



## Local Supplying Companies and Spillover Effects in the Brazilian Automotive Industry\*

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*Fornecedores Locais e Efeitos de Transbordamentos na Indústria Automotiva Brasileira*  
*Proveedores locales y efectos de externalidades en la industria automotriz brasileña*

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*This study's aim is to verify if the presence of an automotive assembling company contributes to the occurrence of spillovers in the form of product or process innovation to local supplying companies. The research method implemented was the multiple case study. Results indicate that relationships involving higher levels of commitment, cooperation and information exchange between local supplying companies and the assembling company contribute to the spillover occurrence in the form of product and process innovation, observed mainly for autonomous-link and constrained-link buyer-supplier relationships, and less intensively in market and power buyer-supplier relationships. Our findings contribute to the literature on spillovers from MNEs and have valuable implications for both research and practice. We attribute the paper's contribution mainly to the in-depth nature of analyzes and the methodology employed, which gave us the detail and richness that are presumably associated with the complexity of the phenomena. For academics, this research provides a theoretical framework that has not been previously applied to the Brazilian automotive industry context.*

*El objetivo de este estudio es verificar si la presencia de empresa planta de montaje de automóviles contribuye a la ocurrencia de externalidades en forma de innovación de producto o proceso para los proveedores locales. El método de investigación utilizado fue el estudio de casos múltiples. Los resultados indican que las relaciones que implican un alto nivel de compromiso, cooperación y el intercambio de información entre proveedores locales y el fabricante de automóviles contribuyen a la ocurrencia de externalidades en forma de innovación de productos y innovación de procesos, especialmente para las relaciones proveedor-fabricante de automóviles del tipo autónomo y enlaces restringido, y con menor intensidad a las relaciones proveedor-fabricante de automóviles que involucran relaciones de poder y de mercado. Nuestros resultados contribuyen a la literatura sobre los efectos de desbordamiento de las compañías multinacionales. Atribuimos esta contribución principalmente a la investigación de la naturaleza que involucra el análisis y la metodología en profundidad, que contribuye a la riqueza asociada a la complejidad del fenómeno estudiado. Para los académicos, este estudio proporciona un marco teórico que, hasta entonces, no se había aplicado al contexto de la industria automotriz brasileña.*

*O objetivo deste estudo é verificar se a presença de uma empresa montadora da indústria automobilística contribui para a ocorrência de transbordamentos na forma de produto ou processo de inovação para as empresas fornecedoras locais. O método de pesquisa utilizado foi o estudo de caso múltiplo. Os resultados indicam que relacionamentos que envolvem altos níveis de comprometimento, cooperação e intercâmbio de informações entre fornecedores locais e a montadora contribuem para a ocorrência de transbordamento na forma de inovação de produto e inovação de processo, principalmente para relacionamentos fornecedor-montadora do tipo autônomo e de ligações restritas, e menos intensamente para relacionamentos fornecedor-montadora envolvendo relações de poder e de mercado. Nossos resultados contribuem para a literatura sobre transbordamentos das empresas multinacionais. Atribuímos esta contribuição principalmente devido à natureza a pesquisa envolvendo análises em profundidade e metodologia empregada, o que, de fato, contribui para a riqueza associada à complexidade do fenômeno pesquisado. Para os acadêmicos, esta pesquisa fornece um quadro teórico que, até então, não havia sido aplicada ao contexto indústria automobilística brasileira.*

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## 1. Introduction

Literature on spillover effects identifies many advantages deriving from the presence of multinational enterprises (MNEs) on host countries' economies (Appleyard, and Field, 1998; Blomstrom, and Kokko, 1998; Gorg, and Greenaway, 2004; Dunning and Lundan, 2008; Gachino, 2010; Narula, 2014; Imbriani et al., 2014). These effects occur first because an increasing part of host countries' production is attributed to MNE's subsidiaries, and secondly, because these investments work as an incentive to industrial development through its direct and indirect effects, such as the generation of technological innovations, the increase on wages and exports, the increase on the levels of productivity, savings and investments, among other benefits (Blomstrom, and Kokko, 1998; Gorg, and Greenaway, 2004; Gachino, 2010).

Spillover effects are notably difficult to measure and, thus, determining exactly how MNE's activities affects local businesses by increasing or decreasing its levels of competitiveness and efficiency constitute a challenge for researchers (Moran, Graham and Blomstrom, 2005). Notwithstanding, there remain research opportunities concerning how the nature of MNE activities as the source of spillovers determines the effect of innovation spillovers to local suppliers (Ha and Giroud, 2015). Spillover effects has been well acknowledged as an important motivation for policies aiming to attract MNE's investments (Gorg, and Greenaway, 2004; Casson, 2007; Liu, Lu and Zhang, 2014). Developing countries, in particular, offer special incentives seeking to attract MNE's investments (Liu, 2008; Liu, Lu and Zhang, 2014), such as tariff reductions or exemptions and subsidies for infrastructure (Liu, 2008).

The argument in favor of such incentives is based upon the assumption that MNEs can help improve economic perspectives of the host country, since they might contribute to the financing of investment projects in the host economy, which can be translated into a mechanism of knowledge and technology management that might help increase revenues and efficiency levels of local companies (Bawlya, 2006). Furthermore, adopting the concept of absorptive capacity from the formulation of Cohen and Levinthal (1990) as a possibility of benefiting from innovation carried out externally to the firm, we have another argument in favor of such incentives (Alvarez, Marin and Santos-Arteaga, 2015).

The Brazilian automotive industry, in particular, has undergone significant changes since the early 1990s, and especially after the 'Plano Real' implementation and the adoption of a sectoral legislation entitled "Novo Regime Automotivo" (Vanalle and Salles, 2011). MNEs in the Brazilian automobile industry, since the late 1970s, have been under a vertical disintegration process that contributed to increasing the complexity of relationships involving suppliers (Vanalle and Salles, 2011). Furthermore, the relationship between the assembler company and local supplying companies is complex, since it involves a multitude of interconnections between several actors in a governance system that is coordinated by the assembling company, so that the choice between potential suppliers takes into account a number of requirements and standards quality.

The choice of the location of Mitsubishi Motor sin Brazil and six of its supplying companies in the region of Catalão, Goiás, as our research object, was guided by the recognition of a new regional economic dynamics that has been established from the deindustrialization process that occurred in Brazil in the late 1990s, in which non-metropolitan municipalities located outside the south-south east axis became targets of large enterprises, particularly the Brazilian Midwest

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region and its attractive elements allowed a spatial displacement of the automotive industry to that new region. By the 1980s, the assembling companies were established in metropolitan regions close to major business and financial centers. The choice of Mitsubishi Motors' location and surroundings in Catalão, brings together those elements constituting a new map of the Brazilian automotive industry that enables anew analytical perspective on a fertile field of research that is still scarce in Brazil.

Companies in the automotive sector in Brazil did get established in the 1950's in the Brazilian south and southeast regions. This period up to the present makes it difficult for researchers to verify the effects of these companies from the automotive sector and other multinational companies established in those regions upon local Brazilian companies.

