyer and Chu (2003) and Gulati and Nickerson (2008), this alternative measure of trust and commitment, means attending to the consequences and not the background of the Trust. Gulati and Sytch (2008) punctuate that such a procedure implies considering Trust and Commitment as exogenous to the inter-relationship.

Regarding the selection of the sample composing the group of auto parts companies, the quantitative research considered the universe of 508 companies associated with the Union of Auto Parts Business - "Sindipeças" (2011), and it was aimed at validating the procedures applied by manufacturers in relationship between companies of the national automotive supply chain, which generate greater or lesser degree of trust, commitment and Information Sharing. All auto parts companies listed in Sindipeças website were contacted by phone or by sending a standard e-mail, obtaining the result of 54 respondents (13.4%).

The representation of Western automakers is composed by Volkswagen (31%), Fiat (20.8%) and General Motors (17.9%) - the largest in production in Brazil, according to Anfavea (2011). In order to avoid duplication or preference of a particular ethnic group, the scope had as a proposal selecting the representation of a German automaker, an Italian and an American. Ford (9.7%) was not considered in the research, because General Motors has represented the American ethnicity as vehicle volume ranking produced the Anfavea (2011).

In the group of Eastern automakers, Honda (3.6%) and Toyota (1.8%) represent this group, due to their higher production at their ethnicity. The selection of the chosen automakers representations got the biggest slice of the Brazilian production, which the output combined constitutes 75.1% of the total vehicle production in Brazil.

Regarding the treatment of the collected data, these were recorded in an array of SPSS v.15 and proceeded to analyze the data using the Wicoxon-Mann-Whitney test or simply Mann-Whitney test (U). This is characterized as non-parametric test appropriate to compare the distribution of functions of one variable at least ordinal measured in two independent samples (BESSERIS, 2009). In selecting the non-parametric method (Mann-Whitney test), we considered the guidelines of Callegari- Jacques (2007, p.166):

- (1) It is appropriate when you do not know the distribution of data in the population;
- (2) Indicated when the variable is measured in ordinal scale; and
- (3) When the classical requirements can not be met, the non-parametric methods are more efficient.

From the characteristics of the data collected in the sample: (i) the distribution of data is unknown, as the number of respondents (54 respondents) does not allow a normal distribution; (ii) with questionnaires formed with ordinal scales (Likert scale) in the perception of the degree of trust and commitment and Information Sharing of auto part managers; and (iii) considering the groups of Eastern and Western automakers as independent groups a 5% significance level in the application of Wicoxon-Mann-Whitney test (U) is assumed.

The analysis compares simultaneously the relations between two independent variables categories (manufacturers group with western ethnic group and manufacturers with eastern ethnicity) and two or more metrics variables (HAIR JUNIOR et al., 2007). In this study, they are considered two variables: the degree of trust and commitment and the degree of Information Sharing.

The advantage is to enable researchers to rank the degree of relevance of the factors, measuring what are deemed more or less important by respondents. The research makes it possible to establish a ranking of manufacturers researched that reflects the companies which processes, procedures, attitudes and relationships correspond to a partnership model that reflects a certain degree of Sharing Information, Trust and Commitment. In this context, when the p-value (probability value) is less than 5%, reject the null statistical hypothesis, as defined in the test application developed in the next section.

#### **4 DESCRIPTION AND ANALYSIS OF RESULTS**

The Brazilian automotive industry, as stated above, is an important segment of the economy, attracting manufacturers of various ethnicities. Automakers from Japanese ethnicity were installed recently in Brazil, indicating that the localization process or nationalization of purchased parts sources, is more embryonic, forcing these manufacturers to import greater amount of items than the ones rooted in the country longer. This condition limits the number of respondents who have common processes in Brazil. Here are the research results, which reflect and corroborate some concepts studied during the development of the theoretical background.

Based on the results obtained in the research, it is clear that the automakers that have lower production volume and even less product diversity, Honda and Toyota, received a high coefficient for this result. So rather than reflecting an opinion of indifference, it means lack of knowledge of automakers procedures.

Regarding the fair and ethical trading, unlike the higher values computed, the alternative neither agree nor disagree, for Honda and Toyota assembly plants they reflect more lack of knowledge or neutrality than a median value. Emphasis should be given to this question the high value computed at FIAT which also points out that no respondents strongly agree with the statement of this issue. It is also noteworthy the high level of agreement for the automaker General Motors, indicating a positive trend in the assessed rate.

