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Analysing Social Capital and Product Innovativeness in the Relationship Evolution of Born-Global Companies
the Mediating Role of Knowledge Acquisition

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Analysing Social Capital and Product Innovativeness in the Relationship Evolution of Born-Global Companies the Mediating Role of Knowledge Acquisition

Abstract

From the extant literature, we know that both social relations and business networks of Born global companies are critical for their international operations. In the extant literature on networks of BGS there are mainly two types of embeddedness: relational and structural embeddedness, but while they are well scrutinized in the strategy and management literature, they are almost completely neglected in the international business literature, especially in relation with innovation activity. Our research aim is to study the direct and indirect effects of relational and structural embeddedness on innovation of born global firms, by including the mediating role of knowledge acquisition. The focus is on vertical strategic partnerships between high-tech born global companies and their key foreign customers, by using a structural equation model to test our hypotheses. We provide results with interesting theoretical and practical implications for born global companies in terms of both relational and structural embeddedness but also innovation.

Introduction

Born globals and international new ventures are young firms operating in high technology industries, which begin to internationalize soon after inception and do this at a high speed. It is a well-known fact that high-technology is well represented among born globals and international new ventures (XXXX), which mean that they often produce and sell advanced and unique products, but, as their domestic market often is small, they are forced to pursue a niche-strategy (XXXX) in order to survive and grow. From the extant literature (XXXX), we know that knowledge and learning as well as networks and relationships are key concepts of our understanding of these firms' international strategy. Regardless of the fact that they tend to be high tech firms, one neglected area in internationalization research is the born globals' international innovation activities. In particular, a gap prevailing is that we have little knowledge about how the international innovation activities of born globals are related to their international networks. Both social relations and business networks are critical for born globals' international operations (e.g., Coviello, 2006), but we cannot find any studies on how the born globals' embeddedness influences the innovation and product development. In the extant literature on networks there are mainly two types of embeddedness: relational and structural embeddedness, but while they are well scrutinized in the strategy and management literature (xxxx), they are almost completely neglected in the international business literature, especially in research on born globals and inter-organizational networks. The embeddedness reflects to what extent the firm holds an insidership position in the foreign market network, which, in turn, Johanson and Vahlne (2009) argue, gives an advantage to identify and develop opportunities in the market. Networks are, thus, systems of joint learning and distribution of information between the firms, and as new knowledge is needed in order develop new products, embeddednes is critical for firms' acquisition of knowledge. As each born global's network is unique and each network has a border in the eyes of the beholder; it has a horizon. The firms acting inside the network have an advantage in terms of finding new opportunities compared to those that are outside the network (Johanson and Vahlne, 2009).

In this study, we assume that innovation is not the starting point of the born global's internationalization process, but something that is developed and exploited when the firm is embedded in an international network of relationships, because knowledge, which drives the born global innovation activity abroad, emerges in interaction with specific actors in the foreign market's network. The focus is on business exchange, that is, the role of the key customer, which represents the main source of foreign revenues of the firm. New product development is an uncertain and non-predictable activity. The risk accompanying product development can partly be reduced by cooperating and interacting with the potential user of the product developed. Thereby, the firm is early in the innovation process confronted with existing needs and preferences related to how the products is planned to be used or consumed.

Our research aim is to study the direct and indirect effects of relational and structural embeddedness on innovation of born global firms, by including the mediating role of knowledge acquisition. The focus is on vertical strategic partnerships between high-tech born global companies and their key foreign customers, by using a structural equation model to test our hypotheses. These results, first of all, contribute to a better understanding of the importance of networks with customers in fostering innovation of the born global companies. Acting in the network rather than holding a specific position in the network leads to acquisition of knowledge useful to innovation activity. Second, we contribute to evaluating the mediating role of knowledge acquisition in the relationship between foreign networks and innovation of born globals. In opposite to most other studies (e.g. XXXXX), we are not primarily interested in the body or volume of the born global's knowledge, but in the activity of acquiring knowledge, and more particular, in the firm's knowledge acquisition in the relationship with its key customers, which we view as instrumental for innovation activity. Third, we capture two specific aspects of foreign networks, which have not been empirically deeply studies in the research, that is, structural and relational embeddedness. As networks are governed by norms and value they are likely to differ between country markets, in the same way as they differ between industries (Rowley, Behrens and Krackhardt, 2000), we contend that we need to pay attention to the network's

embeddedness in different market At this moment, this is the first study capturing all these elements in a same framework.

Paper is structured as follows: first, we describe the theoretical context of the research, then we justify and formulate the hypotheses, and we describe the empirical section, findings and final conclusions.

Theoretical framework – The born globals’ network and the embeddedness

A BG firm is generally defined as a “business organization that, from or near [its] founding, seeks superior international business performance from the application of knowledge-based resources to the sale of outputs in multiple countries” (Knight and Cavusgil 2005). The phenomenon of BG start-ups cannot be effectively explained by traditional stage-based approaches to internationalization (Johanson and Vahlne 1977, 2003; Cavusgil 1980; Reid 1981; Autio 2005), so international entrepreneurship theory emerged, in an attempt to integrate traditional international business studies (e.g., export theories and foreign direct investments) with entrepreneurship theory (Coviello and Jones 2004). According to Oviatt and McDougall (2005, p. 540), international entrepreneurship refers to “the discovery, enactment, evaluation and exploitation of opportunities across national borders to create future goods and services.”

Empirical evidence that suggests the rapid and significant performance gains of BG startups also has prompted some confusion, because researchers have long accepted the traditional notion that the liability of newness affects all new ventures, especially in emerging and technological sectors (Aldrich and Fiol 1994; Deeds et al. 2004). At a general level, international entrepreneurship theory proposes that the development of networks by BG start-ups is the most critical variable reinforcing the BGS’ growth (Kuivalainen et al. 2007; Baronchelli and Cassia 2011).

Given the heterogeneity of the network, we need to specify the model of business relationships in foreign market networks that we use in the following discussion. Thus, the business network view developed in Uppsala research in international business (Anderson, Håkansson and Johanson, 1994; Håkansson and Snehota, 1995; Johanson and Mattsson, 1988; Johanson and Vahlne, 2009) is our conceptual base. This view is based on empirical observations that firms develop lasting business relationships with each other (Håkansson, 1982). As export and international sales to a large extent drive the international expansion of born globals, we focus on the relationship with the firm's key customer.

