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Reverse knowledge transfer from European and American multinationals: An investigation of subsidiary competitive differentiation

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REVERSE KNOWLEDGE TRANSFER FROM EUROPEAN AND AMERICAN MULTINATIONALS: AN INVESTIGATION OF SUBSIDIARY COMPETITIVE DIFFERENTIATION

Abstract

This study investigates the impact of subsidiary autonomy to create and to transfer technical knowledge on its competitive differentiation. Rather than looking at an isolate internal transfer network, we analyse both external and internal networks in the formation of such knowledge. We have designed a survey with 108 American and European subsidiaries in the Brazilian automotive market. We have applied a partial least square structural equation model (PLS-SEM) to test our four hypotheses, two of them investigating the influence of autonomy on the process of reverse knowledge transfer (RKT) and two investigating the impact on subsidiary competitive advantage. The findings suggest that autonomy leads to reverse knowledge transfer, which leads to increases in subsidiary differentiation and that American subsidiaries engage in more external partnerships to create and transfer knowledge than European subsidiaries do.

Keywords: multinational enterprise (MNE), reverse knowledge transfer, subsidiary autonomy, subsidiary competitive differentiation.

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1. Introduction

A multinational enterprise (MNE) consists of parent firm and subsidiaries geographically dispersed around the world with different goals. Such subsidiaries are embedded in internal networks with their parent firms and other subsidiaries (Ghoshal & Bartlett, 1990). They are also embedded in external networks consisting of customers, suppliers and regulators (Andersson et al., 2002; Andersson et al., 2001). In this context, one important theoretical strand regards the creation of knowledge by subsidiaries and the transfer of such knowledge to their parent firms through external or internal networks, which is known as reverse knowledge transfer (RKT) (Ambos et al., 2006). The main idea is that, in a global market competition, MNEs capabilities and competencies can no longer be fully controlled by hierarchical decisions taken solely by the parent firms (Rugman & Verbeke, 2001), so there is a need to decentralize strategic decision-making to subsidiaries (Gassmann & Zedtwitz, 1999). In short, RKT differs from the traditional transfer model not only because of the hierarchical parent firm-subsidiary relationship, but also in terms of subsidiary performance. Moreover, scholars have found that RKT process can benefit the innovative performance within MNEs (Subramaniam & Venkatraman, 2001; Yamin & Otto, 2004); and it has enhanced the competitive advantage of parent firm (Ambos et al., 2006; Gammelgaard et al., 2012; Gupta & Govindarajan, 2000; Schulz, 2001).

In this context, characteristics of actors involved (i.e. parent firm and subsidiaries) in knowledge transfer have been investigated, in particular, the autonomy level (Foss & Pedersen, 2002; Ghoshal et al., 1994; Noorderhaven & Harzing, 2009; Schulz, 2001; Tsai, 2001). This characteristic refers to decision-making limits that are allowed to subsidiaries by its parent firms to improve efficiency and flexibility of their operations in the host country (Gates & Egelhoff, 1986; Taggart, 1997). Hence, autonomy granted by parent firm to subsidiary should be seen as a critical antecedent to knowledge flow (Gupta & Govindarajan, 1991). It is believed that a greater level of autonomy is associated with knowledge creation and development (Gupta & Govindarajan, 1991; Venaik et al., 2005), which implies that autonomous subsidiaries can engage in business operations that contribute to development of new ideas, products or services based on local knowledge (Andersson et al., 2002; Birkinshaw et al., 1998).

Nevertheless, autonomy has a very complex structure and it may differ in terms organizational roles and context. This raises the question of whether the origin of the parent firms affects their business strategies. Hence, based on the literature, we take the position to investigate autonomy as an antecedent of creation of RKT through external and internal networks and not investigating the nature of autonomy for Americans and Europeans MNEs. In so doing, we may assess subsidiary local and global competitive differentiation through two networks dimension. We conceptualize subsidiary competitive differentiation in terms of its influence on local and global market in the development of products, processes and production technique. Hence, the competitive differentiation strengthens subsidiary positioning within MNEs. Drawing upon RKT theory, we argue that the development of such knowledge requires a high level of autonomy granted by the parent firm to its subsidiary, and it requires transfers through internal and external networks to enhance subsidiary competitive advantage.