One notes that, in compliance with contractual clauses, there are high levels of the Japanese ones for the alternative to the indicative neutrality; as well as high indifference index for FIAT and high value of disagreement for Volkswagen, on the other hand with the agreement with the automaker General Motors.

Regarding the criticism and suggestions for improvements, part of the previous question is confirmed, in relation to FIAT, GM, Honda and Toyota, with the difference that the total

disagreement increased in relation to FIAT. On the other hand, there is a recovery in the trust level of Volkswagen best qualified in this item, compared to the previous one.

No alteration for Honda and Toyota, but with slight decrease of GM and Volkswagen, and slight improvement of FIAT, there is a problem with access to the upper levels of the hierarchy; But Fiat has a constancy in total disagreement item, along with the newcomers, Honda and Toyota despite FIAT is not a fledgling company as it has operated in the Brazilian market for 35 years, while Honda has operated for only for 14 years and Toyota for 13 years (ANFAVEA, 2011).

Regarding the perception of the evaluation criteria of the automakers suppliers, this item portrays the highest disapproval rating of auto parts in relation to the automakers. It is clear to note that auto parts, overall, they are unhappy with the criteria used by automakers to assess their services.

Even though GM has received the highest score among the full and simple agreement, it has also obtained, interestingly, the highest total disagreement index. This points to the need for a complete overhaul of the applied criteria and currently methods for benchmarking of suppliers' service level.

Regarding the Information Sharing and regularity of EDI transactions, in that it is a tool used by all automakers with their suppliers, as the standards and rules established by the Commission of Anfavea (2011). There is greater balance in responses, with regard to the oldest automakers: GM, Fiat and VW, with some positive highlight for GM, indifference to FIAT and negative emphasis for VW.

It is observed again the supremacy of GM in their logistics processes. It is noted also a superiority of VW in relation to FIAT, which remains strong in item indifference or lack of opinion made in relation to logistics processes. This indifference in the case of FIAT, may lead to the lack of logistics process by the respondent, since, in many companies, logistics operations do not interact efficiently with the sales sector, in which most of the questionnaires have been sent.

Due to the fact that the respondent sample studied, for the most part does not maintain business relations with Japanese automakers, we could not support the argument attributed to Honda and Toyota, through literature, that their plants are noted for simpler and flagged logistics processes.

Regarding the alignment of the level of information of different people from different sectors, there has been a sharp drop in GM with a disagreement index, and total disagreement 44% above their competitors who follow closely tied; FIAT and VW to 39%, which accentuates as weakness alignment of information between traditional automakers. Perhaps the size of the largest company, with more employees, the flow of information between different sectors may be impaired, by comparing with smaller companies.

In the statistical analysis performed in order to assess the significance of the difference of perception about suppliers to the automakers as their ethnic origin; it has developed descriptive analysis and later a non parametric test to show the existence of differences between the means of automakers groups separated by ethnicity.

The variables identify the questionnaire answers, represented by the average of the sum of the Likert scale regarding factors such as: Trust, Commitment and Information Sharing. Given the descriptive analysis, it can be seen in Table 3 that the scores attributed by suppliers about the variables that make up the Trust, Commitment and sharing information, do not evidence, initially, significant differences in the averages found.

**Table 3 - Descriptive Data Analysis**

|                                      | N   | Sum    | Mean   | Std. Deviation |
|--------------------------------------|-----|--------|--------|----------------|
| Negotiation                          | 107 | 349,20 | 3,2333 | ,83016         |
| Contract Fulfillment                 | 107 | 335,70 | 3,1083 | ,81426         |
| Openess to Criticism                 | 107 | 348,00 | 3,2222 | ,86363         |
| Easy Access                          | 107 | 342,60 | 3,1722 | ,84873         |
| Supplier Evaluation                  | 107 | 343,80 | 3,1833 | ,72660         |
| Regularity in EDI Transactions       | 107 | 333,00 | 3,0833 | ,78627         |
| Simple and Flagged Logistics Process | 107 | 354,90 | 3,2861 | ,75523         |
| Alignment of Information             | 107 | 314,70 | 2,9139 | ,85713         |
| Valid N ( <i>listwise</i> )          | 107 |        |        |                |