This case specifically, involving local supplying companies in the Brazilian automotive industry in Goiás, might give us the possibility of looking at the effects caused by automotive assembling companies on the Brazilian local companies.

The municipality of Catalão is located in the southern region of Goiás state and, due to its strategic location that enables connections with southeast, north and northeast regions, as well as potential for socio-economic development and tax incentives, has become target for investors in the automotive industry.

In this context, the questions that guided the development of this research are: (i) How interactions between assembling companies and local supplying companies occur and how they contribute to the generate spillovers effects?; (ii) Through which mechanisms may local supplying companies benefit from the presence of MNEs in order to innovate?; and (iii) How the characteristics of local supplying companies may affect spillovers occurrence?

Based upon these considerations, this study's aim is to verify if the presence of an automotive assembling company contributes to the occurrence of spillover effects in the form of product or process innovations through the investigation of possible mechanisms of spillovers occurrence to local supplying companies in the state of Goiás, Brazil. Specifically, the study intends to: 1) identify the main factors related to the characteristics of local supplying companies that determine the occurrence of spillovers; 2) investigate if spillovers differ among local supplying companies with different levels of commitment, cooperation and information exchange relationships with the assembling company; 3) identify possible mechanisms of spillovers deriving from the assembling-suppliers relationship.

Understanding those spillover effects contributes to the identification of synergies between foreign and domestic companies in innovation processes, production and economic growth, also providing valuable information related to the decision-making process of public managers on whether they should encourage the entry of MNEs and if they should receive special treatment (Brambilla, Hale, and Long, 2009).

The article is structured as follows. The next section presents a general background on MNEs and spillover effects. It is followed by a conceptual framework to determine spillover effects from assembler-supplier relationship and other methodological issues. Subsequently, the results are presented and discussed. Finally, final considerations based on the analyzed results are presented.

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## 2. Theoretical underpinning

### 2.1. The new route of the Brazilian automotive industry

In Brazil, the automotive industry was initially concentrated in the state of São Paulo due to the abundance of relatively skilled labor, and also for the fact that São Paulo helped facilitate the construction of a network of suppliers in that specific region. The São Paulo region has also concentrated a large number of automotive supplying companies (Borges, 2011).

It is worth noting that since the late 1970s companies in the Brazilian automotive industry have undergone a process of vertical disintegration, which is associated with an increase of the demand for quality of products and services offered by supplying companies. Such disintegration process has increased the complexity of management of relationships with supplying companies (Vanalle; Salles, 2011).

In that context, since the late 1980s, not only companies located in the São Paulo region but most companies in the Brazilian automotive industry have been impacted by the emergence of new manufacturing paradigms such as the lean manufacturing model (Silva 2002; Silva 2010; Vanalle; Salles, 2011).

Other examples of new production paradigms are the modular consortium and industrial condominiums. The automotive production chains that operate following the lines of industrial condominiums are located in Betim, Minas Gerais, (anchored by Fiat), in São José dos Pinhais, Paraná (anchored by Audi), in Gravataí, Rio Grande do Sul (anchored by GM), and in Camaçari, Bahia (anchored by Ford) (Salerno, 2000; Sacomano Neto; Truzzi, 2009). Within an industrial condominium the suppliers directly participate in the production process, for the fact that they share the facilities with the automotive assembler as well as responsibilities when using the same assembly line (Najberg; Puga, 2012).

In Resende, Rio de Janeiro, the anchor company Volkswagen acts as modular consortium in which the entire assembly is made by suppliers (Salerno, 2000; Sacomano Neto; Truzzi, 2009).

In the 1990s, the Brazilian government established the "*Regime Automotivo Regional*" (Regional Automotive Regime), a set of rules willing to decentralize the automotive park and encourage the establishment of automotive assemblers in the North, Northeast and Midwest regions of Brazil by reducing taxes of imported parts and components.

One of the reasons for this decentralization is the fact that the automotive industry has the possibility of becoming a center for development in the regions where it operates, bearing in mind that such an industry usually presents indicators of a positive impact on the generation of employment and income (Araujo, 2014; Negri, 2015).

After the government intervention, with the creation of the *Regime Automotivo Regional* there was the possibility of other Brazilian states, especially those located in areas considered to be "least developed", to attract companies. In that context, the redesign and new location of the automotive industry supply chain was initiated, as well as a dispute between states and municipalities, popularly called the "fiscal war", where local governments offered incentives for companies to be established within new territories (Silva, 2010; Silva, 2002).

One of the Brazilian states that may be considered “victorious” in that war is the state of Goiás, for the fact that it managed to attract investments and the establishment of two automotive assemblers, Mitsubishi Motors Corporation, in the city of Catalão, and Hyundai Caea in the city of Anápolis (Araujo, 2014).

Garofoli (1992) has argued that the process of industrialization driven by migrating companies cannot immediately bring endogenous development, for the fact that the territorial space is only a receiver of the production process, often controlled from the outside. However, at a later time, the migrating company may establish links with the environment, through synergistic processes and local resources, involving the participation of local companies and new entrepreneurs.

This process of integration of the migrating company with local companies is slowly consolidated until they can be interconnected, establish productive relationships and create specific strategies to the new local territory.

In October, 2012, the Brazilian government approved by decree a new program, Inovar Auto, to encourage vehicle technology innovation. This new automotive regime, limited to vehicles manufactured between 2013 and 2017, was created to foster industry competitiveness by encouraging automakers to produce more efficient, safer, and technology-advanced vehicles while investing in the national automotive industry (Ministério do Desenvolvimento, Indústria e Comércio, 2015).

The Brazilian Inovar Auto program has as its main objectives incentivizing investments in vehicle efficiency, national production, R&D, and automotive technology (Ministério do Desenvolvimento, Indústria e Comércio, 2015).