To provide new evidence, regarding the path creation of RKT and in which extent it can increase subsidiary differentiation, we built up a structural equation model (SEM), drawing on

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data collected from 108 American and European subsidiaries in the automotive industry operating in Brazil. Our study intends to make three contributions. Firstly, by disaggregating network (i.e., external and internal) in the process of knowledge creation and its transfer, we can figure out their complementary or supplementary nature in the automotive industry. Secondly, we can find evidence to support autonomy as enhancement factor of subsidiary competitive differentiation. Thirdly, taking into consideration two prominent management styles in the world, we can assess how differently American and European multinationals manage their organizations and what is the impact on subsidiary local and global competitiveness when engaging in two different network typologies.

This paper proceeds as follows. In the following section, we present the theoretical background. In the third section, we present our hypotheses development. In the fourth, the methodology is shown and in the fifth the modelling. In the sixth section, we present the discussion of the findings and conclusion.

2. Theoretical Background

The literature on network theory analyses the linkages among the actors involved in the management of network. A network is based on reciprocal and interdependent task-related activities for effective management (Ghoshal & Bartlett, 2005). An internal network consists of relations within parent firm and its subsidiaries. An external network consists of subsidiary's relationship with partners outside MNE's environment such as suppliers and competitors. This relationship covers a wide range of business transactions such as supply, logistics, strategic alliances and sales distribution (Giroud & Scott-Kennel, 2009). In principle, each relationship within external and internal network is unique regarding scale and scope activities, resources flows, strategic mandates and autonomy (Gammelgaard et al., 2012). Hence, parent firm and its subsidiaries engage in different structural external and internal strategies.

One strategy relies on reverse knowledge transfer from subsidiary to its parent firm. Studies on knowledge transfer has been central to managerial and theoretical implications over recent times. Nevertheless, there is a consensus that research into this field is relatively new and that organizational knowledge transfer is a complex process with several theoretical and empirical approaches. Michailova and Mustaffa (2012) provide an overview of knowledge transfer in a multinational context. The authors identify a fragmented field and suggest organizing the field into four clusters: i) characteristics of knowledge; ii) characteristics of the relationship between actors; iii) characteristics of actors; and iv) outcomes of knowledge flow.

The first topic, characteristics of knowledge, in general, consists of explicit and tacit knowledge since each type of knowledge differs significantly (Nonaka, 1994). Explicit knowledge is codifiable and easy to transfer, whereas tacit is not codifiable and difficult to transfer (Nonaka, 1994). Another related topic is the typology of knowledge, which consists of understanding how different knowledge affects MNE. For instance, some authors have focused on the transfer of technical knowledge (Håkanson & Nobel, 2000; Sunaoshi et al., 2005). Here in this study we are concerned with explicit knowledge and focused on the transfer of technical knowledge.

The second topic, characteristics of the relationship among actors, refers to the actors involved in the transfer process and how this relationship influence the transfer (Håkanson &

Nobel, 2001). Scholars have focused on examining network relationship and its characteristics. In general, studies investigate the effects of embeddedness network on size, length or intensity within MNEs (Andersson et al., 2002; Hansen et al., 2005; Minbaeva, 2007). Moreover, subsidiaries embedded in network relationship with their parent firms benefit from their more central position (Ghoshal & Bartlett, 1990), which means that centrally positioned subsidiaries may have control of the value of chain operations (Astley & Zajac, 1991). On the subsidiary level, we are concerned with the transfer of knowledge from subsidiary to its parent firm analysing the impact on subsidiary performance when this transfer occurs by means of internal and external network dimensions.

The third topic, characteristics of the actors, is related to characteristics of subsidiary and parent firm. These are the most investigated theme in the field consisting of structural characteristics, such as autonomy (Foss & Pedersen, 2002; Noorderhaven & Harzing, 2009; Schulz, 2001), which is the focus of our study. Autonomy refers to the fact the subsidiaries have mandates to improve efficiency and flexibility of their operations and it should be considered as an earlier stage of those operations (Gates & Egelhoff, 1986; Gupta & Govindarajan, 1991; Taggart, 1997). In short, autonomy is aimed at expanding the subsidiary's role within MNEs (Gammelgaard et al., 2012). High autonomy is related to local and global market initiatives, low autonomy to internal and hybrid initiatives (Young & Tavares, 2004).

