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The Impact of Knowledge Transfer on Innovation in Multinational Corporations: Exploring the Contingent Effects

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Abstract:

This direct research explores the contingencies of the relation between knowledge transfer and new product outcomes in Multinational companies. Indeed, in a MNC context, "the conditions under which such knowledge transfer can serve to induce positive outcomes remain unclear."(Lee, 2008, p 1)

After a deep literature review of knowledge transfer and new product outcomes literature, an exploratory study was conducted to understand which factors can influence the impact of knowledge transfer in new product outcomes, with the purpose to give insights about the way to approach a further study. We propose the following three internal contingencies: network strength, absorptive capacity, customer orientation and an external one: technological turbulence, through a semi structured interview guide conducted with 12 top managers. Globally, the exploratory study has provided confirmation for the variables proposed.

Keywords: Knowledge Transfer, New Product Outcomes, Network Strength, Absorptive Capacity, Customer Orientation and Technological Turbulence.

1. Introduction

There were 7000 multinational corporations[1] identified by the United Nations in 1970, about 30000 MNC's by 1990, and in 2005 there were more than 77000 with 850000 affiliates in foreign countries. It appears that the biggest multinationals are still located in the biggest economies and that both MNC's and their subsidiaries account for about two-thirds of the world trade in goods and services *(Cohen, 2007).* This brief overview highlights the importance of MNC's in our day to day. Moreover, innovation is frequently associated to a source of competitive advantage for MNCs and some authors recognize the crucial role of MNC's knowledge management in New Product Development *(Murray et al., 2005).* In fact, "When markets shift, technologies proliferate, competitors multiply, and products become obsolete almost overnight, successful companies are those that consistently create new knowledge, disseminate it widely throughout the organization, and quickly embody it in new technologies and products." (*HBR, 2007, Editor's note).* However, it has been found that few senior executives are happy with how their organizations share knowledge internally (*Szulanski et al., 2002).* There is actually a saying that might explain that feeling. "Research turns money into knowledge, but innovation turns knowledge into money" *(21st CEIES seminar, 2003, p 57),* in fact if there is no entrepreneurial innovation, then there is no knowledge flows and consequently there is no value creation

Extant research has been done about knowledge transfer inducing new product outcomes, however little has been written about how firms' internal and external contingencies affect the knowledge transfer in new product outcomes. Indeed, "knowledge in itself cannot lead to sustainable competitive advantage" (*Lee et al.,* 2008, p 4), rather the configuration and integration of contingent factors may lead to a positive impact of knowledge transfer in new product outcomes.

[1] Multinational Corporation (MNC): any corporation that is registered and operates in more than one country at a time. Generally the corporation has its headquarters in one country and operates wholly or partially owned subsidiaries in other countries. Its subsidiaries report to the corporation's central headquarters. (Encyclopedia Britannica)

This study is organized as follows: we first provide our conceptual framework and propositions, which are based on the RBV and contingency literature streams; we then validate our propositions on data collected from MNCs whose headquarters are located abroad and close with findings, implications, and conclusions.

2. Literature Review

This study integrates RBV and contingency theory by exploring the effect of network strength, absorptive capacity, customer orientation, technological turbulence on the relationship between knowledge transfer and new product outcomes.

Knowledge transfer can be defined as "the degree to which the MNC's headquarter and its subsidiaries are open to change and are willing to transmit knowledge to each other". We more specifically focus our attention to "the level of intensity with which knowledge flows between headquarters and its selected subsidiary" *(Lee et al., 2008, p7/13).*

New product outcomes are conceptualized as "the degree to which an MNC's products are creative, differentiated, and successfully (success rate compared to competition) introduced into the global market relative to its competitors" *(Lee et al., 2008, p13).*

The ties between research on knowledge and research on innovation are so close that several studies have already been done. Indeed, "it is quite common for studies examining innovation to use knowledge or intellectual capital as antecedents, and studies investigating knowledge and intellectual capital frequently use innovation as outcomes" *(Yli-Renko et al., 2008, p 450).* However the knowledge topic is so rich and dynamic that there is still a lot to investigate. Therefore through the literature review, we noticed four important variables that may moderate our topic.

Network strength is defined as "the extent of relational ties (e.g. the degree of close ties, the frequency of interaction, the type of relations) in an MNC network, which facilitates information

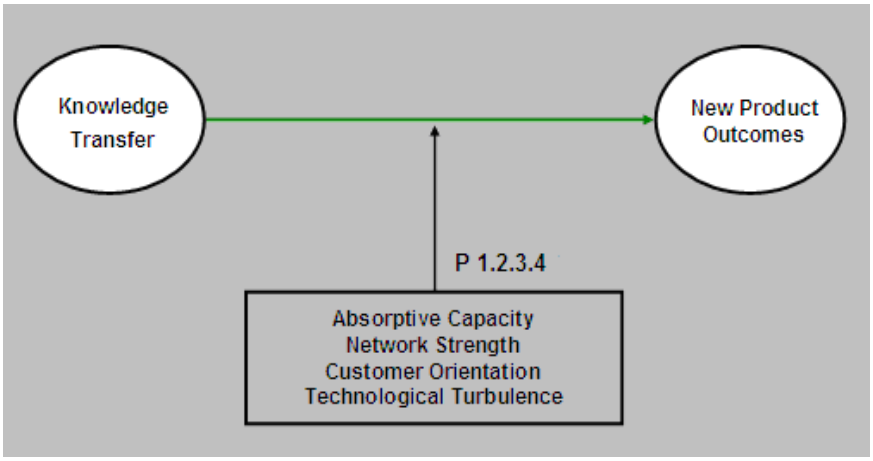
sharing and knowledge access within the networ*k" (Lee et al., 2008, p 8).* It was chosen as a moderator of the relationship between knowledge transfer and new product outcomes, since clear relationship among network strength and knowledge was already established, indeed "valuable knowledge is much more likely to be transmitted through strong ties than through weak ones" *(Ganesan et al., 2005, p 47).*

Absorptive capacity is defined from Cohen and Levinthal's (1990) as the ability to recognize the value of new information, assimilate it, and apply it to commercial ends. Being a complex concept to measure and thanks to the explored literature which defends that "the effective sourcing, sharing, and assimilation of cross disciplinary knowledge are essential for new product development capabilities" *(Subramaniam, 2006, p 543),* we decided to analyze the scanning ability (technology, market information, trends industry seekers) and communication network/climate which are defined as the extent of communication of new ideas and the extent of support in new projects (*Shu, 2005*).