To examine possible differences of the averages, according to the ethnic group of automakers, hypotheses were established of the Wicoxon-Mann-Whiteney test that characterizes the evidence that the averages found in two independent samples are identical or different, considering the significance level of 5%. Tables 4 and 5 identify the test results applied to the variables that characterize Trust and Commitment:

**Table 4 - Mann-Whitney Test Analysis - Trust and Commitment Ranking**

|                             | <b>Automakers -<br/>Ethnicity</b> | <b>N</b>   | <b>Mean Rank</b> | <b>Sum of Ranks</b> |
|-----------------------------|-----------------------------------|------------|------------------|---------------------|
| <b>Negotiation</b>          | Western Automaker                 | 54         | 54,03            | 2917,50             |
|                             | Eastern Automaker                 | 53         | 53,97            | 2860,50             |
|                             | <b>Total</b>                      | <b>107</b> |                  |                     |
| <b>Contract Fulfillment</b> | Western Automaker                 | 54         | 56,72            | 3063,00             |
|                             | Eastern Automaker                 | 53         | 51,23            | 2715,00             |
|                             | <b>Total</b>                      | <b>107</b> |                  |                     |
| <b>Openess to Criticism</b> | Western Automaker                 | 54         | 58,64            | 3166,50             |
|                             | Eastern Automaker                 | 53         | 49,27            | 2611,50             |
|                             | <b>Total</b>                      | <b>107</b> |                  |                     |
| <b>Easy Access</b>          | Western Automaker                 | 54         | 57,17            | 3087,00             |
|                             | Eastern Automaker                 | 53         | 50,77            | 2691,00             |
|                             | <b>Total</b>                      | <b>107</b> |                  |                     |
| <b>Supplier Evaluation</b>  | Western Automaker                 | 54         | 56,33            | 3042,00             |
|                             | Eastern Automaker                 | 53         | 51,62            | 2736,00             |
|                             | <b>Total</b>                      | <b>107</b> |                  |                     |

Source: Research Data (2011)

**Table 5 - Statistical Tests - Trust and Commitment**

|                        | Negotiation | Contract<br>Fulfillment | Openess to<br>Criticism | asy Access | Supplier<br>Evaluation |
|------------------------|-------------|-------------------------|-------------------------|------------|------------------------|
| Mann-Whitney U         | 1429,50     | 1284,00                 | 1180,50                 | 1260,00    | 1305,00                |
| Wilcoxon W             | 2860,50     | 2715,00                 | 2611,50                 | 2691,00    | 2736,00                |
| Z                      | -,010       | -,938                   | -1,586                  | -1,085     | -,846                  |
| Asymp. Sig. (2-tailed) | ,992        | ,348                    | ,113                    | ,278       | ,398                   |
| Exact Sig. (2-tailed)  | ,994        | ,351                    | ,113                    | ,280       | ,401                   |
| Exact Sig. (1-tailed)  | ,497        | ,175                    | ,057                    | ,140       | ,200                   |
| Point Probability      | ,001        | ,001                    | ,000                    | ,001       | ,001                   |

Source: Research Data (2011)

By observing the Tables 6 and 7, it appears that the statistical Mann-Whitney U test has a significance (p-value) of more than 5%, i.e., the lowest level of significance corresponds 0.113 above the 0 level of significance 05. It is not evidenced differences between the means of Eastern and Western automakers in Trust and Commitment aspects. In Tables 5 and 6

below, there are the results achieved with the application of the tests related to information sharing factor:

**Table 6 - Mann-Whitney Test Analysis - Information Sharing Ranking**

|   | <b>Automakers - Ethnicity</b> | <b>N</b>   | <b>Mean Rank</b> | <b>Sum of Ranks</b> |
|---|-------------------------------|------------|------------------|---------------------|
| <b>Regularity in EDI Transactions</b>         | Western Automaker             | 54         | 64,00            | 3456,00             |
|   | Eastern Automaker             | 53         | 43,81            | 2322,00             |
|   | <b>Total</b>                  | <b>107</b> |                  |                     |
| <b>Simple and Flagged Logistics Processes</b> | Western Automaker             | 54         | 59,67            | 3222,00             |
|   | Eastern Automaker             | 53         | 48,23            | 2556,00             |
|   | <b>Total</b>                  | <b>107</b> |                  |                     |
| <b>Information Alignment</b>                  | Western Automaker             | 54         | 50,81            | 2743,50             |
|   | Eastern Automaker             | 53         | 57,25            | 3034,50             |
|   | <b>Total</b>                  | <b>107</b> |                  |                     |