Finally, the last group, outcomes of the knowledge flow, examines the effectiveness of the knowledge transfer and its impact on subsidiary or the MNEs themselves. The literature divided knowledge flows into inflow and outflow. The knowledge inflow occurs when subsidiaries are the recipients of knowledge and outflow knowledge when the subsidiaries are the source of knowledge (Gupta & Govindarajan, 2000; Håkanson & Nobel, 2001; Minbaeva, 2007). Regarding outcomes of knowledge transfer, most authors find a positive association with innovation and performance (Lane et al., 2001; Subramaniam & Venkatraman, 2001; Yamin & Otto, 2004) or with the enhancement of the competitive advantage of the parent firm (Ambos et al., 2006; Driffield et al., 2016; Gupta & Govindarajan, 2000; Schulz, 2001). Andersson et al. (2002) investigate external embeddedness networks (e.g. technical and business) as a strategic resource for performance and competence development in MNEs. The authors found that technical and business embeddedness has a positive impact on the subsidiary performance. Gammelgaard et al. (2012) have examined 350 foreign-owned subsidiaries in the UK, Germany, and Denmark. The authors found out that increases in subsidiary autonomy lead to an increasing in external organizational relationships, which increases parent firm performance when compared to market competitors. Therefore, we analysed subsidiary outcome in terms of its competitive differentiation.

3. Hypotheses development

A subsidiary may rely on either external or internal networks to develop and transfer knowledge depending on its strategic need (Frost et al., 2002; Frost & Zhou, 2005). Internal network occurs within MNEs network, which implies a high level of control (Nohria & Ghoshal, 1997). Thus, the relational and trust model is already established, since they are already in MNEs network (Yamin & Andersson, 2011). This facilitates the transfer of knowledge through internal network. In general, external network is based on commercial transactions with a low level of parent's control, and it is more likely to be held in the host country. Hence, the first stage of the external network is the market transaction, and then it

moves to relational and trust model, which is the building block for network formation (Andersson et al., 2002), which will finally be able to use this channel to transfer the knowledge created (Doz et al., 2001; Doz & Wilson, 2012). Another difference is that the subsidiary needs autonomy to embed in external networks to transfer knowledge, and typically, it can only engage in business operations with external partners, which are of interest of the parent firm (Meyer et al., 2011; Narula & Rugman, 2014).

In short, to transfer knowledge subsidiaries need to coordinate both external and internal networks efficiently (Meyer et al., 2011). In this RKT context, the parent firm or any MNE unit act as knowledge receivers and need to first assess the subsidiary's competencies and gather information about the type, usefulness and location of this knowledge possessed by the subsidiary to be able to engage effectively in the transfer (Yang et al., 2008). This means that the MNEs perception of the knowledge created by external or internal network may differ. Moreover, some scholars point out that parent firm effectively acts as an internal capital market (Mudambi & Navarra, 2004), which corroborates control over investment decisions and a better perception of the results of the knowledge created. Hence, it is more likely that the transfer through internal network can generate better results, but there are also scholars proposing the disintegration of value chain and the positive results originated from external network (Doz & Wilson, 2012). However, it is unclear the impact on subsidiary performance when engaging in both external and internal network transfer.

There is growing body of studies investigating the decision-making autonomy within multinational organizations. Despite the fact that autonomy is a very complex concept to define and measure (Young & Tavares, 2004), we assume autonomy as the degree to which the subsidiary has decision-making power with regard to its functional, strategic and operational areas (Kawai & Strange, 2014; Taggart & Hood, 1999). In this way, autonomy can be understood as the capacity of subsidiary making a decision without the interference of the parent firm. Subsidiaries have their own local strategies and goals that do not always coincide with the goals of their parent firm. Subsidiaries are independent and dependent at the same (Andersson et al., 2001). They are independent in the sense of local market decision taking, which may require a high level of autonomy. However, they are considered dependent, when the strategic decision is given by the parent firm, implying a low level of autonomy.