Customer orientation "refers to the extent to which the customer is involved in product and process improvement, the extent to which the feedback is used for continuous improvement and the processes employed to obtain the voice of customers into design, manufacturing and delivery" (*Madanmohan, 2005, p 486).* Researchers already considered that knowledge related to the user needs is one of the two broad types of knowledge input required and studied with respect to integration and new product success *(Kotabe et al,. 2007)*

Last but not least, **technological turbulence**, as a fourth moderator, is defined as the degree of change associated with new product technologies and involves the extent of volatility, change, and unpredictability related to the technology in the headquarters' global environment *(Moorman et al., 1997).* From the literature, "it has been suggested that innovation represents the most effective means to deal with the turbulence in external environments *(Calantone et al., 2003, p 91).*

Conceptual framework



"As several new product development scholars note, knowledge is the foundation for new product innovation (Kotabe, 1995; Madhavan, 1998; Moorman, 1998), both the form and the content of this knowledge appear to be important inputs to successful new product development outcomes" *(Ganesan et al., 2005, p 48).* Moreover, common sense, supported by a small but influential body of literature (e.g., Bartlett, 1989; Zander, 1995; Hansen, 1999) suggests that "multinationals able to facilitate the exchange and utilization of knowledge across borders can expect to experience a variety of important performance benefits, ranging from more and better innovations to faster technical problem solving to better strategy execution" *(Frost et al., 2005, p 685).*

Given that subsidiaries hold knowledge about their host countries and provide that information to their headquarters which learn from it, then a more intensive knowledge transfer permits the headquarters to build a platform of the similarities and differences across countries which consequently results in new products that better meet global challenges *(Lee et al., 2008).* To conclude, we argue that foreign subsidiaries are sources of market knowledge about their own host countries and that their headquarters' new product outcomes depend largely on the intensity of the knowledge transferred between them *(Almeida et al., 2004*). That is the reason why we assume that knowledge transfer between the headquarters and the foreign subsidiaries enhances positively new product outcomes.

Szulanski (1996) points out that "knowledge is sticky and does not move easily from one part of the firm to the other despite organizational efforts" *(Almeida et al., 2004, p 851)*, consequently "not every unit has the ability to access the knowledge generated". Therefore, the significant role of network strength is supported since it offers greater opportunities for knowledge access and hence greater possibilities for innovation by enhanced communication.

Moreover, to achieve comfortable level of new product outcomes, it is not enough to obtain knowledge resources, indeed; "managers must nurture a team's realized absorptive capacity to enable the transformation of knowledge resources into NPD capabilities" and "both market (customer needs for instance) and technological turbulence in the host country may moderate the effect of NPD capabilities on new product market performance" *(Murray et al., 2005, p 70).* As a result, it is important to analyze the contingencies identified in the conceptual framework.

2.1 Proposition1: Literature supports that knowledge flows is facilitated within a network of embedded relationships that exist in an organization and its members *(Frost et al., 2005).* Indeed, "network begins to matter when they empower managers to talk openly and emotionally without fear, to enrich the quality of their decisions, to test each other's motives and build trust" *(Charan, 1991, p 105).*

From the theory, we noticed that strong ties encourage more communications and idea exchange, resulting in more creative outcomes; however those strong ties can hinder creativity. In fact, unlike developing new insights from continuously sharing information, too much input transferred with no optimal screening to the needs, can diminish the benefits of learning from diverse knowledge resources *(Kotabe et al., 2007),* and thus impede successful new product outcomes because of the redundancies of information. Moreover because of their wish to maintain intimate relationships disruptive ideas might be rejected to avoid any conflict *(Lee et al., 2008)*.

While Nahapiet and Ghoshal (1998) consider that "an atmosphere of cooperation opens access among group members and creates individual motivation to exchange knowledge with group members", Tushman and O'Reilly (1997) go further, defending that "a climate of teamwork is key to effective creativity", and Amabile (1988) argues that "creativity is hurt when an organization's climate is characterized by a lack of cooperation" *(Smith, 2005, p 350).* Thus, cooperation between teams can lead to integration of different functions, which may increase the success of new products through effective communication, functional diversity but can also increase decision complexity and confusion, since "the informal communication patterns, participative decision making, and consensual conflict resolution in cross functional integration can be more time consuming and less efficient than more centralized and bureaucratic processes" *(Troy et al., 2008, p 133).*

Therefore we propose that **P1: Network strength has a moderating impact on the effects of knowledge transfer in new product outcomes.**

2.2 Proposition2: Zahra and George (2000) argue that "effective internal knowledge sharing and integration is the critical part of absorptive capacity" *(Lane, 2002, M2*), and that "without such capacity, they cannot learn or transfer knowledge from one unit to another" *(Tsai, 2001, p 998).* Moreover, firms exposed to the same environment may differ in their absorptive capacity, in their abilities to leverage and benefit from knowledge developed by other units, due to their differential external access and internal capacity *(Tsai, 2001).*