While we are focusing on the ability to act and learn inside social networks of born global firms abroad, we capture two different dimensions of social networks following the work of Nahapiet and Ghoshal, that is, the *structural embeddedness* and the *relational embeddedness*. Refining Granovetter's conceptualization of embeddedness, Nahapiet and Ghoshal define structural embeddedness as 'the impersonal configuration of linkages between people or units' (p. 244). These include the presence or absence of network relationships between actors, along with other structural features like connectivity, centrality and hierarchy. In contrast to the 'impersonal' nature of structural embeddedness, Nahapiet and Ghoshal define relational embeddedness as the 'personal relationships people have developed with each other through a history of interactions' (Nahapiet and Ghoshal, 1998: 244). Key facets of relational embeddedness include interpersonal trust and trustworthiness, overlapping identities, and feelings of closeness or interpersonal solidarity. Unfortunately, such dyad-specific qualities of social capital have been given much less empirical attention (see Uzzi, 1997; Tsai and Ghoshal, 1998) and, as Rowley et al. (2000) argue, they have not been empirically disentangled from social capital's structural attributes. We affirm that both these two dimensions of the embeddedness (structural and relational one) are useful to improve the knowledge acquisition and the innovation of born global companies.

Relational embeddedness refers to the quality of the firm's direct dyadic relationship, while structural

embeddedness commonly concern the configuration of the firm's network, that is, the indirect relationships (Barden and Mitchell, 2007, Moran, 2005). Relational embeddedness develops in a process where firms frequently cooperate and interact, which leads to that the economic exchange between the firms becomes embedded in the social relations. The structural embeddedness focuses on the idea that business relationships can also be indirectly connected to other relationships that have some bearing on them. The born global conducts business with specific customers in the network, which is the foundation for how, where and why it can expand internationally. Firms enter and act in international networks, and within this structure there is a horizon how far they can see.

Internationalization is a result of achieving growth of the already existing business relationships with customers and suppliers in the foreign market's network (Presutti, Boari, Fraticchi, 2016, 2007), but also of developing more distant and indirectly connected relationships within the network horizon. Expanding ongoing business can be achieved, for instance, by developing, starting to use or exchange new products, services or raw materials, but also by applying new methods of production and new ways of organizing ongoing business that is, by developing new products. This type of new product development can be viewed as a process, characterized by a gradual specification and consolidation of a new product as it evolves in interaction with other firms in the network. This is consistent with the internationalization process model that regards the process, as interplay between commitment and experiential learning (Johanson and Vahlne, 2006), which is mainly based on the experience of interacting with customers.

Hypotheses development

Structural embeddedness and knowledge acquisition

The structural embeddedness denotes the extent to which foreign customers allow the born global access to a broader set of new contacts, which the literature discusses as "other appropriable social structures" (Uzzi, 1997) that foster the identification of new business opportunities to acquire

knowledge abroad (Presutti, Boari & Fracocchi, 2007). We acknowledge that a born global with high levels of structural embeddedness in its relationships with foreign customers can better acquire knowledge from its foreign customers (Adler & Known, 2002; Mu, Peng & Love, 2008). Knowledge acquisition in networks with high levels of structural embeddedness refers to the activity where born globals tap into external resources through the conducting of business with specific customers in the network (cf. Jarillo 1989). This is a cost-effective way to acquire knowledge and resources not under the firm's control. Several studies have emphasized the importance of networks to born globals and INVs (Coviello 2006) and there has been an increase in research stressing the importance of structural embeddedness for knowledge acquisition (Eriksoon et al., 1997). It refers to the capacity to develop and utilize a variety of relationships in order to grow and expand in foreign markets. Networks give access to resources and knowledge not otherwise available (Dhanarai et al., 2004; Peng and Zhou 2005). This implies a competence to coordinate and utilize a set of inter-related cross-border relationships, that is, to derive value from a differentiated set of network relationships (Hohenthal, Johanson, Johanson, 2014).

Building on the assumption of resource heterogeneity in the structural embeddedness of foreign networks, it follows that both customers and customer relationships are specific and different from one another. As networks consist of relationships between firms that buy from and sell to each other, we expect that the more attention the firm pays to its customers and the more open it is towards these customers, the more it learns about them and their operations. This highlights the central role of the specific relationships with foreign customers characterized by high levels of structural embeddedness. Knowledge about the network characterized by high levels of structural embeddedness makes it possible to evaluate new technological ideas and opportunities and, when needed, to adapt them to the network.

Hypothesis 1: The greater the level of structural embeddedness between a born global and its key foreign customer partner, the greater the knowledge acquired from this customer.

Relational embeddedness and knowledge acquisition

The relational embeddedness concerns the types of personal relationships people have developed through a history of interactions (Granovetter, 1992). It develops at the individual level as respect, trustworthiness and friendliness and may create strong inter-organizational relationships. Moreover, it is represented by the development of common goals, norms and reciprocal expectations concerning the goodwill and trustworthiness of the exchange partner (Larson, 1992; Nahapiet & Ghoshal, 1998). We recognize that the relational embeddedness may increase relation-specific common knowledge through the higher frequency and greater breadth and depth of the processes of diffusion and transfer of profitable information between business partners (Ring & Van de Ven, 1994; Zahra, Ireland & Hitt, 2000). It reduces the risk of reciprocal opportunism and, more generally, lowers transactions costs, allowing business partners to develop reliable and effective communication channels and reducing uncertainty about economic performance outcomes (Gulati, Lavie & Madhavan, 2011; Stam, Arzlanian & Elfring, 2014). That is to say, relational embeddedness is conducive for firms to receive valid knowledge and detail information, which are the key to test the veracity of firms' perceived opportunities

High relational embeddedness enhances emergence of fine-grained knowledge between the supplier and customers in the relationship, as embeddedness entails social interaction and mutual trust. Trust prevails, when the firms in a relationship avoid exploiting the counterpart's weaknesses and vulnerability in order to enrich themselves. In relationships characterized by relational embeddedness joint problem solving, learning and information sharing are likely to co-exist (Uzzi 1997). Trust enhances the reliability and volume of information exchanged between supplier and customer. On the other hand, a low degree of relational embeddedness is likely to prohibit the flow of information

between firms. Consequently, such relationships do promote acquisition of knowledge. Relational embeddedness promotes both acquisition and exploitation of knowledge, as it leads to openness and information sharing, which, in turn, reduces the uncertainty (Zaheer, Soda, 1999). When firms operate together they tend to develop shared value and to lead to a mutual understanding of each other's needs and capabilities and of both behavior and expected results from this behavior. This influences both actions performed and decisions made in the relationship (Gulati, 1998). Therefore, relational embeddedness seems to be a favored circumstance for knowledge acquisition in the relationship with key customer (Agndal, Chetty, Wilson, 2008).