## 2.2. MNEs and spillover effects

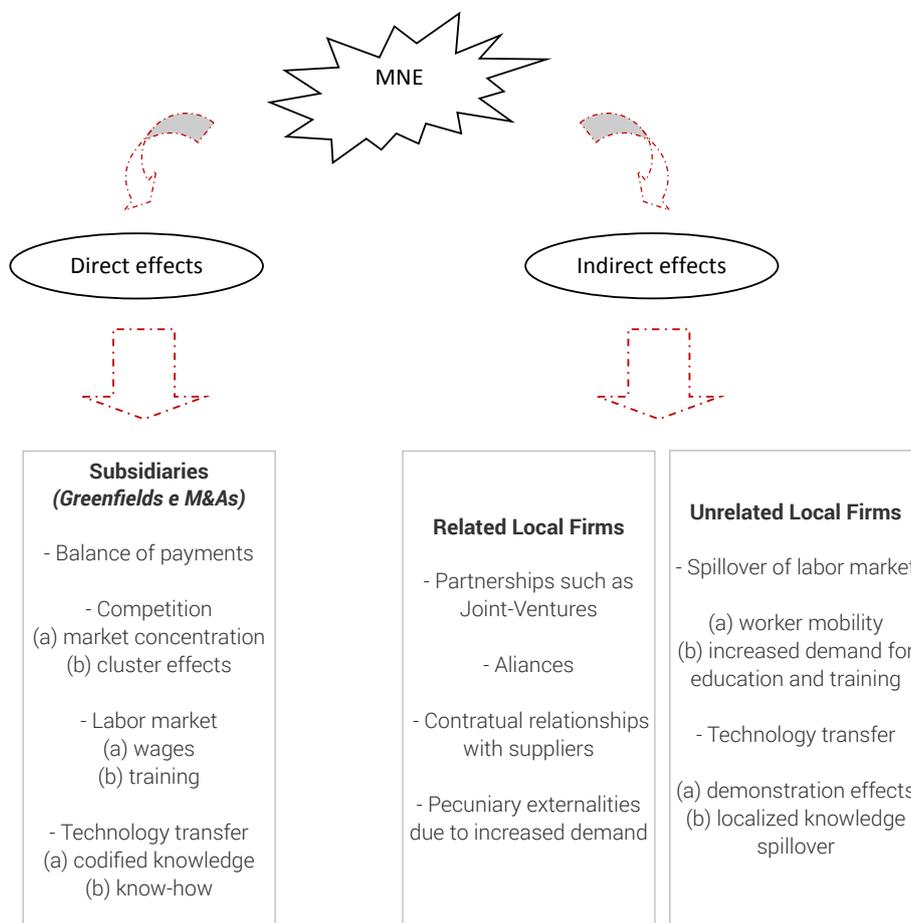
Literature on spillovers effects states that MNEs are distinguished by having particular advantages resulting from the possession of intangible assets, having also the ability to synthesize them into knowledge, product and process technologies, as well as organizational and marketing practices (Blomstrom and Kokko, 1998). In that way, when installing a subsidiary in a country, MNEs transfer new technologies that can overflow to local companies, providing higher levels of competitiveness and productivity gains for those local companies. In other words, the presence of MNE's can cause positive externalities which may contribute directly or indirectly to the performance of local companies (Blomstrom, and Kokko, 1998).

The debate about spillovers effects refers precisely to the externalities generated from the activities of MNEs and their subsidiaries in the host country. When MNEs establish subsidiaries in other countries, they differ from existing companies in the host market primarily for two reasons (Blomstrom, and Kokko, 1998). The first is that they carry with them certain technological properties which compose their specific advantages and allow them to compete with other MNEs and local companies, that usually have more knowledge of the local market and consumer preferences. The second reason is that the insertion of MNEs alters the equilibrium of the existing market, forcing local companies to become more efficient and protect their market shares. These changes tend to generate spillovers that may increase the levels of performance of domestic companies (Blomstrom, and Kokko, 1998).

Thus, firm-specific assets, such as marketing and management capabilities, technological know-how and reputation, that play an important role in the traditional Eclectic theory of FDI of Dunning (2000; 2008) is fundamental to the argument that ownership advantages of MNEs should lead to relatively higher performances than their counterparts. This notion of performance differentials is the basis for the general hypothesis that MNEs generate spillovers to local firms in the host economy (Buckley, Clegg & Wang, 2010, p. 217; Thang, 2011).

Dunning and Lundan (2008) identify the potential direct and indirect effects of MNEs strategies and actions as well as the responses of firms and countries most affected by its presence (Figure 1).

**Figure 1: Direct and indirect effects of MNE's operations in host economies**



Source: Adapted from Dunning and Lundan (2008).

The direct effects are those related to the effects of activities of MNE's subsidiaries, such as those on the balance of payments, trade patterns and market structure, that will depend on a number of characteristic of the host economy, and that are beyond the control of the EM. The effects on labor markets and technology transfer are precisely those controlled by MNEs.

The indirect effects involve both the "pecuniary" and "non-pecuniary" externalities. Dunning and Lundan (2008) define as pecuniary externalities those arising from vertical linkages formed by MNEs that occur when a MNE or its subsidiaries affects the amount and/or supply or demand conditions of related and no-related firms. Non-pecuniary externalities are our object of our study and are commonly known as "technological or innovation spillovers" and arise when spillover to the local economy occur through the mechanisms commonly cited in the literature (Dunning and Lundan, 2008).

Gorg and Greenaway (2004) have argued that the possible mechanisms for externalities from MNEs to occur are imitation, worker mobility, competition and exports. The first mechanism, imitation, assumes that the presence of MNEs can provide local firms with the opportunity to learn by observing MNEs' technologies and management practices and imitate them in their own operations, thus increasing their competitive performance (Blomström and Kokko 1998; Imbriani et al., 2014).

The second mechanism, worker mobility, provides increased productivity by means of tacit knowledge, since MNE workers are henceforth likely to acquire it through work experience, social interaction and training (Liu, Lu and Zhang, 2014). It improves productivity through two mechanisms: the direct externality generated by the complementarities of work, and knowledge transfer of employees from one firm to another (Gorg, and Greenaway, 2004).

According to Liu, Lu and Zhang (2014), the reasons why domestic firms can benefit from MNEs through recruiting workers from MNEs generally include: (1) MNEs have firm-specific assets, such as superior knowledge base regarding innovations, production process, exporting or marketing, and management techniques; and (2) MNEs devote a great deal of efforts to staff training in developing countries.

The competition mechanism considers that the ability to adopt new technologies reduces inefficiency. Unless an incoming firm is offered monopoly status, it will compete with other local companies. Even if local companies are unable to imitate the technology and production process from the EMNs, their entry will already force them to become more efficient, increasing their productivity gains (Gorg, and Greenaway, 2004). According to Duran and Ryan (2014), competition puts pressure on local firms to use their technologies in the most efficient way, to innovate products and processes, and to look at other markets to sell their products.

The fourth mechanism, exports, integrates productivity gains to economies of scale and it is believed that domestic companies can learn how to export with MNEs. The export activity usually involves fixed costs to form distribution networks, transportation infrastructure, learning about the preferences and habits of consumers, for example. MNEs usually already have this kind of information and use it to export from the host country. Thus, local firms can benefit from the information about foreign markets and infrastructure that MNEs already have or may help develop, like distribution networks, transportation, consumer preferences, and legal arrangements (Duran and Ryan, 2014).

Gorg and Greenaway (2004) emphasized the importance of taking into consideration the characteristics of the host country when assessing the generation of externalities from FDI. Once established the location, the fixed factors that influence the level of adherence of new technology and the effects of productivity gains should be considered (Gorg, and Greenaway, 2004).

Studies also points out absorption capacity as an important FDI spillovers determinant factor. For Cohen and Levinthal (1990), the absorption capacity is the ability to recognize the value of a new knowledge, the capacity to assimilate and apply it, based on business purposes. The absorptive capacity represents the link between the firms' capabilities to implement new products and the external stock of technological opportunities (Imbriani et

al., 2014). It is “based upon the idea that some technical knowledge is generally freely available to all firms, i.e., it can be exploited without paying any fee for its use” (Imbriani et al., 2014, p. 58).