In fact, firms with high levels of absorptive capacity are likely to better absorb inputs (capture new knowledge from other units) in order to generate outputs (to help their innovative activities), but will also "aim to experience important performance benefits, from more and better innovations to faster technical problem solving to better strategy execution" *(Frost et al., 2005, p 685).* Furthermore, "papers in this theme suggest that absorptive capacity helps the speed, frequency and magnitude of

innovation and that the latter produces knowledge which becomes part of the firm's absorptive capacity" (*Lane et al., 2002, M3).* It is a virtuous circle relationship, where absorptive capacity increase innovation and innovation produces knowledge which becomes part of the firm's absorptive capacity *(Lane et al., 2002, M3).*

Based on the theory, we noticed that being continuously exposed to knowledge, complex or not, raise the level of the firm's absorptive capacity in acquiring newer and broader technology bases. In addition, "high levels of absorptive capacity from complex resource base reduce the risk of their technologies being 'locked out' and also increase their likelihood of better innovative performance" *(Kotabe et al., 2007, p 264).*

Therefore, we propose that: **P2: The relationship between knowledge transfer and new product outcomes becomes stronger as the recipient team's absorptive capacity becomes greater.**

2.3 Proposition3: Within multinational firms, user-need related knowledge is located closer to the host market and facilitated by participation in the local market *(Kotabe et al., 2007).* From the theory, it is said that working on either few customers' needs can hinder the firm's development efforts since the time and resources required to meet the target demands may constrain opportunities to develop new and diverse products for other customer or new markets, or having too many customers in firm's portfolio can result in "information overload and confusion because management spreads its attention and efforts across a broad set of customer information sources" *(Yli-Renko et al., 2008, p 134).*

Research suggests that the probability of success is higher when the new products are based on consumer expectations and when customers are treated as partners in new product development process *(Gotteland et al., 2006).* Indeed, firms not only can explore innovation opportunities but also have access to customers' evaluation of product designs and final offerings, which at the end of the process, reduce potential risks of misfitting buyer needs *(Li & Calantone, 1998).*

From the theory, we noticed that customer has a critical role in the overall product development process, thanks to his useful early feedback that enables the firm to redirect a project for instance. Starting in the generation phase, he originates new solutions to problems faced in the marketplace, which make the suppliers work on new technologies and products. Then, in the development stage, he establishes and brings required resources, industry contacts, or complementary technologies to the innovation network. In the testing phase, customers can serve as the testing ground for the new product's relevance and acceptance in a variety of user contexts. Thus, "closer relationships with customers not only directly help in a firm's innovation process but also compensate for the negative effects of both dependence and small portfolio size" *(Yli-Renko et al., 2008, p 133/145).*

Therefore, we propose that **P3: Customer orientation strengthens the effects of knowledge transfer in new product outcomes.**

2.4 Proposition4: "Previous research indicates that when market conditions are unpredictable, transferring or sharing knowledge between business entities can obstruct potential creativity, which subsequently damages new product outcomes" *(Lee et al., 2008, p 10).* However, literature suggests that "when the technology is rapidly changing across firms within the same industry, that is when there are high levels of technological turbulence, intensive gains in customer and competitor knowledge (market knowledge transfer) from subsidiaries can help the MNC in the successful development of new products" *(Lee et al., 2008, p 20).* Those technological changes can make obsolete the existing technology, which as a result shortens the product life cycle. For that purpose, headquarters and subsidiaries must intensively transfer knowledge to stay in the competition, and consequently enhance new product creativity and performance *(Lee et al., 2008).* As a consequence of turbulence, the value of prior learning may be dissipated, because of being outdated, "which forces the organization to search for and process more information about the environment" *(Moorman et al.,*

1997, p 96). Moreover, technological turbulence has an important effect on dispersion's impact on product creativity, since intensive shared understanding and homogeneous knowledge detract creativity. The advice would be to develop internal heterogeneity under conditions of high turbulence, since diverse pockets of knowledge and skills enable the firm to increase their probability of exploiting emerging opportunities, which may provide value for new product development practice *(Moorman et al., 1997).* Therefore, we propose **P4: Technological turbulence strengthens the effect of knowledge transfer on new product outcomes.**

3. Methodology

We seek insights on the contingencies of the relation knowledge transfer and new product outcomes at a global level and check if relevant variables are considered in the framework (See Appendix A). Semi-structured interviews were conducted. This approach allows reducing what interviewees might think thanks to an interview guide, and at the meantime it allows interviewees to discuss any issues they want to, regarding the subject *(Story et al., 2001).* A guide (See Appendix D) was used with the different topics, divided into open questions as well as a closed question. We used a cross-sectional sample of companies affected at some point by innovation; ranging from Food and Beverage, Pharmaceutical to IT industry (See Appendix B), which brought us rich insights. For convenient reasons, we looked for managers open to our discussion, from Portuguese subsidiaries which headquarter is abroad, with no restriction regarding the country of origin.

We adopted two established selection criteria in this study. The first was “position”: Was the informant in a position to generalize "about patterns of behavior (related to the content of inquiry), after summarizing either observed or expected organizational relations"*?* The second criterion was knowledge: how knowledgeable they were about the content of inquiry? We adopted a self-

assessment of knowledgeability, on a seven-point Likert scale (anchored at "not very knowledgeable' to 'very knowledgeable") *(Li & Calantone, 1998, p 20)*.

We addressed our interview guide to marketing and R&D managers, since they have been shown in previous research to be knowledgeable key informants about information concerning new product development *(Gatignon et al., 1997).* We therefore used the number of employees as a control variable, since it is likely to provide a more accurate presentation of firm size than measures of revenue or profits *(Sheremata, 2004.)* Besides, "large units tend to have more resources with which to enhance their innovation and performance" *(Tsai, 2001, p 1000)* and better achieve the headquarters' support for their business operations and innovation activities.