According to Moran (2005) relational embeddedness determines how much of the resources that are within reach will be accessed, and to what extent. Thus, a firm may have several relationships with customers, all possessing experience, resources and skills, but the quality of the social relations is likely to determine to what extent they are able to share each other's resources and knowledge. The risk of new product development is twofold, where the first is if the new product would meet the needs and preferences of customers, as there is always a risk that the new product will not be compatible with needs and trends in the market. The second is a product of whether the firm possesses the knowledge and capabilities to develop the new product. These risks can be reduced by cooperating and interacting with the potential users, namely the customers. The more the firm can predict that the new product will be sold and used by the customer, the more confidence in the process and as relationships are stable, relational embeddedness increases predictability. Closeness and trust, which implies that the firm and its customers are familiar and perceived the counterpart as reliable, which, in turn, lead to that if the relational embeddedness is not misused in an opportunistic way, the relationship is strengthened and becomes long-lasting and durable. We posit:

Hypothesis 2: The greater the level of relational embeddedness between a born global and its key foreign customer partner, the greater the knowledge acquired from this customer.

Knowledge acquisition and innovation (new product development)

The last two decades have displayed a change in how firms, and in particular small and medium sized firms, undertake innovatory activities as firms more widely involve their customer relationships and use their external networks to acquire knowledge useful to innovate. Innovation is often a product of interactions among different actors interacting to acquire knowledge which is the base of all profitable innovation process. Thus, the wider the knowledge acquired, the more likely the born global is able to develop new products. A big key customer in a foreign market has a specific importance, partly because it represents a big share of the turnover in the market, partly it functions as pipe through which information can flow from other actors in the market, and, finally, it can play the role of springboard to new customers and new markets in the foreign country. Consequently, we contend that the firm through the relationship with its key customer is able to obtain both general market knowledge, which may concern other potential customers and suppliers, but also cultural and institutional knowledge, which can be linked to product the firm, is developing. In addition, as the key customer is planned to use the new product, it can give specific knowledge about technology relevant for the market, which also has a positive impact on product development.

The second component of the knowledge acquired in the relationships with the key customer goes beyond the customer, and instead related to other firms in the network. The key customer transmits information about needs and trends in the network. Thus, this information comes from other sources in the networks; sources in the firm's indirect relationships, located outside the firm's network horizon. However, taking into account that the transmitter is the key customer, implies that a certain level of trust prevails in the relationship, which makes the experience, opinion and ideas of the key customer relevant and valuable. In this way the firm may identify the customers' needs and preferences early and in detail and quickly observe new needs and trends in the market (cf. Fang, Palmatier and Evans, 2008; Noordhoff et al., 2011).

As the knowledge acquired in other relationships with foreign key customers gives the born global a memory of how to handle a specific problem, the born global can establish routines and

structures to manage the process of new product development. In line with this, Coviello and Joseph (2012) find that the capability to act in networks to acquire knowledge has a critical influence on innovation. As a born global involves its key customer in product development and interacts with key the partner to acquire knowledge they may perform various types of innovation work. In this light, no matter the extension of networks or the maintenance of existing relationships, the interaction is characterized by identification of shared interests, such as improved efficiency, profit or value, between suppliers and customers for the purpose of bringing about coordination and cooperation. Interaction in network generates trust and cooperation between customers and suppliers (Phelps, Heidi, Wadhwe, 2012; Uzzi 1997). The prevailing trust makes it likely that the knowledge acquired and the information exchanged is perceived to be of a high quality by the suppliers and customers and to be valid for the innovation.

Hypothesis 3: The greater the knowledge acquired from the key foreign customer partner, the greater the new product development.

Innovation and new product development emphasizes the acquisition and development of knowledge through born global companies' actions and reactions in the network (Alvarez and Barney 2007). Accordingly, new product development is based on knowledge, which is of value perceived by the born global and may lead to more efficient, profitable or valuable way of using resources. Product development is contingent on the information and knowledge generated from born global firms' interaction with other actors in the network. Firms thereby firms evaluate, modify and justify their perceptions about potential innovation and technology development based on the born global's own and others' knowledge. In the network where firms interact with others, firms acquire experiences of acting in international networks. Internationalization is partly about maintaining and strengthening the existing relationships, which, for instance, can be done by introducing new products, technologies and processes in relationships to the born global's customers.

As relational embeddedness entails reciprocity and interdependence it results in behavioral expectation, which produces predictability (Uzzi and Lancaster 2003).). At the same time, structural embeddedness refers to the capacity to develop and utilize a variety of relationships in order to grow and expand in foreign markets (Dai and Liu 2009; Peng and Zhou 2005). This point does not only mean that the exchange can be performed, but that problems emerging can be solved and that information and knowledge can be exchanged. Uzzi and Lancaster (2003) find that both tacit and explicit knowledge can be exchanged. The firm and its customer screen each other's needs so that they can be matched with the resources and knowledge of the firms. This leads to a cost-efficient learning.

In short, acting in relationships is likely to have a positive influence on the process of acquisition of knowledge and by doing this the firms can use this knowledge as a platform for product development, which, in turn, strengthens the already existing business relationships. The more knowledge the born global has accumulated on product development in customer relationships, the more confident it is that it can do this again. Thus, the experience from acquiring knowledge in international networks reduces the perceived uncertainty, and is likely to lead to establishment of routines to repeat product development. Furthermore, the fine-grained knowledge gained from existing relationships is not just about the counterparts themselves, but also is about counterparts' counterparts' information and capabilities, which facilitates the born global companies' development of new products.

Hypothesis 4a: Knowledge acquisition in the foreign market's network mediates the relationship between structural embeddedness and new product development.