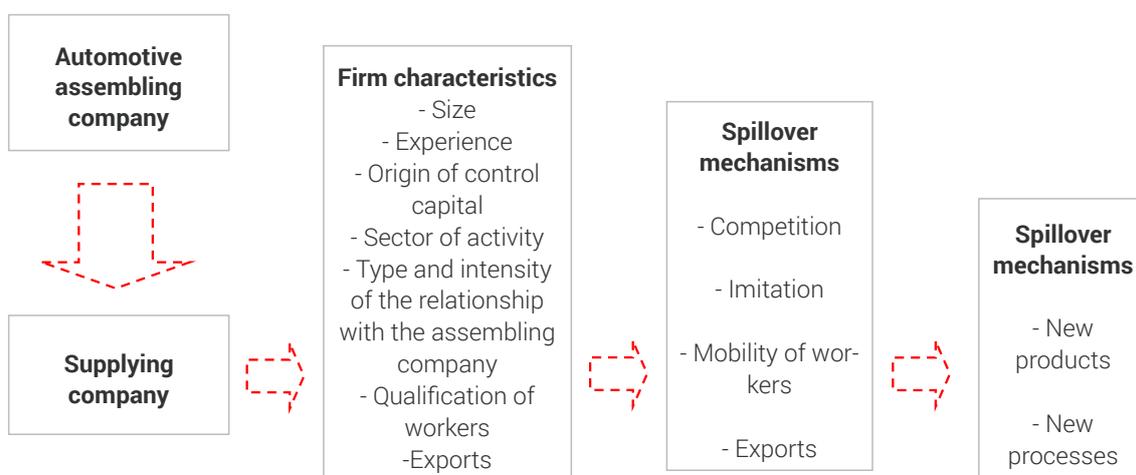
Narula (2002; 2014) notes that FDI and operations of MNEs do not generate positive externalities automatically. MNEs may disseminate a large number of externalities that can be easily assimilated or not, depending on local firm’s capacity. According to Narula (2014), even where the motivation of MNE activity creates opportunities for spillovers and linkages to the host economy, it is not always the case that the domestic economy has the capacity to absorb them. Thus, domestic firms need to have the necessary absorptive capability to benefit from MNEs.

### 3. Research methods

Literature discusses the mechanisms through which MNEs can generate positive externalities and contribute to the development of micro and small enterprises (MSEs). For this to happen, local companies must possess new technology learning capabilities, capacity for imitating and establishing inter-organizational relationships. Moreover, local characteristics which surround organizations and the sector of activity to which they belong are also important for the occurrence of spillovers.

Having this context in mind, in order to identify possible channels through which externalities occur and check the effect upon innovation capabilities of local supplying companies, this study followed the model described in Figure 2. The mechanisms’ classification follows the proposal of Gorg and Greenaway (2004). The existence of possible negative externalities associated with the activities of the assembling company is not part of our object of study.

**Figure 2: Analytical model of analysis of spillover effects in the Brazilian automotive industry**



Source: The authors (2015).

Considering its objective, this study can be characterized as qualitative. The research method chosen was the multiple case study. It was not the intention of our research to look at companies that were representative of the supplying companies in the region of Goiás. That is also the reason why we have chosen to work with the case study design. According to Yin (2009), case studies are generalizable to theoretical propositions and not to populations or universes. In this sense, the case study, does not represent a 'sample', and in doing a case study, the goal would be to expand and generalize theories (analytic generalization) and not to enumerate frequencies (statistical generalization). Our goal was to shed light in the connection between certain kinds of relationship established between supplying companies and the assembling company in Goiás, the new region for the automotive industry in Brazil, and through the analysis of those relationships, identify spillover effects.

The choice of the location of Mitsubishi Motors in Brazil and six of its supplying companies in the region of Catalão, Goiás, is justified for the fact that it is located in a non-metropolitan municipality and outside the South-Southeast axis and also for the fact that this MNE was the first to get established in the Brazilian Midwest, a region that became target to investors in the automotive industry in the late 1990s due to its attractive elements that allowed a spatial displacement of the automotive industry to that region.

This study's first stage consisted of an exploratory research using non-structured interviews with the purchasing manager of the automotive assembling company. This first stage was undertaken to obtain information on the leading local supplying companies located in the municipality of Catalão, in the state of Goiás, Brazil, as well as information on specific features of the automotive supplying companies. This phase of the research aimed at identifying the agents involved in the assembling company's supply chain as well as the relationships between the supplying companies and the assembling company.

We have identified at this stage of the research the agents that were related to Mitsubishi Motors' supply chain in different segments. The relationships between the local supplying companies and the assembling company in this study involved both industrial suppliers and local service providers from upstream supply chain, and suppliers involved in production processes (assembling company's line), represented by first-line suppliers that were attracted by Mitsubishi Motors to settle in Catalão in order to supply complete systems parts. The other agents and segments (non-local service suppliers, financial and credit institutions and outsourcing companies) were not included in this research.

Initially, we had access to a list of 118 suppliers of various sectors of economic activity located in various parts of Goiás state. In this stage we could also access and understand the nature of activities involved in the relationships established between supplying companies and the assembling company.

The list of local supplying companies received from the assembling company reported 85 suppliers from Catalão, 29 suppliers from Goiania, 2 suppliers from Aparecida de Goiania, 1 supplier from Anapolis, and 1 supplier from Três Ranchos. From the total of the suppliers identified, six companies were chosen.

The supplying companies chosen to be part of this study followed the typology of buyer-supplier relationships proposed by Tangpong et al. (2008).

Tangpong et al. (2008), developed a buyer-supplier relationship typology which translates itself into a useful analytical tool for understanding exchange relationships involving assembling and supplying companies for the fact that it takes into consideration two main dimensions: power-dependence and relational contents.

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Thus, based on this typology, we have selected two supplying companies to represent [market buyer-supplier relationships](#): M and I companies. These selected firms represent a kind of relationship in which the assembling company and suppliers are not committed to one another and their relationships could thus end as the spot market presents more attractive opportunities with other exchange partners.

Firms M and I represent relationships which can be characterized by low 'relationalism' and low supplier-dependence in which the assembling firm and suppliers lack cooperative efforts, joint activities, and collaborative work environment. The relationship between suppliers and the assembling company is short-term oriented and they do not combine complementary resources to reap the benefits of resource synergy. The detailed profiles of M and I suppliers are presented in the next section.

We have also selected two supplying companies to represent [power buyer-supplier relationships](#): F and FL companies. These two firms were selected to represent power buyer-supplier relationships for the fact that they can be characterized by low relationalism and high supplier-dependence. Their relationships are exchange relationships in which the assembling company dictates exchange terms to their advantage at suppliers' expense. With low relationalism relationships, the assembling company tends to act opportunistically over their dependent suppliers in obtaining better terms of exchange or switching to new suppliers who better cope with their demands, and, as a result, the relationships tend to be short-term oriented. The detailed profiles of F and FL suppliers are presented in the next section.