We were able to interview 12 managers in marketing and R&D department, each of the interviews occurred on interviewees' local of work, lasted approximately thirty to forty five minutes and there were no apparent reticence in answering any questions. All interviewees agreed to have the interview taped, and "each interview was written up straight after the interview and transcribed verbatim so that bias was not introduced" *(Story et al., 2001, p 21).*

4. Results and discussion

In this chapter, we will discuss the propositions of the conceptual framework, to determine if our framework makes sense, if it includes the most relevant variables and if propositions are meaningful (See Appendix C). Globally, top managers agree with the fact that knowledge transfer is really important to understand the market, the new technologies available and to figure out a possible niche or a possible gap in the market. However, knowledge transfer does not automatically lead to new product outcomes. In fact, knowledge has to be filtered and understood to be well processed and to lead to positive outcomes. This highlights the necessity of knowledge integration to strengthen the impact of knowledge transfer in new product outcomes. Besides, when managers face complex

products (IT, pharmaceutical industry…), market knowledge and existing knowledge are not enough to provide creative outcomes, hence, in specific markets, Research and Development department has a critical contribution in the product development process. In that case, the power and intensity of knowledge transfer are diminished, and R&D becomes the premium source of knowledge for new product outcomes.

Moreover, physical interfaces of knowledge exist to enhance interactions. Global brand offices are the ones that facilitate knowledge flows by pushing and pulling information. It was highlighted that by permanently being in contact with all subsidiaries, global teams not only get to know how each market is going locally and get to know the projects in process, the failures or success, but also create and maximize synergies among countries that are currently developing a new product or that have seen the need to launch that same product, enabling to enrich the corporation business model with success models. Furthermore, they develop coercion among the teams and show that communication enhances curiosity, creativity, efficiency which consequently improve new product outcomes and provide better performance. Regarding local marketing manager involvement in new product development, it occurs that most of them only operate in the promotion stage from the marketing mix. Indeed, the product, the price and more or less the place are inputs given by the global brand or the headquarters. Nevertheless, half of the sample explained that marketers and R&D managers have the possibility to develop new products when it is about local brands. Moreover, it can happen that a locally brainstormed idea can make a team to be a project leader, giving them the opportunity to implement the project first, for instance. Globally, managers consider that knowledge transfer from Multinationals to subsidiaries positively enhances new product outcomes.

4.1 Proposition1: Managers defend that network strength strengthens the effects of knowledge transfer in new product outcomes, even if some interpretations are different which makes it

interesting. Indeed, working as a network, accelerates knowledge transfer, but it does not mean that it facilitates the decision process, as one manager explained. Knowledge transfer is useful but not enough that is the reason why go or no go forums exist.

We noticed that in some cases, the role of global and local teams are so well defined and static, that it raises lack of flexibility, of creativity and of comprehension. In fact, some conflicts can emerge among those two particular teams, since the locals who know the market are tempted to develop new products and global teams whom do not possess the all and proper information about the market do not appreciate the local teams involvement and feedback. This situation occurs because the corporation should have better explained the central role of global teams as an interface that not only give but also receive essential information. To ensure open mind and flexibility since markets are dynamic, communication and comprehension are key factors to achieve good results. In fact, the more cohesion in the network, the more there is creativity, and the more the development of new products. Moreover, having a great and harmonious network, generate a bigger number of contacts, this per se generates creativity. The cafeteria forum has been exemplified as an excellent creativity source for idea generation by interconnecting employees in an informal way.

Managers explained that intensive networking is a value nurtured by the corporate culture with the purpose of guarantying the quick share of existent competences concerning innovation, through frequent meetings where managers met, for instance. It occurs that networking is more and more used whatever the department or the business. Indeed, Marketing, R&D, Logistics (stock optimization) and Sales department have to continuously communicate with each other to successfully implement new product outcomes. Moreover, as they are the source of inputs of lots of members of the organization, they all have a critical role in the development of new products.

Organizations noticed that through networking, performance is greater due to the developed synergies and to bigger visibility and creativity. Two managers suggested that the increased

communication enhances the flow of information which increases new product outcomes and position the company as a pioneer innovator. Another one affirmed that sometimes local teams work in clusters, which in a sense make them work as a network, and because their results depend on each member of the cluster, they have to properly and reasonably communicate to achieve mutual objectives. So by networking they will transfer their knowledge and brainstorm to come up with new projects or ideas. To conclude and follow that reasoning, internal network strength is a crucial factor to develop more and better products.

Managers agree with the critical role of a healthy network, (highlighted by the theory "Sharing information openly, visibly, and simultaneously is one of the most important dimensions of sustaining a network" *(Charan, 1991, p 105)*), that by the way encourages people to redirect their energies in constructive directions *(Zander et al., 2000)* to enhance knowledge transfer and though, new product outcomes.

4.2 Proposition2: Managers agree with the fact that absorptive capacity strengthens the effects of knowledge transfer in new product outcomes.

Three managers suggested that there is a lot of information circulating via different mechanisms, which makes hard its digestion and put in practice and recommended less but better knowledge transfer. In fact, not all the knowledge transferred is applicable because of a lack of time, of absorption and of analysis.

Moreover absorptive capacity from the source of knowledge is also essential. Indeed, if it does not have the capacity to filter knowledge, which will lead to new product development, then at the end; the organization might meet some problems regarding the consumer's acceptation of the new product. Innovation cannot be too radical, or too far from what the consumer is expecting.