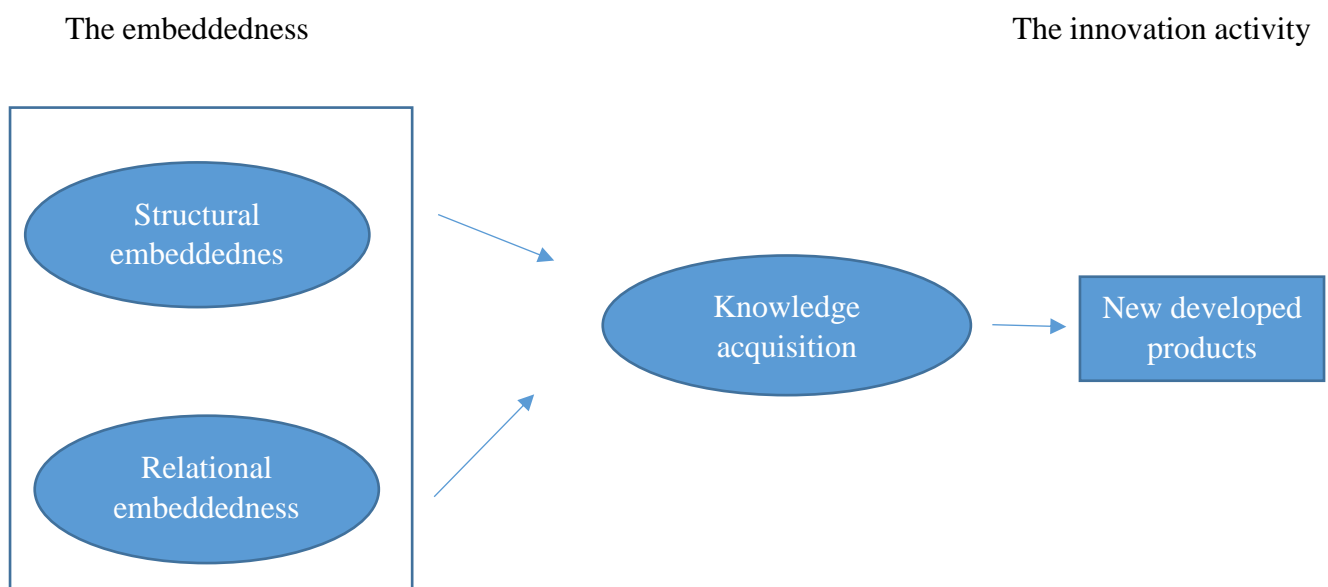
Hypothesis 4b: Knowledge acquisition in the foreign market's network mediates the relationship between relational embeddedness and new product development.

Table 1 formalize the research's hypotheses and Figure 1 describes the hypothesized model

Table 1 Research's hypotheses

				Hypothesis	Supposed effect
Structural embeddedness	on	knowledge acquisition		H1	+
Relational embeddedness	on	knowledge acquisition		H2	+
Knowledge acquisition	on	new products development		H3	+
Structural embeddedness	on	new developed products via knowledge acquisition		H4a	+
Social embeddedness	on	new developed products via knowledge acquisition		H4b	+

Figure 1: The hypnotised model



Method

Sample and data

The field setting of this research consists of a geographical cluster of small and medium-sized high-tech firms located in one of the most important areas in central Italy, the Tiburtina Valley, which is approximately 14 kilometres from the centre of Rome. This urban cluster has already been the focus of previous international studies (Presutti et al. 2007, 2011, 2016). At the beginning of our data collection (June 2015), the sectors represented in this area were 1) electronics (370 firms); 2) media (250 firms); and 3) new economy (e.g., manufacturers of new hardware, firms in the information services industry, Internet access providers, and telecommunication network managers; 350 firms). We focused on the electronics sector, which, according to the definition of the National Federation of Electronics Firms, consists of the computer industry, electronics in the strictest sense, and telecommunications.

First, to consider born global companies we applied these criteria: their small size at the time of their first international operations (fewer than 10 employees), recent foundation (less than 10 years), and early internationalization (during their first 3 years of existence). This process left a total of 150 firms, 82 of which accepted our request for a personal interview to complete the questionnaire

Our empirical research focuses on the foreign vertical relationships between these born global start-ups located in the cluster and their main foreign customers. In this respect, we implemented Yli-Renko et al.'s (2001) suggestion to give entrepreneurs the freedom to list their main foreign customers, imposing a maximum of 10 partners per company. The final relational map of the adopted sample (82 companies) is composed of 492 main foreign customers spontaneously listed by the interviewed entrepreneurs (6 foreign customers on average).

The data to test our hypotheses come from a direct survey using a specially designed questionnaire. Our key informant was the entrepreneur. Firms were contacted by telephone to obtain

the names of potential respondents (the entrepreneurs) and to determine whether they would agree to complete the survey through face-to-face interviews. The data collection process lasted approximately 6 months. We realized 100 total hours of interviews, averaging 100 minutes total, per entrepreneur.

The survey process was developed in four phases: 1) conducting literature reviews to develop the measurement scales; 2) developing the questionnaire (structured in a closed question-answer form); 3) pre-testing the questionnaire on three randomly selected sample firms; and 4) data collection. The investigated born global firms belong to the “specialised suppliers” category according to the Pavitt classification in that they primarily produce and offer technology and services to their industrial customers. In this case, customers also access technology through the acquisition of products from suppliers (Wooley, Rotter, 2008). Thus, for both foreign customers and suppliers, knowledge acquisition and innovation processes depend to a great extent on interactive learning between them. This situation encourages local firms to become increasingly specialised, resulting in strong differentiation in their internal knowledge bases. The R&D activity and the scope and extent of new products launched for these firms are strongly conditioned by knowledge acquired from their foreign customers because new products need to be in line with foreign customers’ specific requirements (Dyer and Sing 1998).

Overall, the firms in the sample developed an average of 6 new products per year (range 1-23). The average sales of the respondent firms amounted to €310,000, with an average age of 6 years. In addition, the average R&D expenditure in relation to total sales was 2.5% (range 0.01-15%). The key customers are more old in age to their suppliers ($M = 14$ years) but were similar in terms of size ($M_{\text{sales}} = €308.15$). Table 1 reports the descriptive statistics for the untransformed variables.