Nevertheless, regardless of the level of autonomy, it should be seen as a critical antecedent to knowledge flow (Gupta & Govindarajan, 1991; Schulz, 2001; Tsai, 2001). Traditionally, the existence and competitiveness of the MNEs have been attributed to internal knowledge flows (Bartlett & Ghosbal, 1987; Forsgren, 2013). Nonetheless, it is unlikely that all knowledge flow will be equally beneficial to parent firm because of differences in networks typologies. Internal network will be more tightly constrained by the corporation's dominant logic, than the more externally embedded relationships will be (Yamin & Andersson, 2011). The internal network is designed to conduct several value-adding activities within MNEs towards organizational goal this framework is depicted as value of chain (Porter, 1985). Thus, to verify the impact of autonomy on reverse knowledge transfer, we formulate the following hypotheses:

> *H1: The greater the extent of subsidiary autonomy, the greater subsidiary technical knowledge transfer through external partners.*

H2: The greater the extent of subsidiary autonomy, the greater subsidiary technical transfer through internal network.

From the perspective of this study, we examine whether the transfer of technical knowledge either internal or external increases subsidiary competitive differentiation, since the motives and forms of origin differ from each other. Monteiro et al. (2008) argue that there is only a few studies in the knowledge transfer literature actually measuring outcomes within multinational context. Our key concern is to find out whether the knowledge flows between subsidiary and parent are complementary or supplementary, since there is always a question of whether the knowledge created in the host country and transferred to other location can increase subsidiary competitiveness in the global market.

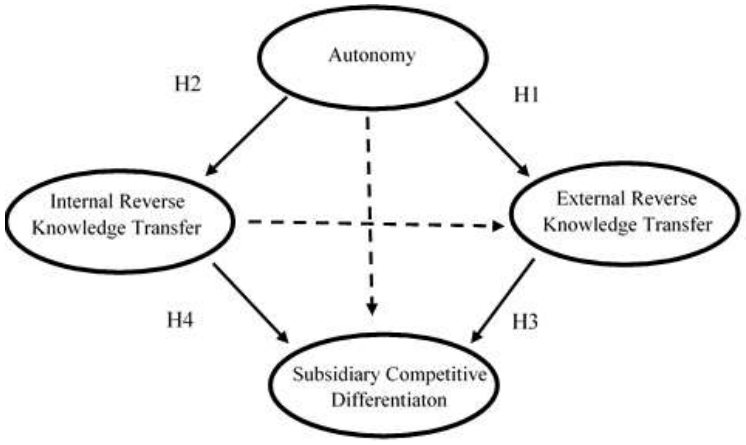
Considering that the knowledge created in the subsidiary could originated from external and internal sources, it is important for the entire MNE to perceive it as relevant and absorb the knowledge transferred by the subsidiary. Absorptive capacity is the way multinational units receive and appreciate as important the new knowledge (Gupta & Govindarajan, 2000; Pak & Park, 2004) exploiting this knowledge for organizational value creation (Zahra & George, 2002). In the organizational structure, it is easier for the MNEs units to absorb the knowledge originated from internal sources. Nevertheless, when external partners are perceived as having superior ability to develop knowledge, then they become more relevant for the entire MNEs, which will increase their interested in receiving that knowledge. Therefore, the more subsidiary transfers knowledge to other MNEs units and they absorb it, the more likely the subsidiary are to benefit from these transfers and more likely that the entire MNEs will engage in reverse knowledge transfers. In order to investigate the effect of the reverse knowledge transfer on the subsidiary competitive differentiation, we posit the following:

H3: The greater subsidiary technical knowledge transfer through external partners, the greater is subsidiary competitive differentiation.

H4: The greater subsidiary technical transfer through internal network, the greater is subsidiary competitive differentiation.

Based on this argumentation, we propose a structural equation model to test our four hypotheses (Figure 1).