Interviewees declared that filtering the useful and essential information is mainly a question of good sense and considered absorptive capacity at a group and individual level of judgment. Furthermore, manager emphasized that as the companies established common and standardized tools, and as everybody talk with the same language, then this facilitates absorptive capacity, which facilitates the occasion of transferring knowledge and as a consequence enhance the development of new products.

Globally, our interviews match with the theory, in fact managers agree with the point that "absorptive capacity results from a prolonged process of investment and knowledge accumulation" *(Tsai, 2001, p 998*). Managers explained that continuously exchanging know how, information and best practices is a good way to improve sales and innovation performance. Moreover, they approximated the theory which proposes that prior knowledge gained through previous product development activities, provides the firm "a stronger basis on which to build new capabilities due to greater absorptive capacity and due to larger range of experiences on which to create solutions for the ill structured problems that arise in future new product development projects" *(Marsh et al., 2003, p 144).*

4.3 Proposition3: Managers believe in the essential role of customer orientation, as a process of information transfer that leads to development of new product outcomes. One of the managers proposed that knowing the customer preferences, habits and behavior intensifies the knowledge flows from local (market) to global teams (headquarter) and surely help to develop product that matches demand. However another manager suggested that it is not always a cause consequence effect, since usually corporations have subsidiaries all over the world and it is hard to conciliate each customer's expectations, meaning that some boundaries in the transmission of knowledge occur. In other cases, it has been clarified that corporations value customer knowledge but for costs reasons or scales of economy, they cannot totally reply to specific needs; focusing on markets that represent

an important share of the worldwide sales or working by clusters and not with countries as a single market, cancelling any possible moderating effect of customer orientation on the relation knowledge transfer to new product outcomes.

Resorting to customers can have a negative impact on the development life cycle of a product; since it can enlarge it term due to a long knowledge transfer process. In fact, customer feedback may take much longer to be communicated, absorbed and applied to commercial ends, than what is really expected.

One manager stressed the eternal innovator dilemma, which consist in the fact that companies might face the risk of only incrementally innovating, since most of the time, customer feedbacks which occur through knowledge transfer mechanisms, provide input to improve or to extend a range. Nevertheless, by analyzing customers' feedback, there is always an outlier that if explored, can disruptively change the business.

Managers stated that some companies do consumer research locally in order to better understand their final customer and better catch gaps or new trends in the market, and then, transfer those inputs to the central that will compile the information and figure out new solutions. Thus, managers conclude that customer knowledge dynamise knowledge transfer which leads to new product development. We noticed that the literature reviews pretty much what happen in reality.

In fact, Grewal and Tansuhaj 2001, defended that while customers' preferences are frequently changing, the value of knowledge transfer between MNC's headquarters and its subsidiaries is undermined, since it "can make new products obsolete faster and sometimes even before a firm can recuperate its new product development and introduction costs" *(Lee et al., 2008, p 19),* while Cooper (1992) identified "customer knowledge process as a critical factor in enhancing new product characteristics*" (Li & Cantalone, 2005, p 16)*.

4.4 Proposition 4: Managers agree with our last proposition, which suggests that technological turbulence strengthens the effect of knowledge transfer on new product outcomes. Technological turbulence enhances the development of new products, however being a dynamic turbulence it increases a sustainability issue. Indeed, not having critical mass to justify the elaboration of a new line disable the viability of a new project. As a result, the technology might be held but the market might not be ready to receive it, meaning that the costs incurred will be greater then the possible revenues. Therefore, following technological turbulence do not always ends with positive outcomes, since in some cases, the technology has to stay in "stand by" until the market exists or consumers show a need. Managers have to be attentive to technological evolution in order to anticipate customers' needs, which is doable through intensive communication among the multinationals.

We notice that technological turbulence affect new product development with some limitations. Indeed having in mind the customer exigencies, turbulence has to be analyzed and tradeoffs made regarding the impact of that turbulence in the new product development process. Is it better to consider that turbulence while developing new products, or shall we consider that this turbulence does not worth that investment?

Depending on the industries, we have figure out that technological turbulence do not have the same strength. In fact, some industries like Food and Beverage do not require that much technology, so manager's interpreted technological turbulence regarding the tools (machines, IT systems) that can be developed to improve the production process or the R&D investigation, which as a consequence will manage a better and greater product development process.

In the case of mature or dropping markets, technological turbulence can be the light of a deep tunnel, since it refreshes the activity due to its broad impact in both competition and consumers. Moreover, even if great ideas are not so easily brought to the table in those markets, it is always good to share

them, since lots of small ideas generate huge value. Manager explained that theoretically turbulence should bring more innovation to the market, however the process is long and costly and sometimes it happens that the product developed never reaches the market due to not being the first to enter, not matching customer's needs or because of some competitors' patents that were not known.

Managers demonstrated that technological turbulence increases the frequency of communication among teams since time to react as a response to that turbulence is limited. Indeed, there is always a risk of the information being transmitted to be outdated, which can be prejudicial for the operationalization of that information. Furthermore, if technological turbulence is high, then it concerns every subsidiary, thus transferring knowledge is essential to be able to absorb that turbulence and take advantage of it. To conclude, technological turbulence request specific attention from managers in order to be sure that it is worth investing in a new project. Teams have to integrate that new technology in a coherent way, matching it with the organizations' mission and value, to ensure credibility. Once again, the interviewees agree with the literature. They all settled that technological turbulence requires greater and faster knowledge transfer to positively affect new product outcomes. Indeed, "turbulence is likely to reduce the value of prior learning, which forces the organization to search for and process more information about the environment" *(Moorman et al., 1997, p 96).*

4.5 Other findings:

We noticed that the flow of information transferred affecting new product outcomes, not only depends on network strength, absorptive capacity, customer orientation and technological turbulence but also on the corporate culture, the external ties or even the knowledge integration mechanism.