Table 1. Descriptive statistics of the untransformed variables

Average	S.D.	Min	Max
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Innovation	6	5.2	1	12
Size (€0.000)	310.10	301.95	100	350
CustSize (€0.000)	308.15	242.24	111	420
CustAge	14	12	2	28
FirmAge	6	4.24	2	10
R&D expenditure	2.5	2.04	0.10	0.23

Measures

The individual measurement items for the study's dependent, independent, and control variables are listed in Table 3; the construction of the measures is explained in the following. All statement-style items were measured on a scale from 1 = do not agree to 7 = completely agree.

Dependent variable

New product development. First of all, we measured innovation activity by asking the born global firms how many new products or services they had developed during the previous three years as a result of the relationship with their foreign key customers, in line with Yli-Renko et al. (2001). The responses ranged from 0 to 18 with a mean of 9. The natural log of this measure was used in the analysis to compensate for skewness.

Independent variable

Knowledge acquisition in the relationship. We measured knowledge acquisition with two statements reflecting the technological and market knowledge that a firm may acquire from the key customer. The items were based on Nooteboom et al. (1997) and Von Hippel (1988) and have previously been used effectively by several authors (i.e. Simonin, 1997, 1999; Zander and Kogut and Zander, 1992; Zahra et al., 2000; Yli-Renko and Autio, 1998).

Structural embeddedness. We used multi-item measures to analyze structural embeddedness between a firm and its key foreign customers because they provide considerable advantages over single-item measures (Churchill, 1979). Specifically, we measured structural embeddedness using 3 items that reflect the degree to which the key foreign customer relationship provides the born global companies with a network of new foreign business contacts. This structural dimension is based on the works of Larson (1992), Uzzi (1997) and Yli-Renko, Autio & Sapienza (2001).

Relational embeddedness. We used multi-item measures to analyze the relational embeddedness between a firm and its key foreign customers because they provide considerable advantages over single-item measures (Churchill, 1979). According to the embeddedness literature (Granovetter, 1992; Uzzi, 1997), the relational embeddedness measures both the level of trust between a firm and its key foreign customers and the similarities in how firms and foreign customers perceive, interpret, and evaluate the world. In line with previous studies (Nahapiet & Ghoshal, 1998; Yli-Renko, Autio & Sapienza, 2001), we selected seven items to measure relational embeddedness.

Control variables

We included some control variables to isolate the effect of the independent variables in the model. First, an important factor influencing innovation activity is the size of the involved partners (Acs and Audretsch, 1991; Tsai and Ghoshal, 1998), in line with the idea that larger firms may invest more

resources in R&D activities. As several studies suggest (e.g., Kogut and Zander, 1992), both superior resources and economies of scale allow larger firms to exploit external knowledge successfully for their innovation process. We controlled for the effects of size by including the total sales of both the born global companies and their foreign customers. Moreover, we use R&D spending (R&D) as a control variable for a firm's willingness to invest in absorptive capacities useful to its knowledge acquisition from its foreign key customer. Following other recent research on measuring absorptive capacity (e.g., Cohen and Levinthal, 1990; Meeus et al., 2001), this parameter was measured by considering the log value of the average ratio between R&D expenditures and total sales for the previous three years. Following similar studies (Rallet & Torre 2000; Boschma 2005; Presutti, Boari & Majocchi, 2011), we included also geographical proximity as a control variable which we computed using the natural logarithm of physical distance (in km) because we expected relative changes in distance to be more significant than simple, absolute changes. Finally, we included cultural distance as a control variable by using items of Simonin (1999) to measure how the national culture of foreign customer greatly differs from the born global companies' (item of Simonin, 1999). Table 2 reports the descriptive statistics of the variables and their correlations.

Table 2. Descriptive statistics and correlations

<i>Variables</i>	1	2	3	4	5	6	7	8
1. Firm size								
2. Customer size	0.15							
3. R&D spending	0.23*	0.28*						
4. Geographical proximity	0.10	0.11	0.17					
5. Cultural proximity	0.38	0.11	0.22	0.100				
6 Structural embeddedness	0.28	0.21	0.28	0.19	0.27			
7 Relational embeddedness	0.18	0.23	0.32	0.14	0.21	0.43*		
8 Knowledge acquisition	0.11	0.28	0.15	0.13	0.38*	0.42*	0.29*	

9. Number of new products developed	0.01	0.23	0,11	0,23	0,33*	0.38*	0.21*	0.49**
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* p-value at the 10% level. ** p-value at the 5% level. *** p-value at the 1% level.

Reliability and validity

We took several steps to ensure data validity and reliability. First, we pretested the survey with 5 entrepreneurs of born global firms and asked them to closely review the survey. We then revised any potentially confusing items following the received suggestions. Second, we used previously validated measurement items wherever possible to help ensure the validity of our measures. Third, multiple-item measures were used for most constructs to enhance content coverage. We measured these items on the questionnaire using 7-point Likert scales. As a first step of measure validation, to assess the unidimensionality of the research constructs (Churchill, 1979), we factor analysed the final scales using the principal axis method, positing a single factor (exploratory factor analysis). After exploring the factor structure of the data, we submitted the data to confirmatory factor analysis. The results of this analysis verify that the measurement model performed well because the selected constructs demonstrate good internal consistency and reliability: the standardised factors are all above the recommended minimum of 0.40, and the average variances extracted are all above the recommended minimum of 0.50. All of our multiple-item constructs achieved Cronbach alphas of 0.71 or higher, indicating strong internal consistency (Table 3).

Table 3. Measurement model

Factor name	Measurement item	Standardised loading	Cronbach's alpha	Average variance extracted
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Structural embeddedness	We obtained new contacts (customers, suppliers, and employees) through this foreign customer	0.65**	0.85	0.44
	This foreign customer has opened the door to other valuable business partners	0.70**		
	This foreign customer provided us with new contacts useful to our development	0.65*		
Relational embeddedness	In this relationship, both sides avoid making demands that can seriously damage the interests of the other	0.75***	0.88	0.48
	In this relationship, neither side takes advantage of the other, even if the opportunity arises	0.73**		
	This foreign customer always keeps promises to us	0.65**		
	We consider this foreign customer's order even if we have not yet received a formal request	0.57**		
	We've never been afraid of losing contact with this foreign customer	0.68**		
	We maintain close social relationships with this foreign customer	0.87**		
	We know this foreign customer's people on a personal level	0.81**		
Knowledge acquisition	Because we supply to this foreign customer we are able to obtain a tremendous amount of market and technical knowledge	0.74**	0.80	0.49
	We get most of our valuable information on customer needs and trends from this customer	0.52*		