We have selected one supplying company to represent [autonomous-link buyer-supplier relationship](#): the SN supplying company. This company represents a kind of relationship characterized by high relationalism and low supplier-dependence. The chosen supplier represents a kind of buyer-supplier relationship in which cooperative efforts, joint problem solving, and information exchange are critical to cooperative strategies and promoting learning, knowledge-sharing and, thus, tend to be long-term oriented. In addition, SN supplying firm has low degree of dependence on the assembling company and is in a good position to learn, innovate, and provide improved qualifying services from which the assembling company can benefit in the long run. The assembling firm works cooperatively with its independent supplier, who in fact has a managerial choice whether or not to nurture the cooperative relationships and has voluntarily chosen to do so. Detailed information about SN supplier is presented in the next section.

Finally, we have selected MP supplying company to represent the [constrained-link buyer-supplier relationship](#), in which the assembling company works cooperatively with suppliers who dedicate a significant portion of their operations to and significantly depend on the assembling company. This supplier represents a kind of relationship that is characterized by high relationalism and high supplier-dependence, in which the assembling company and their suppliers take a long-term approach in fostering mutually beneficial cooperative buyer-supplier relationship. MP is systemist supplier that is located inside the assembling company's plant and represents suppliers who dedicate a significant portion of their businesses to the assembling company. Thus, our constrained-link relationship supplier is MP supplying firm, and its detailed profile is presented in the next section.

Selection of the companies that are part of this study were also based upon the following criteria:

- 1) Among the surveyed local suppliers, there are (a) first-line supplier; (b) supplier that has been attracted by Mitsubishi Motors to settle in Catalão; (c) comercial company; and (d) local service suppliers, including vocational education services.
- 2) Among the researched companies, half were micro enterprises, while the other half were medium and large companies.

3) Among the companies that are suppliers of the multinational automotive assembling company, (i) one third of the companies has from 1 to 20% of sales directly linked to the demand of multinational companies; (ii) one third of the companies has from 21 to 40% of sales directly linked to the demand of multinational companies; and (iii) one third of the companies has more than 41% of sales directly linked to the demand of multinational companies.

4) Companies selected have between 10 and 30 years of experience in the market.

The next step was an exploratory study using in-depth interviews with managers from the six chosen local supplying companies. This phase of the research aimed at investigating: 1) the different forms of spillovers that might be in the form of product or process innovation for each of the four mechanisms of spillovers; and 2) the main factors that contribute to the occurrence of spillovers in the form of product or process innovation.

Interviews were conducted in June 2013, having as the data collection instrument a semi-structured questionnaire containing: (i) an initial part with a brief description of the research objectives; (ii) the profile of the respondent; (iii) the profile of the local supplying company researched; (iv) the degree of involvement with the assembling company; (v) product innovation; (vi) process innovation; (vii) qualification and mobility of workers; (viii) competition and imitation; and (ix) exports.

Each category of analysis contained open and closed questions. Interviews were recorded and transcribed with the consent of the respondents. Collected data from the interviews were analyzed and interpreted based upon the content analysis technique. The content analysis methods are usually suitable for the analysis and interpretation of data in qualitative research presenting extremely diverse discourses (Bardin, 1977, 2006).

The treatment of the collected data was guided by 7 blocks of analysis: 1) the profile of the local supplying company researched; 2) the degree of involvement of the local supplying company with the assembling company; 3) product innovation; 4) process innovation; 5) competition and imitation; 6) qualification and mobility of workers; and 7) exports. These blocks of analysis allowed the identification of different mechanisms of the occurrence of spillover that were classified as: competition, imitation, mobility of workers and exports.

To maintain the confidentiality of information provided by the 6 respondents, fictitious names to refer to their companies were created as follows: F Company, I Company, M Company, MP Company, SN Company, and FL Company.

## 4. Results and discussion

The results section presents first of all the profile of the local supplying companies researched as well as the characteristics of the automotive assembling company. Secondly, the relationship between supplying companies and the assembling company was presented.

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#### 4.1. Local supplying companies' profile

This section exposes the characteristics of local supplying companies approached by this study accessed through the in-depth interviews that were carried out.

F Company is a local supplier, from a family business which manufactures fused iron and steel pieces. The company supplies the local market in Catalão and has relationships with from 4 to 10 multinational enterprises. F Company is 30 years old and has 10 employees.

I Company is a family company operating in the commercial and service delivery sector. Its story began 11 years ago operating in the reseller, retailer business in the region of Goiás, transporting diesel and kerosene oil. Currently, the company delivers fuel to final consumers, farms and companies. Its employees are properly trained to perform operations handling hazardous products, in companies duly accredited by law. It is an independent company that has 9 employees and relationships with from 4 to 10 multinational enterprises.

M Company is a local supplier from a family independent commercial business which works with paints and accessories (automotive and industrial). The company has relationships with from 4 to 10 multinational enterprises. It has 7 employees and it has been in Catalão for 24 years. The controlling shareholders are 100% national.

MP Company is an industrial segment supplier attracted to Catalão by the assembling company. It is an unit belonging to a multinational company which began its operations in 1989. The company used to operate only with the transformation of engineering plastics for the automotive industry, but with the growth of business in 2001, it opened a unit in Catalão, designed to specially supply the automotive assembling company established in that city. Currently the company has four units in Brazil. In 2003 the company started also to work in the construction industry by developing a new construction system. In 2008, there was the scission between the automotive and the construction segments, which provided a comprehensive performance of the company in different markets, allowing that company to become one of the most important within plastic engineering industry. Its unit in Catalão has 110 employees. The controlling shareholders of the company are both domestic and foreign.

SN Company is a vocational education service supplier and a regional unit of a large company in education for the industrial sector. The unit in Catalão is therefore part of a larger complex of technical education in Latin America which qualifies more than 2.3 million Brazilian workers per year and supports companies in 28 industrial areas, through the training of human resources and the provision of technical and technological services, such as consulting and assistance to the productive, laboratorial, applied research and technological information sectors. SN supports the local market in the region of Catalão and its revenues are close to 2 million *reais*, only from its unit in Catalão. The unit in Catalão has relationships with from 4 to 10 multinational companies. In Catalão it is 25 years old and has 62 employees. The controlling shareholders of the company are 100% national.

F Company is a local supplier from an industrial family company producing steel and hard ware in general. It supports the market from the region of Catalão offering mainly steel structures. It has relationships with from 4 to 10 multinational enterprises. It is 18 years old in Catalão and has 40 employees. The controlling shareholders of the company are 100% national.

Results regarding the companies chosen to be part of this study indicated that they are from 11 to 30 years old and, on average, they have 20 years of experience in the market of Catalão. Among the companies researched: (i) two companies belong to the industrial sector of plastics manufacturing and engineering for the automotive and steel industries; (ii) two companies are in the trading business of hardware and paints; (iii) one company provides transport, reseller, retailer services; and (iv) one company provides education and training services.

The six companies studied have an average of 39 employees, including both micro and small enterprises and also large companies. In other words, the smallest company has 7 employees while the largest has 110 employees.