Source: Research Data (2011)

**Table 7 - Statistical Tests - Information Sharing**

|                          | <b>Regularity in EDI Transactions</b> | <b>Simple and Flagged Logistic Processes</b> | <b>Information Alignment</b> |
|--------------------------|---------------------------------------|--|------------------------------|
| Mann-Whitney U           | 891,000                               | 1125,000                                     | 1258,500                     |
| Wilcoxon W               | 2322,000                              | 2556,000                                     | 2743,500                     |
| Z                        | -3,394                                | -1,961                                       | -1,105                       |
| Asymp. Sig. (2-tailed)   | ,001                                  | ,050   | ,269                         |
| Exact Sig. (2-tailed)    | ,001                                  | ,050   | ,271                         |
| Exact Sig. (1-tailed)    | ,000                                  | ,025   | ,136                         |
| <i>Point Probability</i> | ,000                                  | ,000   | ,001                         |

Source: Research Data (2011)

By analyzing Tables 6 and 7, it is apparent that the statistical Mann-Whitney U test has a significance (p-value) over 5% for the variables "simple and flagged logistical processes" (0.050) and level alignment of information from different people from different sectors (0.269). Meanwhile, the variable "regularity of transactions with EDI" shows a lower significance than 5% (0.001), thus indicating the existence of significant differences in the

processing of information through EDI, about groups of Western and Eastern automakers.

Table 8, in turn, shows the ranking of automakers in all variables that were analyzed:

**Table 8 - Ranking of Automakers**

| <i>RANKING</i> | <i>AUTOMAKER</i> | <i>%</i> |
|----------------|------------------|----------|
| 1°             | GENERAL MOTORS   | 65%      |
| 2°             | HONDA            | 61%      |
| 3°             | FIAT             | 60%      |
| 4°             | VOLKSWAGEN       | 59%      |
| 5°             | TOYOTA           | 58%      |

Source: Research Data (2011)

The result indicates performance of 65% success for GM regarding the best results (100%). In this evaluation, the best placed is only 7% ahead of the worst placed, implying that there is no great difference recorded between the performances of the automakers.

Considering Toyota and Honda, which received, in most questions, the neutral rating, due to the lack of suppliers of these automakers among respondents. The values attributed to Volkswagen and Fiat, in turn, are extremely low. This analysis supports the conclusion that, in general, the performance of automakers, from the viewpoint of its auto parts suppliers, is below average, at least of what is expected of a true "partner" as it is proclaimed in the automotive business.

Table 9 reflects that success in sales achieved by Volkswagen in Brazil, does not correspond to the assessments made by the researched providers regarding logistics processes and Supply Chain Management, which put it in 4th place out of five companies researched:

**Table 9 - Automakers Score in the Research Compared to Production Ranking in 2011**

| <i>RANKING -<br/>RESEARCH</i> | <i>AUTOMAKER</i> | <i>RANKING -<br/>MARKET</i> | <i>PRODUCTION</i> |
|-------------------------------|------------------|-----------------------------|-------------------|
| 1°                            | GENERAL MOTORS   | 3°                          | 651.051           |
| 2°                            | HONDA            | 6°                          | 131.455           |
| 3°                            | FIAT             | 2°                          | 757.418           |
| 4°                            | VOLKSWAGEN       | 1°                          | 1.135.142         |
| 5°                            | TOYOTA           | 10°                         | 64.588            |

Source: Research Data (2011)



As shown in Table 9, while its production emerges well ahead of other automakers, the research recommends Volkswagen the application of adjustments in case management of their supply chain, ranked second to last in the ranking of this research. Another caveat must be made to the position of Honda in the search rankings, lies in second place, despite the proportion of respondents who claimed not to work with the automaker.

## **5 CONCLUSIONS**

In the Supply Chain of Automotive Industry, the information must flow as much as starting from the consumer, their new trends, needs, aspirations, levels of demand and quality or to reach the most distant layers of supply, their difficulties in raw materials, quality and production bottlenecks, the closer to the end user layers.