New product development	Number of new products developed as a result of the key foreign customer relationship (logarithm)	1.00		
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***p >0.001

RESULTS

The hypotheses are tested using structural equation model. As the hypotheses involve the testing of mediation effects, a series of nested models were compared to select the one with the best fit. Nested model tests help internally validate a hypothesized model by comparing the chi-squares of models that differ in the number of paths hypothesized; nested models can be derived by adding or deleting paths. A significant difference in chi-square indicates that the more complex model provides a better fit with the data. The three nested models are: (1) the hypothesized mediation model, which includes both the direct effect of structural and relational embeddedness on the innovation and indirect effects through knowledge acquisition; (2) the direct effect model which consists of only the direct relationships among variables; (3) the indirect model which considers only the indirect effects of structural and relational embeddedness through knowledge acquisition. The fit indices are shown in Table 4. Based on the fit indices, all of the models showed reasonably good fit with the data. Model 1 had the highest goodness of fit indices in general ($\chi^2 = 422.23$; $\chi^2 / df = 1.34$, $p < 0.01$; RMSEA=0.06; CFI=0.92; IFI=0.94; TLI=0.90). Akaike's information criterion revealed a relatively better fit with the data for Model 1. A Chi-square difference test also suggested that Model 1 had a significantly better fit than the direct effect model (Model 2) ($\Delta\chi^2 = 36.32$ (2), $p < 0.01$) and Model 3 ($\Delta\chi^2 = 23,260$ (4), $p < 0.05$). Therefore the results of Model 1 are reported in Table 5 to test our hypotheses.

Table 4. Nested model testing sequence and difference tests

Models	Chi² (df)	IFI	TLI	CFI	RMSEA	AIC	ΔChi²
Model 1	422.23	0.938	0.921	0.922	0.060	550.11	-
Model 2	458.55	0.911	0.891	0.931	0.067	580.02	36.32 (2)
Model 3	445.49	0.916	0.921	0.920	0.065	565.10	23,26 (4)

Note: ΔChi² statistics are based on the comparing model 1 with the other two models. Models 2 and

Hypotheses 1 and 2 propose that structural and relational embeddedness have a significantly positive association with knowledge acquisition. The results (Table 5) indicate that the standardized regression weights between structural, relational embeddedness and knowledge acquisition were significant and positive with coefficients of 0.42 (bias-corrected $p < 0.01$) and 0.49 (bias-corrected $p < 0.01$) respectively. Thus the two hypotheses are confirmed. Hypothesis 3 is concerned with the relationship between knowledge acquisition and new products development. The results indicate that the standardized regression weights between knowledge acquisition and new products development were significant and positive with coefficients of 0.59 (bias-corrected $p < 0.01$). Therefore H3 is supported. H4a suggests significant indirect effects of structural embeddedness on new products developed through knowledge acquisition. As predicted, the indirect paths through knowledge acquisition from structural embeddedness to new products developed ($\beta = 0.37$, bias-corrected $p < 0.01$) were significant. As no direct effect of structural embeddedness on new products developed were found, full mediation of knowledge acquisition in was in evidence, in support of hypothesis 4a.

In a similar vein, the results disclosed no significant direct effect of relational embeddedness on new products developed, but relational embeddedness had indirect significant effects through knowledge acquisition on new products developed ($\beta = 0.38$, bias-corrected $p < 0.01$). Thus, Hypothesis 4b was supported. Finally, the only significant relationship between a control variable and our mediating variable is the positive association between R&D and knowledge acquisition (Table 5). In terms of innovation and control variables, three significant relationships may be observed: new

product developed is positively related to R&D spending, foreign size and cultural proximity between partners. Figure 2 respectively represents the results of our model

Figure 2: Results of the model

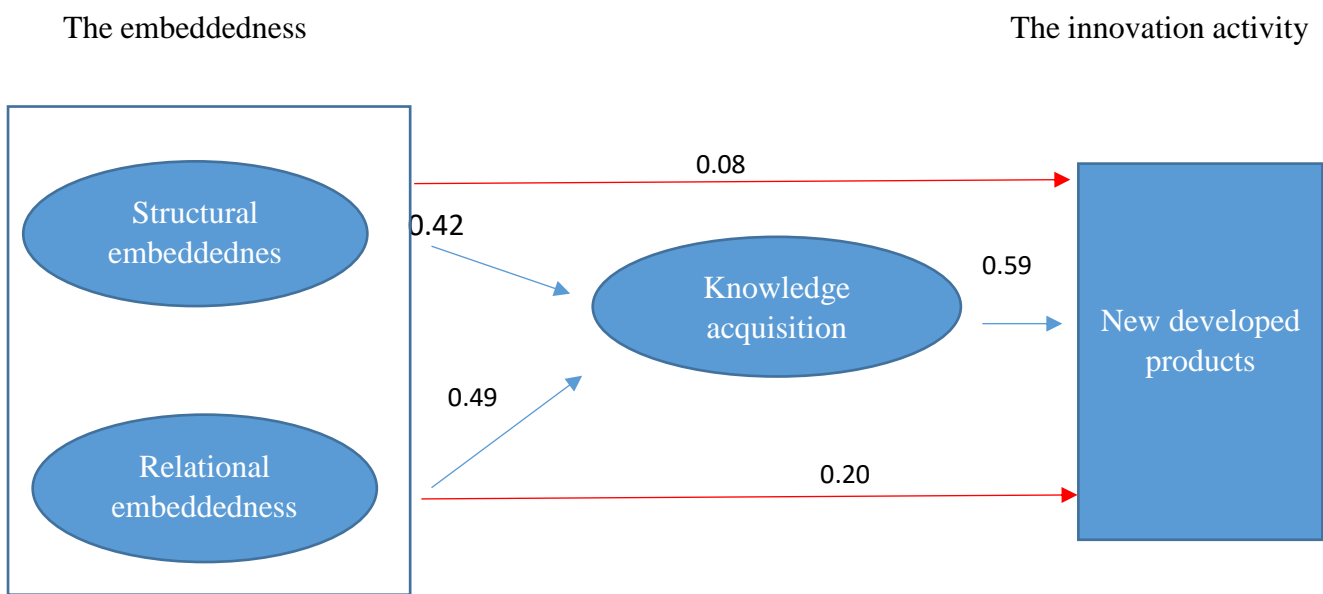


Table 5 Structural equation modelling results

	Standardized estimate	P value	Hypothesis
Direct effects			
Structural embeddedness on new developed products	0.08	n.s.	