Four of the six companies researched are family businesses and two are owned by large corporate groups. Among the family companies three are microenterprises (with revenues of less than 360.000 *reais*). These family companies have no more than ten employees and only firm can be characterized as medium-sized firm (with revenues of more than three million and six hundred thousand *reais*) and 40 employees.

Among the companies owned by large corporate groups, one has national and foreign controlling shareholders, 110 employees and annual net sales of 45 million *reais*, while the other has 100% national controlling shareholders, 62 employees and annual net sales of 2 million *reais*.

The present study revealed that: (i) 2 of the companies have from 1 to 20% of their sales directly linked to the demand of multinational companies; (ii) 2 of the companies have from 21 to 40% of their sales directly linked to the demand of multinational companies; (iii) 1 company has from 41 to 60% of its sales directly linked to the demand of multinational companies; and (iv) 1 company has more than 80% of its sales directly linked to the demand of multinational companies.

In terms of production being directly linked to the demand of automotive assembling company, this study indicates that: (i) 2 of the companies researched have from 1 to 20% of their production directly linked to the demand of the assembling company; (ii) one company has from 21 to 40% of its production directly linked to the demand of the assembling company; (iii) 2 companies have from 41 to 60% of their production directly linked to the demand of the assembling company; and (iv) 1 company has over 80% of its production directly linked to the demand of the assembling company.

These results indicate that the six companies chosen to be part of this study present elements that are representative of the population of interest.

#### 4.2. Characteristics of the automotive assembling company

The automotive assembling company approached by this study, the Mitsubishi Motors in Brazil, is affiliated to a huge Japanese conglomerate which is present in many parts of the world in various segments, such as the real estate market, hotels, construction, transportation, mining, insurance, machinery and automotive engines.

The assembling company history in Brazil has started in 1990, with the license for importing vehicles from that assembling company. In 1991, the assembling company opened its first point of sales in the city of São Paulo. In 1998 the local industrial unit of Catalão started to operate, with an area of 14.000

m<sup>2</sup> and fully national control. In 2005, the company had 110 sale spots; 4000 workers in over 90 cities in Brazil; 1.800 direct employees and 5000 indirect employees in the factory in Catalão, 80% of whom are from that region. In 2007, new investments in expansions were made by the assembling company, reaching 95.000m<sup>2</sup> of constructed area four years later. Currently, the factory in Catalão produces more than 300 vehicles per day. In 2013, the company produced 350,000 vehicles manufactured at the company in Catalão and sold 500.000 vehicles in its 182 dealers throughout Brazil.

### 4.3. Intensity and importance of the assembler-suppliers relationship

The type and intensity of the relationship between the assembling company and local supplying companies identified in this study can be understood from the analysis of two main elements of analysis: information flow and commitment (Helper, 1991). The results allowed to identify different levels of relationships between the assembling company and local supplying companies ranging from simple relationships covering only commercial aspects; relationships at an intermediate level, encompassing information exchange on plant and equipment; and, at a more advanced level, those relationships involving mutual aid in the solution of operational and technical problems with certainty on the commitment that the supplier has the continuity of supplying partnership (Helper, 1991). MP Company is a case of assembler-supplier relationship in an advanced level, as illustrated by one of the interviewee.

"In this case here, we are inside the Mitsubishi Motors' plant because we are direct and first-line suppliers. Today, 100% of our portfolio is directed towards meeting the Mitsubishi Motors' demand. The company is located in other states and the headquarters is in São José dos Pinhães, [...] but, basically, this unit was created to directly meet the assembling company line demand." (MP company's manager).

MP Company is the only company among the surveyed local supplying companies which can be understood from a scope of analysis involving commitment and a more advanced cooperation stage. The above speech provides evidence that the location of suppliers near the assembling company is an important aspect that contributes to the assembler-suppliers relationship and promotes spillovers. This evidence is consistent with the spillover theory and reinforces the argument of Karkalakos and Deltas (2013) that physical proximity in the assembler-supplier relationships contributes to the occurrence of spillover.

In addition, MP Company represents a new format of relationship between the assembling company and its suppliers that generated a hierarchy structure in the automotive supply chain.

"In reality, we are established in Mitsubishi Motors' productive plan, in an area that has been provided to us by Mitsubishi, in which every piece of machinery and infrastructure is our responsibility. Then, we have machinery in which our pieces are produced, finished and are handed directly to Mitsubishi's line. It is basically that!" (MP company's manager).

"We produce panels for vehicles. We're talking about an average of 3500 panels per month. We expect to produce over 4500 panels this year." (MP company's manager).

The manager speech allows us to identify that the assembling company strategies imply delegation of responsibilities to suppliers that now assume design and manufacturing functions, which in turn increases their power within the supply chain and, consequently, contribute to the occurrence of spillovers.

"[...] the assembling company was founded 14 years ago and this partnership has been set to shortly thereafter, within three years. We have started with an area of almost 500 square meters and now we have an area of 3600 square meters." (MP company's manager).

Spillovers arising from the relationship with Mitsubishi become particularly evident when the manager highlights the considerable growth of the MP Company since it has become an assembling company's partner. Also regarding the type of relationship with the assembling company, Manager of F Company stated that:

"Usually when I am not manufacturing the product for the assembling company, I am selling the components for the assembling company to manufacture the product itself. The assembling company has the technical part, it has its factory which manufactures the same product as I do. The frequency of this relationship is continuous." (F company's manager).

In this case, the relationship suggests a weak interdependence between assembler-supplier, in which the assembling company has a bargaining power over the supplier, thus hindering the identification of spillovers.

For I Company, the relationship with the automotive assembling company is different. The relationship is discontinuous and there is no mutual dependency. The frequency varies depending on the product offering from a larger supplier, in this case, Petrobrás.

"We do not even get to sell 5%, I think. They buy everything from Petrobrás, for the fact that Petrobrás sells the more accessible goods if compared to mine. We supply the assembling company in emergency situations. If a generator gets burned, if they are short in a certain raw material, we help. But these big companies do not buy from us." (I company's manager).

Again, weak ties in the assembler-supplier relationship limit the identification of spillovers for I Company, as illustrated by the speech above. However, for SN Company we have identified an intermediate level of interdependence relationship encompassing information exchange for the development of programs specifically geared to Mitsubishi Motors, identified in following the passage.

"The assembling company is totally involved, showing us how to do things, indicating sources of information and experiences of the assembling company [...] and it allows us to develop training courses to specifically meet the assembling company's demands." (SN company's manager).

This speech of SN company's manager highlights the importance of the assembling company in generating spillover effects for the supplier company, since it has become able to develop new services and to acquire new equipment and software as a result of the interactions with the assembling company. These results are consistent with the spillover theory, since they force local companies to introduce new products/services and to intensify their productive activities, understood as spillovers effects.

#### 4.4. Product and process innovation arising from assembler-supplier relationship

In this topic, attention will be focused on spillovers effects arising in the form of product and process innovation. In terms of product innovation for the period that goes from 2010 to 2012, we have found the following for companies F and SN:

"[...] Totally innovated the aspects of production, purchasing merchandise, machinery. We had to innovate everything. From about 100 to 200 items." (F company's manager).