This perception of the new role of prominent information in Brazil and in the world, does not pass the explicit knowledge of the companies that, despite the global economy, impose the same competition rules to suppliers and automakers globally. These companies do not develop similar perceptions and, do not even, equitably align the corrective actions on information management; It is concerned and, at the same time effect (solution) to the problems that impact the supply chain.

The responding companies of this research showed certain mistrust to participate in the study, since the collected information could be used by automakers, hindering possible negotiations on future business. They feared that a negative rating could cause a climate of animosity between partners, possible retaliation from automakers in future business and preferred to refrain from express their opinions. It can be considered in this way that poor adherence to research by the auto parts was the major limitation of the research.

The evidence obtained through the various scores given by respondents in the field research, was that the Trust in the Automotive Supply Chain is modified according to the automaker, similar to those obtained by Gulati and Sytch (2008) and Gulati and Nickerson (2008).

The research allowed the verification that the information sharing is weak with regard to auto parts and automakers, regardless of ethnicity, which is contrary to what was found by Dyer and Chu (2003), when commenting that the auto parts relationship with Eastern manufacturers is more stable, committed and reliable.

This conclusion, at first, seems odd, as the supply chain of the automotive industry is an example for Supply Chain Management, especially in the first layer of the automakers'

suppliers. This reflects the view of the sample studied, which recognizes the power of the automakers in the demand for information sharing on the part of auto parts.

It was not possible in this research to visualize some trait that characterizes relations of trust between automaker and auto parts supplier, since the lack of trust and information sharing was found even among intense relationships, which included large number of items sold and high frequency of delivering materials.

On one hand, globalization of the automotive segment has a dimension that enhances the convergence of some behavioral characteristics of automakers, on the other hand, other aspects remain distinct, such as the internationalization trajectories of Western and Japanese automakers. The relations of Western automakers facing the "Japanese challenge" have not been homogeneous, neither in time nor in space, or on the form of the strategies implemented.

Given the diversity of origins, cultures, existing processes and ethnic groups in national and global automotive industry, it would be natural that, like the industrialized markets such as the US and Europe, Brazil, also sought a process of standardization or alignment of the criteria used in evaluating the performance of suppliers and customers, members and participants of the same supply chain.

However, this standardization, still does not exist for the Brazilian automotive industry, limiting its Supply Chain process evaluation to vision, criteria and particular values of each automaker that due to the diversity of backgrounds, ethnicities, suffer quite diverse conceptual philosophical influences such as discipline and Japanese partnership, punctuality and German inflexibility and productivity and aggressiveness in US sales.

With so many rules governing this eclectic market, auto parts suppliers, which follow the guidelines of their headquarters, sometimes foreign, when exporting, suffer pressure from their overseas customers, overloading them with too much diversity in their standards, policies, visions, priorities etc.

The Brazilian automotive segment requires a standardized assessment process much fairer and consistent, as the evaluation of all technical, logistical and commercial process to be made, also from the customer to the supplier's point of view. This is an action remaining to improving the supply chain as a whole, so that there is serious and real establishment of the collaborative partnership process.

It is recommended that future studies assess the perception of suppliers (auto parts) on buyers (manufacturers), with respect to the Trust, Commitment and Information Sharing

existing in the relationship between members of Chains of Brazilian automotive supplies, with the consent of manufacturers themselves or with the participation of SINDIPEÇAS. Another suggestion is that a discussion of the existing assumption is developed (different ethnic groups would have/ would lead to different treatment, resulting thus in different patterns of relationships).

The conclusion of this study confronts the result of Dyer and Chu (2003), and future research may develop contingency analyzes (assuming different countries and samples). Since the reality of Information Sharing in chains has changed a lot in these past 10 years, thereby adding even more a comparison with an older work; It would be interesting to update the research, making a contrast studies of Dyer and Chu (2003), in relation to the eastern ethnicity manufacturers.

It is considered that this study has contributed to the academic and business, from verifying the relations in the automotive Supply Chain with automakers of Japanese ethnicity and their direct suppliers (1st tier) are nourished by the Trust and Commitment, more than other automakers, and these ingredients facilitate information sharing in the automotive supply chain.

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