Relational embeddedness on new developed products	0.20	n.s.	
Structural embeddedness on knowledge acquisition	0.42	<0.01	H1
Relational embeddedness on knowledge acquisition	0.49	< 0.01	H2
Knowledge acquisition on new developed products	0.59	< 0.01	H3
Indirect effects			
Structural embeddedness on new developed products via knowledge acquisition	0.37	<0.01	H4a
Relational embeddedness on new developed products via knowledge acquisition	0.29	<0.01	H4b
Control variables			
Firm size on knowledge acquisition	0.15		
Firm size on new developed products	0.18		
Foreign customer size on knowledge acquisition	0.30	n.s.	
Foreign Customer size on new developed products	0.29	<0.01	
R&D on knowledge acquisition	0.25	<0.01	
R&D on new developed products	0.38	<0.01	

Geographical proximity on knowledge acquisition	0.23	n.s.
Geographical proximity on new developed products	0.45	n.s.
Cultural proximity on knowledge acquisition	0.48	n.s.
Cultural proximity on new developed products	0.56	<0.01

Discussion

Through a structural equation model approach, this study has focused on the direct/indirect effects of structural and relational embeddedness on innovation activity of born global companies, by including the mediator role of knowledge acquisition. We empirically study this research question by analysing the vertical strategic partnerships between born global companies and their key foreign customers. We provide results with interesting theoretical and practical implications for born global companies in terms of both relational and structural embeddedness but also innovation. In particular, our results indicate that structural and relational embeddedness are positively related to knowledge acquisition, and that knowledge acquisition is positively correlated to new products development of born global companies. We also find support for mediating role of knowledge acquisition between structural/relational embeddedness and knowledge exploitation in terms of innovation.

The positive association between relational embeddedness and knowledge acquisition is consistent with the assumptions that relational embeddedness has many different correlated advantages in terms of innovation activity (Rowley, Behrens and Krackhardt, 2000), where the first has a direct impact on the relationship, as it promotes exchange of fine-grained information and acquisition of tacit

knowledge as a consequent of the joint problem solving taking place when interacting. The interaction is a consequence of the transfer of products and services between the firms and most of the problems emerging are related to this transfer. Consequently, solving this problem reduces the possibility that similar problems appear in the future and this tends to increase the quality of the relationship. Second, relational embeddedness provides a mechanism to govern the relationship, as trust and confidence are likely to occur, as a result of the interaction. It enhances coordination in the relationships, which makes them efficient and long-lasting, Trust makes the activities performed in relationships reliable and predictable, and thereby reduces the risk associated with both economic exchange and development of new products. Thus, relational embeddedness can give benefits that are possible to reach especially in a long-term relationship.

At the same time, our results confirm the positive correlation between structural embeddedness and knowledge acquisition, suggesting that key foreign customers may sustain knowledge acquisition abroad by providing introductions to other customers and their knowledge bases (Zahra et al., 1999). The process of knowledge acquisition abroad benefits from the capability of foreign customers to enhance the breadth of profitable knowledge for a high-tech born global, increasing the potential for new sources and ideas during its foreign development. This result is congruent with recent empirical studies, which have emphasized that the exposure to many different external sources of knowledge or profitable contacts is essential to learning in new competitive international environments (Yli-Renko et al., 2001; Zahra et al., 1999). In fact, the exposure to a variety of other valuable business partners or significant sources of knowledge enhances the ability of high-tech born global companies to assess and value the knowledge available from the foreign customers in order to reinforce their knowledge acquisition (Holm, Eriksson, & Johanson, 1996).

This means that first of all when developed, structural embeddedness in the network relationships is a necessary condition to satisfy a minimum level of dependability and reliability before a deeper emotional investment inside vertical relationships. However in this research we confirm that structural embeddedness is not sufficient to make efficient a relationship in terms of innovation,

because it's necessary to invest also in the affective embeddedness elements to reduce risk during the business exchange between two partners. Relational embeddedness reduces risk by reinforcing trust and lowering conflicts and coordination costs so to encourage product resources exchange in terms of knowledge acquisition and exploitation (Rodriguez, 2002; Presutti et al., 2016). Thus, our results contrasted two alternative views on social versus relational embeddedness, as we verify that instead of being substitutes, structural embeddedness becomes most beneficial when combined with relational one.

Moreover, our results provide strong support for our second set of hypotheses that suggest that knowledge acquisition from foreign customers can be exploited to enhance the innovation activity of high-tech born global companies. We verify that high-tech born global companies that acquired greater levels of knowledge through their key foreign customer relationships usually are able to obtain higher innovative performance. This result supports studies, which emphasize the importance of acquiring external knowledge from customers to reinforce the innovation activity (Yli-Renko et al., 2001). It confirms many traditional and more recent strategic and entrepreneurial studies (i.e. Shan et al., 1994; Majocchi, Odorici, Presutti, 2016), which put in evidence the importance of both structural and relational elements of inter-organizational relationships to benefit of new product development. As most born globals are high-technology firms operating in markets characterized by long-term business relationships, the extent to which they acquire knowledge is likely to enhance their possibility to identify valuable knowledge and new ideas (Prashantam, S., & Dhanaraj, 2010; Rovira Nordman, and Melén, 2008). A born global can proactively develop relationships beyond basic project networks, which may expand the scope of opportunity seeking (Coviello 2006) and problem solving in order to develop new product and innovate. When a born global draws other firms close to its business connections, and consequently, to their technologies, products and processes, it becomes more aware of innovation opportunities. Social interaction in relationships with customers entails openness and transparency between the supplier and the customer, which are conducive to acquisition of knowledge. In summary, external knowledge is a particular requirement because high-tech born

global companies must leverage inter-organisational foreign customer relationships to broaden their stock of knowledge regarding both technology and R&D activity (Pirolo and Presutti, 2010; Dyer and Sing, 1998).