"[...] Here on SN we have developed professional qualification programs and have also purchased equipment and software that are specifically targeted to meet the Mitsubishi's demand." (SN company's manager).

The results indicate that assembler-supplier relationships involving higher levels of commitment, cooperation and information exchange contribute to the occurrence of spillovers in the form of innovative products and services, observed only in first-line suppliers and intermediaries. For MP company, the aspect of product innovation was proved quite present, so that the company sought to invest intensively in actions to improve its products.

"We have developed a front cover finish, a new raw material [...] it is a sugar-cane fiber-based polypropylene [...] it is a composite material. We have also developed a new line of material for headlining the ceiling of cars, where we have a better performance considering weight, quite interesting acoustic factor, and much better cost for the assembling company." (MP company's manager).

The above passage allows us to identify the spillover occurrence in the form of product innovation that has been clearly identified, possibly for the fact that it is the kind of relationship involving first-line supplier, which comprises systems or modules, instead of individual components. In terms of the assembling company's contribution for product innovation, we found that, again, only SN Company and F Company identified the automotive assembling company as fundamental to the development of innovation.

"[...] The assembling company has even spurred technical team selection to include the candidate's adherence to the job vacancy stage [...] Mitsubishi Motors has even helped us showing how to do [...] And our selection processes now have steps with professional profile [...] and it has also been important in structuring high performance teams for the assembling company." (SN company' manager).

"The assembling company has contributed greatly to our company. For instance, the product that we manufacture ourselves for the assembling company cannot be found in the market. If I do not follow the assembling company's innovative ability I will stay behind." (F company's manager).

We could identify within this case, a reactive and adaptive behavior of the company facing competition. However, for company MP, the innovative feature is not due to the assembling company's demand, but it is a response to the very proactive and creative attitude of the supplying company:

"Actually, our company has this characteristic. Our logo says 'The solution in plastic', which is a determination of the group to really be searching for new solutions, new ideas. We really understand that it is important, fundamental, to chase new solutions. So it is a characteristic of our company." (MP company's manager).

It is possible that in this case, the sector in which company MP operates might have played a fundamental role on the proactive behavior of the company. That's because more technology-intensive sectors such as the automotive industry product engineering, require a more proactive attitude from companies, so they can meet the demands and complexities of their market. The other surveyed companies did not mention any product innovation that has been originated in the company, but the products generated by the market, which until that moment, had not been available by another company in the local market.

Spillovers in the form of process innovation were identified in all the surveyed companies, especially those in which cooperation and interdependence relationships were more present. We could see that for companies F, I, and M there was some difficulty in identifying how process innovation might occur. We

could observe that process innovation was limited to the context of computerization and qualification of employees. The size and maturity of the company, as well as the complexity of MP's operations contributed to that company's main processes alteration and consequent gains in terms of results.

"Yes, we had about four new innovative processes internally; [...] new processes and new raw materials. Regarding process [...] we are also initiating a new process internally, a process of water jet cutting, which also provides a very important special finish quality answering to the levels of quality required today, and also quite important productivity factor. We can increase our productivity from 60 to 70%." (MP Company's manager).

These results are consistent with the spillover theory and confirm they depend on the absorptive capacity of local companies, which in turn depends on the local companies' ability to recognize the value of new knowledge, the ability to assimilate and apply it to generate organizational knowledge (Cohen and Levinthal, 1990). Thus, techniques and organizational procedures that are able to be more easily deployed with low costs were observed among all surveyed suppliers. In contrast, very specific technologies that require high levels of investments, efforts and organizational skills could only be observed in larger companies. That is to say that the first-line and intermediate relationship companies in which the interdependence between assembler-supplier was greater.

#### 4.5. Spillover mechanisms arising from the assembler-suppliers relationship

Regarding the competition mechanism, the research identified that it was present in all the surveyed companies. MP's manager pointed the strength that the automotive assembling company's brand has had in the market and how it can be related to having positive effects for the supplying company.

"I hope so. The name of the assembling company is very strong in the market, not only nationally speaking. Being a supplier, [...] which is our case [...], I think it strengthens the image of our company [...]. And having a greater assurance regarding the liability of other customers, then [...] I think it's rather positive profit." (MP Company's manager).

The speech of MP's manager reinforces the fact that being an assembling company's supplier and having the company's name tied to the assembling company's brand allows the company to become more competitive in the market and characterizes competition spillover effects.

The researched companies have identified that being part of the assembling company's supply chain allowed those companies to conquer new market shares. Since MP is an exclusive supplier, it was not possible to identify this change. Companies M and I did not identify such a relationship while for company F this was a fundamental change.

"Through the assembling company we could enter the market of other companies that also worked with the assembling company. Sometimes the assembling company hires a product from a certain company and that company hires me to produce the product for them!" (F company's manager).

The above speech allows identifying an indirect competition effect. Since it is a small supplier and the interdependence relationship occurs at a lower intensity level, we could observe an indirect spillover effect, not due to the assembling company itself, but due to other suppliers that, somehow, end up

contributing to the researched local supplying companies that become more competitive and reach new markets. The present research has identified that there is a situation in which the first-line supplier also assumes the responsibility of managing other suppliers at different levels of the supply chain.

"[...] there is the situation in which we have been importing items from Japan, Thailand, bringing these items to Brazil and making their manufacturing [...]" (MP company's manager).

"[...] due to the difficulty on finding local suppliers to some components [...] in fact, our intention is to nationalize these imported items [...] we are even bringing those processes into the firm and, consequently, increasing our margin, our commercialization and, strategically, we see it as an opportunity for growth and to establish other new business." (MP company's manager).

Spillover effects become quite evident with the chaining effect that occurs with actors in different levels of the supply chain, enabling the local supplying company to develop strategies in order to reach new market shares for the fact that it has developed new products or processes. The passage highlights the supplier adapting behavior due to the identification of the assembling company's need for products that are not yet available in the local market. The spillovers effects occur just when local businesses use specific knowledge and information that has been achieved from the relationship with MNEs, thus, developing new products/services or processes in order to become more competitive.

The imitation mechanism has become evident with the identification of practices that occur when companies tend to adopt structural models and processes in a typical mimetic behavior, such as the adoption of certification. The study has identified that, in terms of certification or qualification requirements by the assembling company that contributes to the local supplying companies' competitiveness, only MP claimed to have the ISO9000 certification as a step achieved by that company to meet the assembling company's requirements. ISOTS1664 certification remains a challenge that MP seeks to achieve in the coming years. However, for the managers of companies F, I and M, the requirements are concentrated in the pursuit of product and service development with quality, without any understanding that the search for any kind of certification is necessary at the moment.

"[...] products must have good quality. To be able to provide the service to the assembling company, one has to have all sorts of safety, training, technical skills. And this is a distinguished characteristic that we have regarding our competitors. We do not think about any certification at this moment." (F company's manager).