From the theory, we notice that new product outcomes is a function of the firm's internal culture and climate for innovation (e.g. support for teamwork and "intrapreneurs") and a function of senior

management's involvement with and corporate commitment to new product development *(Kleinschmidt et al., 1994).* Settings that have been confirmed by managers which pointed that the intensity and the quality of the knowledge transferred depend on the corporate culture leading to new product outcomes. Indeed, it happens that a corporate culture believes knowledge transfer to be a priority in order to develop competitive advantage, and by communicating that idea to the members of the organization, they will have more incentives and more willing to achieve that goal. But also that top management leadership has an important impact in the way the corporation organizes itself as an internal network as well as their openness to the others developing external network. Indeed, as a manager noted, it is always good to maintain and cultivate relations with external partners, as we never know if at some point we will directly depend on them or work for them. Managers supported the point that developing a good relationship with external partners; increases communication, confidence and a better understanding of expectations which leads to better performance and higher capabilities to anticipate new trends and develop new products. Moreover, it was enlightened that by enlarging and developing external network, they achieve synergies, since their supplier for instance that continuously work with them, understand better their strategy, mission and values which facilitates comprehension and efficacy. This argument matches with the theory that defends that by not taking into consideration the acquisition and application of external sources, the success of new product development will be jeopardized *(Marsh et al., 2003)*, but also that "organizations' ability to innovate depends on their capacity to integrate external with internal knowledge" (*Shu et al, 2005, p1*). As referred by the theory, Okhuysen and Eisenthardt (2002) found that "conventional knowledge transfer approaches, need to be complemented by formal intervention mechanisms to enable knowledge integration" *(Subramaniam, 2006, p 552),* since the KBV suggests that "knowledge is sticky, in other words, its characteristics make it difficult, costly and uncertain to transfer and to recombine within the firm" *(De Luca et al., 2007, p 96).*

Managers declared that to manage efficiently all subsidiaries, homogeneous methodologies and processes of work exist (templates, strategy uniformed, network of suppliers, autonomy given regarding promotion and sales of products). The purpose is for every member of the organization to speak the same language, and to have the same vision and values. This permits to create synergies among the teams, to save time and money and to increase competences.

Even tough managers do not have a central role in the development of new product, since they basically implement the best practices of the success models, they noticed that it exists a lot of knowledge transfer mechanism implemented by the firm, which they value a lot, considering them as an enabler of communication at a worldwide level, without distance, language or time limitations. This argument follows the reasoning that "the many impediments to knowledge integration associated with multinational innovation structures can be offset by managers through the development of an appropriate and supportive set of organizational mechanisms" *(Frost et al., 2005, p 677).*

A great tool to enhance knowledge transfer is definitely the mobility of the managers, which is often a requirement from the companies. Indeed, joining foreign subsidiaries not only is a rich personal experience but it also is benefic for the recipient of the information. Indeed, one manager mentioned that mobility enable employees to be a source of knowledge but also a recipient leading to positive new product outcomes, since one of the purpose to travel or even to be an expatriate is to absorb the full knowledge in progress and increase their business performance through communication. This was confirmed by the theory that defends that "mobility of personnel between departments or sub-units within an organization is also a stimulus to innovation" *(Sanchez et al., 2003, p 60).*

To conclude if knowledge transfer is perceived as a possible motor for innovation, and if clear mechanism are developed to facilitate and enhance active transfer, then the outcomes will be positive.

5. Conclusion

The goal of this exploratory study was to propose a conceptual framework linking knowledge transfer to new product outcomes through contingents' factors. Our conceptual framework was validated by the interviewees.

Managers highlighted that both internal and external network as a single moderator would definitely strengthen much more our problematic, since externalities have to be considered while you are a company in a dynamic environment. This would be enabled by an active participation of top management in divulging the central role of cooperation and communication internally and externally.

Regarding, absorptive capacity, it is definitely a way to filter knowledge and apply it to commercial ends, reaching positive new product outcomes, however, incentives from corporations should be developed to privilege quality instead of quantity of information flows.

When conducting a customer oriented vision, boundaries have to be settled regarding the possible insights collected. Indeed, customers' "touch" might bring too broad or too specific insights, not marketable on large scale, and might also delay reactivity in the business. In fact, reactivity is required to respond to technological turbulence, to be the first to enter new opportunities, however tradeoffs have to be performed either following the move or holding the current strategy. It is all about being able to sort out opportunities, thanks to existent and transferred knowledge and keeping in mind the final objective which is to enhance new product outcomes. To conclude, MNCs have to be reactive to respond to a dynamic and exigent market, but at the same time prudent, since knowledge transfer is a long process of investment and knowledge accumulation.

Conceptual work in the research problem is still in the early stages, thus, although we view the contributions of this study as important, in light of future researches, we view them as at best modest. In fact, several promising directions for future research subsist.

Limitation and future research:

First of all, it should be interesting to introduce an industry type control variable, like "technological intensity" since the ease by which knowledge can be codified and the need for interaction and iterations in the innovation process should be different in the high technology industry, for instance.

Secondly, one might consider that by studying one industry in one country might end up with some biased conclusions. Indeed, it is not so obvious that those results can be generalized to other industries, as the theory highlights "there is no "one size fits all" policy. What works in one subsidiary is not necessarily appropriate for another (*Lucas*, 2006, p 272). It would be producing "average" results instead of realistic ones. Moreover, in our framework we consider knowledge transfer, as a vertical flow from headquarter to subsidiaries, whereas conclusions might have been different if we had considered inter-firm and intra-firm, horizontally and vertically. Indeed, Kessler and Charkrabarti (1996) suggested that "to bring a product to market requires that organizations form linkages, upstream and downstream, lateral and horizontal" (*Kessler et al, 1996, p 1172)*.