Figure 1. Structural equation modelling



3.1. Management Styles

The general idea is that these relations, above explained, is equal for all companies around the world. However, some studies have shown that MNEs from different regions of the world exhibit diverse levels of subsidiary autonomy and performance (Gammelgaard et al., 2012; Jong et al., 2015; Kawai & Strange, 2014; Newburry et al., 2003). American and European management styles have received a significant amount of attention from the literature over the last decades (House et al., 2004; Perlitz & Seger, 2004; Pudelko & Harzing, 2007). American MNEs tend to be related with high level of formalization (Bartlett & Ghoshal, 1999) and standardization (Harzing, 1999). In general, American MNEs focus on short-term economic results and Japanese MNEs on long-term. Whereas European MNEs focus on medium-term economic results and it has greater orientation towards welfare of their people than American and Japanese MNEs (Calori & Dufour, 1995). Moreover, the European style is somewhat unique and fragmented, since some managerial aspects may differ significantly by region, such as preferred power distance (House et al., 2004). Pudelko and Harzing (2007) argue that European style has been shaped by both the Japanese and American management styles; and it lies between them, since Japanese and American styles are more extreme cases. Nevertheless, the authors assert that European style is converging towards a more Americanized model. Moreover, in respect to tolerance and positive attitudes toward cultural differences, European style differentiates itself from the Japanese or American styles, where cultural differences are perceived as a problem to overcome rather than an asset (Zitkus, 2011). In this case, it is recommended to take into consideration these differences in modelling managing strategies in multinationals context to verify if there is any distinct aspects among them.

4. Methodology

4.1. Constructs

The model has four constructs: reverse knowledge transfer through external partners, reverse knowledge transfer through internal network, subsidiary autonomy and subsidiary competitive differentiation in terms of development of products, processes and production technique. Table 1 shows the items used in the survey.

Table 1. Constructs and Questionnaire items

Scale: five-point Likert scale (1 = strong disagree to 5 = strong agree).

External Reverse Technical Transfer
P9_7 External partners of your subsidiary develop products that are transferred to parent firm and/or other subsidiaries of your organization.
P9_8 External partners of your subsidiary develop processes that are transferred to parent firm and/or other subsidiaries of your organization.
P9_9 External partners of your subsidiary develop technical productions that are transferred to parent firm and/or to other subsidiaries of your organization.
Internal Reverse Technical Transfer
P7_4 Your subsidiary develops and continuously transfers products to parent firm and/or to other subsidiaries.
P7_5 Your subsidiary develops and continuously transfers process to parent firm and/or to other subsidiaries.

P7_6 Your subsidiary develops and continuously transfers production techniques to parent firm and/or to other subsidiaries.
Subsidiary Autonomy
P13_1 Regarding the global strategy, your subsidiary adopts different product development strategies and processes according to customer needs. P13_3 Regarding the global strategy, your subsidiary adopts different product development strategies and processes according to competitors' performance. P13_4 Regarding the global strategy, your subsidiary adopts different product development strategies and processes according to changes in the market.
Subsidiary Competitive Differentiation
P8_1 In relation to local and global competitors, your subsidiary stands out in development of products. P8_2 In relation to local and global competitors, your subsidiary stands out in development of processes. P8_3 In relation to local and global competitors, your subsidiary stands out in development of production techniques.

4.2. Sample choice and data collection

Taking into consideration that the type of industry or host country environmental conditions can affect the relationship between subsidiary and parent firm. We consider only one host market, Brazil, and one specific market, the automotive industry, to avoid these problems. The sampling for this study consists of automotive subsidiaries in Brazil to capture the dyad subsidiary-parent RTK. The dataset was collected from an online survey with top senior executives in the automotive industry. We have designed a survey questionnaire to investigate the effect RKT on subsidiary's competitive differentiation on a typical five-level scale (Likert, 1932), which ranges from strong disagreement (1) to strong agreement (5). The response rate was 17.1% (108/630). Moreover, we have hired a company specialized in performing surveys to carry out a follow-up by phone with all respondents.

According to the answers of the survey, the average autonomy level are American MNEs (3.34) and European MNEs (3.72); the average subsidiary competitive differentiation are American MNEs (3.45) and European MNEs (3.56). This indicates that European MNEs granted higher level of autonomy to their subsidiaries compared to American MNEs. Interestingly, however, the level of subsidiary differentiation decreases in terms of development of products, processes and production techniques, while American MNEs increases.