"To supply the assembling company, I have to train all of my staff. Things changed a lot. Companies that moved here, large companies, obligate us to show our chemical reports. But the certifications [...] not yet [...] we are preparing ourselves to a future moment." (I company's manager).

"[...] yes, being a supplier in the automotive sector, we have a concern with national and international certification. [...] The structuring of high performance teams [...]" (SN Company's manager).

Company SN claims to have the future commitment of seeking certification to meet the automotive industry as a whole, also demonstrating an imitation spillover effect that occurs when companies imitate processes and structural models in a mimetic behavior.

Regarding the worker mobility mechanism, we have identified that the policy of hiring employees with experience in other MNEs appeared to be a practice limited to hiring employees with previous

experience in Mitsubishi Motors itself, as in the case of companies SN and F. SN has several employees hired employees with previous experience at Mitsubishi Motors while F has several employees with experience participating in training courses promoted by Mitsubishi Motors.

"[...] training is within the 'Mitsubishi Motors'. We are all required to do a safety training 2 times a year within the assembling company. Even I have to do it!" (F company's manager).

There seems to be a concern of the first line supplier only to promote and develop local skilled workforce. The development of products and processes are constructed based on internal processes of learning or even on national geographical boundaries, due to the small competitive pressures the company faces.

"[...] no, none of our hired employees had prior experience in other multinationals. Practically, our employees were built. They are local employees who have been trained and qualified here. Even because our process is quite limited to Brazil, then, we do not face an intensive level of competition in our sector." (MP company's manager).

"[...] it is not our concern to know specifically about Mitsubishi Motors units in other countries, but to seek new experiences. When I say 'seek new experiences', I mean experiences that are geared to our process, the new solutions and that means to give opportunity to really get our employees getting involved and achieving our goals." (MP company's manager).

Thus, there seems to be a concern of the first-line supplier about promoting and developing local workforce, which hinders the identification of occurrence of spillovers regarding the worker mobility mechanism. There is evidence that the development of products and processes are constructed based on internal learning processes or even on the scope of national geographical boundaries, especially due to the small competitive pressures this supplier faces.

The exports mechanism could not be identified in this study, since no analyzed company was oriented to carry out export activities. We could not identify any companies' actions seeking to encourage future export activities. This result can be justified depending on the size of the companies, since they are all small and, in a way, with little experience even in regional markets. International insertion seems to be still a distant reality for the six companies approached by this study. The only larger and more mature company that could act more strongly in international market has an exclusive contract and therefore its nature differs from the others and does not fit the export mechanism.

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## 5. Final considerations

Results suggest new forms of relationship regarding the assembling company and their local supplying companies characterized by a hierarchical structure in the supply chain ranging from (i) the simplest relationships covering only commercial aspects; (ii) relationships at an intermediate level, encompassing information exchange about the plant and equipment; and (iii) an advanced level of relationship involving mutual aid in the solution of operational and technical problems with certainty about the commitment of the continuity of the supply contract.

Commitment and cooperation were stronger when involving autonomous-link buyer-supplier relationships (that between the assembling company and the systemic supplier) and constrained-link buyer-supplier relationship (that between the assembling company and the professional qualification service supplier). In those cases it was possible to observe a greater interdependence in the assembler-supplier relationship, involving not only increased levels of information exchange, but also higher levels of commitment in contractual relationships involving a smaller number of local supplying companies. In this context it is also a more favorable environment to the occurrence of innovation spillovers.

Result also suggests that, although the cooperative model may have great prominence in the discussion about the automotive sector management improvements, there is still evidence that, in practice, long-term commitment and cooperative relationships may exist with few preferred suppliers, such as those in autonomous-link and constrained-link buyer-supplier relationships. With the other suppliers - such as those representing market and power buyer-supplier relationships - relations are non-cooperative.

Thus, the results indicate that relationships involving higher levels of commitment, cooperation and information exchange between local supplying companies and the assembling company contributes to the spillover occurrence in the form of product and process innovation, observed mainly for autonomous-link and constrained-link buyer-supplier relationships, and less intensively in market and power buyer-supplier relationships. Nevertheless, spillovers in the form of process innovation were identified for all surveyed companies, especially those in which cooperation and interdependence were more present.

Results related to the mechanisms of spillovers are organized in Table 1. In terms of the imitation mechanism, this study found a reactive and adaptive behavior of small local supplying companies facing competition. Spillovers occur when companies imitate processes and structural models in a mimetic behavior, such as occurs for some local supplying companies when seeking to develop organizational practices to achieve certification.

**Table 1: Synthesis of results for spillovers mechanisms analysis occurring in Brazilian automotive industry**

Mechanism	What does the theory states?	What the results suggest?
Imitation	Occurs with the adoption of new production methods and new management practices. Products and simpler processes are also easier to be imitated. The same applies to innovation in organizational practices.	Spillovers occur when firms imitate processes and structural models in a mimetic behavior, such as when adopting practices to achieve certifications.
Competition	Occurs due to reductions in productive inefficiency levels and faster adoption of new technologies among local firms. Even if local firms are unable to imitate the technology and production processes of MNEs, they will exert pressure on local firms, forcing them to use existing technology more efficiently, generating productivity gains.	Being part of the automotive assembling company supply chain allowed them to acquire new management skills, enabling the conquest of new market shares. An indirect competition effect was also identified in the assembler-suppliers relationships that involved lower levels of interdependence.
Worker mobility	Occurs with the adoption of new technology and increased productivity resulting from human capital. The mobility of workers and managers who were trained by multinationals to local firms can generate innovation and productivity improvements.	The policy of hiring employees with experience in other MNEs appeared to be a present management practice for first-line and intermediate level suppliers, but limited to hiring employees with experience in Mitsubishi Motors itself. There is a concern among suppliers about promoting local workforce.
Exports	Occurs because local firms learn to export with MNEs due to economies of scale and exposure to the technology frontier. Through collaboration and / or imitation, local businesses can learn how to enter international markets.	This mechanism could not be identified, since we could not identify any companies' actions seeking to encourage future export activities. International insertion seems to be still a distant reality for the six analyzed firms. The only larger and more mature company that could act more strongly in the international market is committed to supplying exclusively for Mitsubishi Motors.

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In terms of the competition mechanism, we have observed that having the assembling company's brand linked to local supplying companies allows them to become more competitive in the market. An indirect competition effect was also identified in relationships involving lower levels of interdependence.

Regarding the labor mobility mechanism, results indicated that the policy of hiring employees with experience from other MNEs appeared to be a management practice for the first-line and intermediate level suppliers, but limited to hiring employees with experience in the assembling company itself.

Our findings contribute to the literature on spillovers from MNEs and have valuable implications for both research and practice. We attribute it mainly to the in-depth nature of analyzes and the methodology employed, which gave us the detail and richness that are presumably associated with the complexity of the phenomena. For academics, this research provides a theoretical framework that has not been previously applied to the Brazilian automotive industry context. Our results do not intend to exhaust studies on spillover effects, but to add some new contribution to our incomplete knowledge on the subject and, therefore, call for additional insights.

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