For future research, we recommend to lead this conceptual framework in other countries in order to be able to compare them and also to determine foreign subsidiaries' behavior regarding their capacity to absorb and send knowledge and at which extent they participate to the new product development process. It should be interesting to interview managers from both headquarters and theirs subsidiaries to have insights of how the framework fits in these 2 sides. Studying the impact of exchanging knowledge in each innovation step during the development process might bring useful conclusions. Indeed, it will permit us to know if managers continuously or punctually exchange knowledge in the innovation procedure. Finally, future research could observe the research problem taking into consideration the impact of similar cultural contexts between headquarters and subsidiaries, the leadership involvement in the corporation, the headquarters' country of origin, knowledge integration mechanisms and different directions of knowledge transfer.

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Appendices

Appendix A: Operationalization of the Variables

In this appendix, you will find the operationalization for each variable, used to explain the concepts in the interview phase.

	Scale	Items measured	Source
Knowledge Transfer	To measure this variable, that represents the level of intensity with which knowledge flows between headquarters and its selected subsidiary, a four items anchored on a seven point semantic differential scale (1= "not at all intensive, and 7= "very intensive") was processed.	-Information and knowledge transfer between the headquarters and this subsidiary related to customers … -Information and knowledge transfer between the headquarters and this subsidiary related to competitors … -Information and knowledge transfer between the headquarters and this subsidiary related to needs and preferences … -Information and knowledge transfer between the headquarters and this subsidiary related to marketing actions and strategy …	The items discussed were essentially about knowledge related to customers, to competitors, to needs and preferences and to marketing actions (Lee et al, 2008, p 23).
New Product Outcomes	Measured by the adaptation of items from the work of Moorman (1995) which were then anchored on a seven-point bipolar scale (Moorman 1995; Song and Parry 1997).	Compared to our major global competitors: -Our products are … not at all creative/ very creative. -The degree of product differentiation is …relatively low/relatively high. -The success rate of our new products is … relatively low/relatively high.	Respondents evaluated the new products introduced for the global market regarding their creativity, their level of differentiation and their success rate compared to the major global. (Lee et al, 2008, p 23).
Network Strength	Adapted from the work of Antia and Frazier (2001) on a seven-point Likert scale.	Using 5 items: the degree of close ties, the frequency of interaction, the type of relations, the frequency of communication, and the frequency of problems discussion among subsidiaries.	(Lee et al, 2008, p 23).
Absorptive Capacity	We adapt both Tu (1999) and Leonard-Barton's (1995) empirical work to a set of items which were aimed at assessing 4 dimensions on a 7-point Likert-format scale with anchors at 1="strongly disagree" and 7="strongly agree".	Tapping four dimensions; external scanning ability, existing technology/ market knowledge, communications networks, and communications climate.	(Sheremata, 2004, p 216).
Customer Orientation	Customer orientation, is measurable on a five-point Likert's scale (1=very low, 5=very high) (Narver and Slater 1990)	-My firm's objectives are driven by customer satisfaction. -We continuously monitor our level of commitment and orientation to serving customers' needs. -We measure customer satisfaction systematically and frequently. -My firm's strategies are driven by our beliefs about how we can create greater value for customers.	Refers to the extent: "to which the customer is involved in product and process improvement, to which the feedback is used for continuous improvement and the processes employed to obtain the voice of customers into design, manufacturing and delivery." (Madanmohan, 2005, p 507)
Technological Turbulence	Based on the definitions and measurement developed by Jaworski and Kohli (1993), the degree of technological turbulence was measured on a seven-point scale, where 7 =strongly agree and 1=strongly disagree.	-The speed of change of the technologies embedded in current products is fast in this industry. -Technological changes can provide the industry with tremendous opportunities. -The technologies of this industry develop quickly. -Firms in this industry face big pressure in technological change.	(Y. Li et al, 2008, p 73).

Appendix B: Companies and People Interviewed

	Company 1	Company 2	Company 3	Company 4
Sector	Food & Beverage	Household & Bodycare	Motorcycle engine	Food & Beverage
Position	Innovation Manager	Marketing Manager	Marketing Director	Iberia R&D Product Manager

	Company 5	Company 6	Company 7	Company 8
Sector	Telecommunications	Telecommunications	Beverage	Cosmetics
Position	R&D Product Manager	Strategic Marketing Manager	Brand Manager	Brand Manager

	Company 9	Company 10	Company 11	Company 12
Sector	Food & Beverage	Pharmaceuticals	IT	Household & Bodycare
Position	Brand Manager	Marketing Manager	Category Marketing Manager	Category Marketing Manager

Appendix C: Interviews

C2: “Nem todos os dias temos ideias out of the box”, por isso sim, a transmissão de conhecimentos leva ao desenvolvimento de novos produtos, mas pode ser incremental vs radical (new to the world) já que as primeiras sustentam o investimento das últimas.

C3: “O desenvolvimento de produto é feito com base na tecnologia e no que está a fazer a concorrência.” Por isso a transmissão de conhecimento, de informação sobre os mercados, concorrência, novas tecnologias é muito importante.

C6: “Obviamente a transferência de conhecimento leva ao desenvolvimento de novos produtos, no entanto nem toda o conhecimento pode ser aplicado no processo de desenvolvimento.”

C11: “Se a equipa central, situada numa zona específica dos EUA, “não beber do mundo inteiro, é lhe impossível adaptar produtos à realidade global” – “é o que faz a riqueza da empresa”

C12: Apesar de se implementarem a nível de marketing local., “best practices” dos “lead countries”, existem sessões criativas de geração de ideias em que todos os países participam, logo todos acabam por estar envolvidos no desenvolvimento de inovações.”