According to Michailova and Mustaffa (2012), studies on knowledge transfer are imbalanced, since most of them have focused on the single country basis and more than half (60%) focus on China or the United States. Few scholars have focused on two-country perspective. For instance, Brazil and Mexico (Sparkes & Miyake, 2000) and Denmark and the United States (Schulz, 2001). Hence, studies should focus on more geographically dispersed cases. In line with this, our sample covers 17 countries, that is, multiple destinations for technical knowledge transfers. Furthermore, we also provide a comparison of the European and American management styles.

4.3. PLS modelling

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The partial least squares approach to structural equation modelling (PLS-SEM or PLS path modelling) is based on variance technique (VB-SEM), which was originally developed by Lohmöller (1989) and Wold (1975). It offers an alternative method to based covariance technique (CB-SEM), which was drawn up by Jöreskog (1978). While CB-SEM estimates the model parameters in a way that discrepancy between the estimated and sample covariance matrices are minimized, PLS path modelling maximizes the explained variance of the endogenous latent variables by estimating partial model relationship in an iterative sequence of ordinary least squares (OLS) regression (Hair et al., 2012). It is worth mentioning that PLS does not require multivariate normality assumption, and it can be applied to small samples despite the fact that it could be used as a predictive tool for theory building (Hair et al., 2012; Ringle et al., 2012). In this study, we have applied this methodology using the SmartPLS V2.0 (Ringle et al., 2005).

4.4. Robustness check

In order to verify for the commom method bias, we have calculated the eigenvalues for all observed variables loaded in the model applying Harman's Single Factor approach. We have found 3 factors above eigenvalues of 1 and no factor above the threshold of 50%. This suggests that method bias is not a problem in our data set.

To avoid any rule of thumb for minimum sample size requirement, we have ensured that there is no sample size problem by calculating the power of our model using G*Power 3.1.9 (Faul et al., 2009). Estimating the power level is a key characteristic of a rigorous study applying structural equation modelling (Gefen et al., 2011). Hence, we have validated our model by verifying its stability through an adequate sample size choice and analysing the statistical power with G*Power. We have chosen the model F-test – linear multiple regression: fixed model, R2, deviation from zero and the inputs were sample size of 108, significance level (α=0.01), effect size (0.35) and predictors (3), giving us a minimum sample size of 71. Hence, we follow Hulland (1999) conducting the analysis into two stages. First, we checked for the reliability and validity of the measurement model. Second, we assessed the structural model.

5. Structural Equation Modelling

5.1. Measurement model

The first step in SEM was to confirm that the constructs were indeed reliable and valid for testing the hypothesized structural relationship. As can be seen from Table 2, all the Cronbach's alpha for the constructs are above the usual threshold of 0.70 as suggested by Hair et al. (2014). However, this test has some limitations, for instance, it assumes that the measures contribute equally to reliability (Bollen, 1989; Shook et al., 2004). Thus, the composite reliability (CR) is used as a more appropriate indicator as suggested by Shook et al. (2004) and each value should be above 0.70. The average variance extracted (AVE) should be above 0.50. Moreover, outer loadings above 0.70 are considered highly satisfactory. Therefore, the results of these tests indicate that all conditions have been satisfied.

Table 2. Results of validity and reliability tests

Constructs	Outer Loading	AVE	CR	Cronbach Alpha
Subsidiary Autonomy		0.7024	0.8763	0.7888
P13_1	0.8397			
P13_2	0.8502			
P13_3	0.8243			
Internal Reverse Knowledge Transfer		0.7593	0.9043	0.8416
P7_4	0.8200			
P7_5	0.9009			
P7_6	0.8910			
External Reverse Knowledge Transfer		0.8397	0.9400	0.9049
P9_7	0.8577			
P9_8	0.9647			
P9_9	0.9234			
Subsidiary Competitive Differentiation		0.7065	0.8778	0.8405
P8_1	0.7497			
P8_2	0.8760			
P8_3	0.8889			

Source: Author's elaboration

We also performed a discriminant validity test for each construct in the modelling. According to Fornell and Larcker (1981), the diagonal entries are the square root of AVE and they must be greater than the off-diagonal entries, which are the correlations (Table 3).