Finally, we strongly support the hypothesis that knowledge acquisition mediates the relationship between structural and relational embeddedness and knowledge exploitation in terms of innovation, confirming the essential role of knowledge acquisition in transforming the potential benefits of “embeddedness” into concrete innovation outcomes. Both structural and relational embeddedness significantly predict a firm’s knowledge acquisition ability, which in turn is significantly associated with its new developed products (Odorici, Presutti, 2013). Thus, while structural and social embeddedness inside vertical relationships are unable to directly influence the innovation activity in our field of research, these results highlight the essential role of knowledge as a key mechanism by which inter-organizational collaborations is leveraged for the development of new products. Accordingly, these results confirm that knowledge is the most strategically-significant resource of a born global firm for its innovation activity, justifying a growing interest in how organizations can acquire and exploit knowledge from their partners (Burgelman and Hitt, 2007; Davidsson, 2005; Smith and Cao, 2007; Woolley and Rottner, 2008). Thus, the born global firm’s innovation ability derives more from acquired knowledge level in the interactions with foreign customers than from the specific characteristics of the relationships.

IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH’S DIRECTION

The aim of this study is to advance our understanding of the process of knowledge acquisition and exploitation (innovation) inside vertical relationships between born global companies and their main foreign customers by analysing the role of relational and structural embeddedness. We reveal that

both structural and relational bonding impact on knowledge acquisition which in turn positively influence the innovation process. This suggests to invest at the same time in foreign knowledge acquisition activity and both structural and relational bonding factors to reinforce the innovation. In particular, this research establishes the critical moderator role played by the construct knowledge acquisition.

According to a theoretical point of view, our study helps address the need to deeply detail studies of innovation process of born global companies, thus providing evidence of the value of integrating concepts from strategic management and international entrepreneurship theories. We propose that both relational and structural embeddedness in the vertical relationships of high-tech born global companies enhance the acquisition of valuable knowledge and paves the way for creation and new combination that may be exploited for innovative competitive advantage. Thus, we invite the researchers in international entrepreneurship theory to link bonding concept with knowledge-based concepts of innovation process as an explanation of innovation activity.

A large set of managerial implications arises from this study. For born global companies, the innovation is not a pure domestic activity and the sales are mainly an international activity; thus, innovation and sales must be integrated in a same conceptual framework. Relationships and networks are not only instrumental in where and born global firms internationalize, but the study demonstrates that having and nurturing close relationships with key customers in foreign market networks have a positive impact on innovation. Due to their relatively young ages, born globals may suffer from liability of lack of legitimacy in their networks and a limited set of resources (Zimmerman and Zeitz 2002). It can address these shortcomings by acquiring knowledge from external partners to reinforce their innovation activity (Dai and Liu 2009; Zhou, Barnes, and Lu 2010). This study builds on the idea that it is the ability to *act* and learns in the network that enhances new product development of born global companies. Knowledge acquisition is a key to overcome resource constraints in international markets' networks (Sullivan-Mort and Weerawardena 2006). Entrepreneurs should

actively develop relationships with foreign customers to favour knowledge acquisition useful to innovative performance by acting many foreign networks which consist of long-term relationships and are characterized by trust, cooperation, interdependence and mutual commitment, which are developed in an interactive process. The interaction produces benefits, such as resources, knowledge and legitimacy (Hohenthal, Johanson, and Johanson 2014).

Foreign networks consist of long-term relationships and are characterized by trust, cooperation, interdependence and mutual commitment, which are developed in an interactive process. The interaction produces benefits, such as resources, knowledge and legitimacy (Hohenthal, Johanson, and Johanson 2014). Due to their relatively young ages, born globals may suffer from liability of lack of legitimacy in their networks and a limited set of resources (Zimmerman and Zeitz 2002). It can address these shortcomings by acquiring knowledge from external partners to reinforce their innovation activity (Dai and Liu 2009; Zhou, Barnes, and Lu 2010). This study builds on the idea that it is the ability to *act* and learns in the network that enhances new product development of born global companies. Knowledge acquisition is a key to overcome resource constraints in international markets' networks (Sullivan-Mort and Weerawardena 2006).

In addition, our study highlights the importance of investing in structural and relational embeddedness to benefit from innovation process. Furthermore, intense knowledge-exchanging relationships based on relational and structural embeddedness between high-tech born global companies and their customers can form the basis for profitable vertical relationships that may eventually lead to even greater innovation opportunities. It requires an entrepreneurial management based on professional competences able to develop the networks based on both structural and relational embeddedness with significant foreign customers in relation to their knowledge, restricting the number of so many inter-organizational strong and close social ties. Consequently, entrepreneurs able to develop networks with their main foreign customers would have the greatest chances of reinforcing the foreign development of a born global start-ups, moving beyond their close near networks if they are to enjoy

long-term success concerning international innovation in several foreign markets. The ability of entrepreneurs to leverage external social networks abroad can be considered as a core competence.

Thus, a well-developed system of “pipelines” connecting the start-ups to customers all over the world is beneficial for the start-up’s knowledge acquisition and exploitation (Rowley, Behrens, and Krackhardt 2000). However, knowledge flow through pipelines is not automatic, and participation is not free; therefore, the process behind the creation and maintenance of global pipelines must be predesigned and planned in advance, requiring specific investments to assure long and stable relationships between business partners (Sarkar, Aulakh, Cavusgil, 1998; Shammout, Algharabat, 2013).

Really, it also suggests the increasing need for policy makers to better address public policy to support the foreign growth of these global start-ups, in the form of more tailor-made policies and programs relating to the fast pace of their international development from inception. It could allow a born global to better select their foreign customers, in order to reduce the risk of opportunism which typically characterizes the management of relationships between distant partners. Certainly, at a general level, these results allow us to affirm that in the actual knowledge-based economy foreign development is not an exclusive competence of large multinational firms, but also of smaller ones as long as they are managed by valid entrepreneurs with the right capabilities to grow abroad. In fact, our results reinforce the necessity for a manager or an entrepreneur to better manage not only the traditional material resources but the knowledge and the social networks. In other words, these are the intangible assets which allow a global start-up to accelerate its foreign growth.

Some limitations of our study must be discussed to pinpoint opportunities for further research. First, our results refer to born global companies operating inside a high-tech cluster. To generalise our theory, a test with other kinds of sectors should be performed. Second, our definition of innovative performance is limited to the number of products and services developed by these firms, with no distinction between different types of innovation (i.e., disruptive and incremental). Further research

could try to develop this point by addressing heterogeneity in innovation processes and extending into other dimensions of strategic foreign vertical partnerships to gain a more complete picture of the importance of the mediating role of knowledge acquisition.

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