Proposition1: Network Strength strengthens the effects of Knowledge Transfer in New Product Outcomes. (Moderating effect)

C1: "A pior ou melhor performance dos novos produtos tem muito mais a ver com o quanto esses produtos “casam” directamente com as expectativas dos consumidores do que propriamente com a estrutura em network. A network pode acelerar o momento em que essas inovações chegam ao mercado. Se chegarem antes da concorrência é expectável que obtenham uma melhor performance."

C2: - “E um output do funcionamento da empresa, como processo de partilha de informação”

- “O funcionamento em rede, é uma competência fundamental para poder gerir projectos em vários países ao mesmo tempo.”

C8: “O funcionamento em rede permite sinergias, e difusão de informação em tempos records, que permite posicionar a empresa como pioneira na inovação.”

C12: “Relativamente à network interna, é sem dúvida um factor crucial para desenvolver mais e melhores produtos. Departamentos como marketing, R&D, market research, vendas...têm que estar permanentemente em contacto, pois todos eles têm uma palavra a dizer no desenvolvimento de novos produtos.”

Proposition2: Absorptive Capacity strengthens the effects of Knowledge Transfer in New Product Outcomes. (Moderating effect)

C2: “Pelo julgamento próprio, por isso pode levar a enganos.”

“A estrutura organizacional obriga as pessoas do local e global a colaborarem, daí as reuniões trimestrais, para estar a par do que se passa.”

C7: “Qualquer palavra, duvida que escrevemos no browser, aparece informação”.

C4: “Essa troca de informação, faz com que haja mais desenvolvimento de produtos, mais aberturas de projectos, e mais credibilidade quando se apresenta o projecta, já que existem fundamentos de outras subsidiárias.”

Proposition3: Customer Orientation strengthens the effects of Knowledge Transfer in New Product Outcomes. (Moderating effect)

C4: “Portugal e Espanha funcionam a nível de cluster, os lançamentos efectuados num país ocorrem também no outro omitindo que as preferências dos consumidores sejam diferentes.”

C8: - “Obter o máximo de informação sobre o consumidor, permite captar novas tendências de consumo, novas necessidades, e depois de filtrada e transmitida a informação útil, é então iniciado o processo de desenvolvimento de novos produtos. “

C9: “Em cada fase do processo de desenvolvimento de um produto, é tomado em conta a opinião, a preferência, a necessidade, o comportamento do consumidor no passado e no presente, para ver se o que esta a ser desenvolvimento fit com as expectativas do consumidor. Por isso podemos dizer que o conhecimento do consumidor realça a transmissão de conhecimento o que leva ao desenvolvimento de novos produtos.”

C11: “No entanto o facto de se receber constantemente feedback, pode prejudicar o ciclo de desenvolvimento do produto, devido ao prazo com que o consumidor comunica com a empresa ser maior do que o processo de desenvolvimento.”

C12: “Os nossos consumidores são sempre o ponto de partida para o desenvolvimento dos novos produtos. Para tal, existe uma série de ferramentas de research que nos dão insights para desenvolvimento não só de novos produtos, bem como para a constante melhoria dos produtos já comercializados”

Proposition4: Technological Turbulence strengthens the effects of Knowledge Transfer in New Product Outcomes. (Moderating effect)

C2: “Com a turbulência, há uma necessidade acelerada de dar novos conhecimentos.” - “Cada vez mais informação tem que ser partilhada, para que o insight de cada mercado seja aplicado pelo outro sem que cada um esteja a iniciar um investimento ao começar de forma autónoma.”

C5: “A turbulência é estímulo para a inovação.”

C11: “Não nos podemos deixar levar por uma moda de um momento, porque elas vão e vem, num abrir e fechar de olhos, por isso a turbulência tecnológica nem sempre intensifica a relação transferência de conhecimento – desenvolvimento de novos produtos.”

C12: “As novas tecnologias são muitas vezes o ponto de partida para uma inovação, quer seja a nível de performance do produto, quer na eficiência da sua produção, comercialização, mas requerem muita pesquisa, muitos fluxos de transferência de conhecimento.

Appendix D: Interview Guide

The following guide was used as a rough guide, enabling the interviewer to react to the individual situation whilst following a general outline of research questions.

1 – Filters
Making sure that the interviewed person is a marketing or R&D manager in the consumer goods Industry, and that he/she is knowledgeable about information concerning new product development process.

2 –Guiding principles:
Warm-up and initial question
...As you know, I am a student of the Management Master at Faculdade de Economia da Universidade Nova de Lisboa; and I am conducting interviews in Portugal about contingencies that might affect the relationship between knowledge transfer in MNCs and new product outcomes*.

For that purpose I will introduce now a first question regarding this subject and after that you will be free to tell me whatever comes to mind regarding this topic.

This interview will last approximately 40 minutes.
And the question is:
What comes to your mind on this topic*?
Would you please tell me which variables do you consider to be important for the development of new products through knowledge transfer?

Main topics to be developed...

− Business Issues
What product sectors does your company operate in?
Is the company structured according to these product sectors, or in some other way?

− Role of Knowledge Transfer
What challenges are affecting your company at the present time?
- Technological changes (internal)
- Market changes (customers)
- Environmental (conjuncture etc.)

How is headquarter – subsidiary communication links managed?

− Involvement in New Product Development
What sort of Product Development do you carry out? Is this product development carried out within each division or is there one team responsible for all product development?
What is the source of most new product ideas?

− The conceptual framework
Variables that affect the relation Knowledge Transfer – New Product Outcomes
Is the framework accurate? Suggestions to improve the framework (more variables, different relationship between each existing variable)