Table 3. Discriminant Validity

	1.	2.	3.	4.
1. Autonomy	**0.8381**			
2. Internal RKT	0.3830	**0.8714**		
3. External RKT	0.3464	0.5371	**0.9164**	
4. Competitive Differentiation	0.3774	0.4804	0.3822	**0.8590**

Note: Diagonal are the square root of AVE values, and the off-diagonal entries are the correlations among constructs.

Therefore, all the tests provide support for the convergent validity, internal consistency and discriminant validity implying that we can carry on the SEM.

5.2. Mediating effect

We applied the Sobel test (Sobel, 1982) to verify the mediating effect over the constructs Internal Reverse Knowledge Transfer and External Reverse Knowledge Transfer. This test is a traditional method to verify the significance mediating effect (MacKinnon et al., 2002). The formula for testing follows:

$$z - value = a * b / \sqrt{b^2 * s_a + a^2 * s_b}$$

Where (a) is the regression coefficient for the relationship between the independent variable and the mediator variable, (b) stands for the regression coefficient for the relationship between the mediator variable and the independent variable. The standard errors of these paths are denoted by (s). Moreover, according to Hair et al. (2014), we can assess the

mediating intensity by the formula VAF = Indirect Effect / Total Effect, being a partial mediating effect values between 0.20 and 0.80. The VAF above this range is a full mediating effect. Table 4 shows the result for mediating effect tests for all possible paths in the model.

Table 4. Results for mediating effect

Path	Mediator Variable	Sobel Test	VAF	Results
Autonomy → Competitive Differentiation	Internal RKT	3.888 ***	0.410	Partial
Autonomy → Competitive Differentiation	External RKT	3.177 ***	0.268	Partial
Autonomy → Internal RKT	External RKT	4.179 ***	0.418	Partial
External RKT → Competitive Differentiation	Internal RKT	3.881 ***	0.543	Partial

*Note: ***, ** and *, significant at 1%, 5% and 10%, respectively.*

5.3. Structural model

The main evaluation criteria for PLS are the R-squared, the path coefficients, and their t-statistics. In order to fulfil this goal, we performed the bootstrapping approach with n=1000 to get the t-statistics for the path coefficients. Table 6 shows the result of the estimation for three proposed models considering only reverse technical knowledge through internal network (Model 1), reverse knowledge through external partners (Model 2) and the conjoint network model (Model 3). We also have tested the other relations in which we do not propose any hypothesis, however, we can see that they are all significant. The first non-tested relation is between external and internal RKT, which suggests that there is a positive association with internal transfer and transfer through external partners. The second non-tested relation is between autonomy and subsidiary competitive differentiation, which is also significant considering all three models, meaning that, in fact, autonomy is crucial for subsidiary differentiation. Nevertheless, in this study, we argue that not only autonomy is essential for the creation of subsidiary competitive differentiation, but the creation and transfer of knowledge from subsidiary to other MNEs units, which are confirmed by the results of Table 5.

Table 5. Hypotheses tests

		Model 1	Model 2	Model 3
Paths	**Hypothesis**	**t-statistics**	**t-statistics**	**t-statistics**
Autonomy → External RKT	H1		5.379***	5.252***
Autonomy → Internal RKT	H2	6.309***		3.302***
External RKT → Competitive Differentiation	H3		4.110***	1.751*
Internal RKT → Competitive Differentiation	H4	4.804***		3.629***
Internal RKT → External RKT	-			6.354
Autonomy → Competitive Differentiation	-	2.315	2.971	2.143
R-squared		0.277	0.221	0.287

*Note: ***, ** and *, significant at 1%, 5% and 10%, respectively.*

5.4. Management styles

Moderating effect Mod(.) occurs when a moderating variable can influence the level of significance between the dependent variable and the independent variable (Henseler & Fassott, 2010). Thus, we have included a moderator variable in our analysis to assess differences in the American and European management styles in terms of subsidiary autonomy and its impact on reverse knowledge transfer. A dummy (1) was created to

American MMEs in the data set, so European MNEs was assigned value of (0), than we have estimated the full structural equation model. The only significant moderating effect was found in autonomy level granted to subsidiary to develop and transfer knowledge relying on external partners (Table 6).

Table 6. Testing moderating effects

Paths	t-statistics	Significant
Mod (Autonomy → External RKT)	3.263 ***	Yes
Mod (Autonomy → Internal RKT)	0.323	No
Mod (External RKT → Competitive Differentiation)	0.137	No
Mod (Internal RKT → Competitive Differentiation)	0.604	No
Mod (External RKT → Internal RKT)	0.048	No
Mod (Autonomy → Competitive Differentiation)	1.020	No

*Note: ***, ** and *, significant at 1%, 5% and 10%, respectively*

6. Conclusion

This paper sheds light on the process of technical transfer through external and internal networks, investigating the impact on subsidiary competitive differentiation. Although there is a growing number of studies investigating the process of RKT from subsidiaries to their parent firms, there is little research studying in which extent the disaggregate network (external and internal) impacts subsidiary local and global differentiation. Traditionally, most of studies consider only RKT within internal network. We have analysed RKT on both perspectives for the case of 108 automotive MNEs suppliers in Brazil. In this regard, the overall results (Table 5) indicate that both technical knowledge transfer through internal and external networks increase subsidiary competitive differentiation in terms of production, processes and production techniques. We also have found support for the autonomy as antecedent of creation of RKT. Hence, we have accepted all hypotheses proposed in this paper. In short, this fact indicates that the way parent perceives subsidiary capability lead to autonomy granted to subsidiary for creating and transferring knowledge either relying on internal or external networks.

The results concerning the inclusion of moderating effect in the model to capture differences in management styles have shown that American MNEs only differ significantly from European MNEs in respect to the association between autonomy and reverse knowledge transfer through external network (Table 6). This indicates that American MNEs grant more autonomy to their subsidiaries in Brazil to engage in external operations to develop and transfer knowledge, in the other words, European MNEs are more centralized, than American MNEs are. This finding suggests that American MNEs are into a relational and trust business model with external partners.

6.1. Practical implications

The fact that the automotive suppliers multinationals face intensive global competition due to relative low manufacturing cost or labour cost – especially in developing markets – MNEs decentralise not just their operations to those countries, but also value-creating activities, which are sought after. In this context, low level of autonomy reflects specific characteristics of subsidiaries perceived positioning by their parent firms. Different levels of autonomy of

subsidiary explain the magnitude and scope of knowledge creation expected from the subsidiary (Gupta & Govindarajan, 1991), and it might depend on subsidiary specific context. For instance, a low level of R&D activities or greater involvement in the adaptation of manufacturing technology (Taggart, 1997). In particular, the fact that the hypotheses (H1) and (H2), which relate autonomy to creation and knowledge transfer are accepted. This indicates that automotive suppliers in Brazil engage in more strategic and innovative activities.

To achieve an enhancement in competitiveness capability, subsidiaries need to be well integrated into the corporation network and be granted by a high level of autonomy to engage in external operations with partners. As our research has shown, the perception of the subsidiary capability from its parent firm will drive the knowledge transfer, which also may indicate that the parent firm commitment towards augmenting local knowledge into corporation network. Thus, to increase MNEs competitiveness, subsidiaries must respond to parent expectations through business adjustments, such as manufacturing process, network embeddedness or along their value chain. Thus, this requires them to become innovative, delivering a cheaper product or efficient production techniques to fill MNEs knowledge gap to compete more efficiently worldwide.

6.2. Limitations and further research

As last comments, we point out the limitations of this research, especially from the constraints of the data set, the sample used and the adopted scope. This is one host country study, which does not permit to expand the results to other emerging markets. We are also aware of the limitations of the sector that was analysed. Despite its importance and almost limitless resources – if compared to other industries – the automotive sector has its own particularities, and the conclusions we had reached could not be the same as if we consider other industry.

For future studies, we could suggest investigating the policies that lie behind these practices we studied here. Possibly, through in-depth qualitative analysis, it would be possible to verify how these elements: subsidiary autonomy, RKT through internal and external networks and subsidiary competitive differentiation are defined in firm's strategic plans.

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