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# **The Complexity of the Business Network Context and its Effect on Subsidiary Relational (Over-) Embeddedness**

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# **The Complexity of the Business Network Context and its Effect on Subsidiary Relational (Over-) Embeddedness**

## **Abstract:**

Many studies have focused on the effects of MNC subsidiaries' external relational embeddedness. Little attention has been given to its antecedents and especially to the potential effect that the business network context might have. We try to fill this gap and attempt to explain variation among subsidiaries' degree of relational embeddedness. Our results show a strong and robust effect of the business network context -- i.e. the network context in which the direct business relationships between the subsidiary and its partners are embedded -- on the degree of relational embeddedness. However, contrary to previous literature, we find an inverted u-shaped relationship. We discuss our findings with regard to the issue of over-embeddedness and the literature on the strength of weak versus strong ties.

**Key Words:** business networks, subsidiary relational embeddedness, environmental complexity, network context.

**JEL Codes:** M00; M11; M16

## INTRODUCTION

MNC subsidiaries differ with regard to the extent to which they have built strong and interdependent relationships with their business partners (i.e. customers and suppliers, cf. Andersson & Forsgren, 1996). Numerous studies have shown that such relational embeddedness can be a driving factor of subsidiary knowledge creation (Almeida & Phene, 2004; Håkanson & Nobel, 2001; Mu et al., 2007) and performance (Andersson et al., 2002), enabling embedded subsidiaries to contribute to the competitive advantage of the multinational corporation (MNC) (Nell et al. 2010).

However, despite the importance of subsidiary relational embeddedness we still know very little about its antecedents (Andersson et al., 2005). While both MNC internal factors (e.g. Andersson et al., 2005; Håkanson & Nobel, 2001; Luo, 2001; Jindra et al., 2009) as well as environmental factors have been proposed to be associated with subsidiary relational embeddedness (e.g. Giroud & Scott-Kennel, 2009; Holm et al., 2005; Chen et al., 2004; Scott-Kennel, 2007; Nell et al., 2010)<sup>1</sup> it is especially environmental characteristics that are often captured in rather rudimentary, limited ways. For example, a number of studies use industry or country dummies (e.g. Jindra et al., 2009; Andersson et al., 2005; Chen et al., 2004) despite doubts that the subsidiary's host country is a relevant factor when investigating subsidiary embeddedness (Yamin, 2007). Other studies attempt to measure more directly perceptions of the environment such as the level of competition (Holm et al., 2005; Scott-Kennel, 2007).

While all these variables are to some extent helpful, they are at odds with the markets-as-networks view which argues that markets can be conceptualized as sets of interconnected actors and that, therefore, individual business relationships are embedded in

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<sup>1</sup> Firm internal and external factors have also been identified influencing firms' inter-organizational behavior in more general settings (e.g. Gulati & Gargiuolo 1999).

a wider network context (Anderson et al., 1994; Blankenburg Holm et al., 1996, 1999; Halinen & Törnroos, 1998). Thus, while the concept of subsidiary relational embeddedness is based on the markets-as-networks logic, the environment of the subsidiaries' relationships is frequently *not* based on the markets-as-networks logic.

We argue that this is not only conceptually inconsistent but also critical for understanding variation of subsidiary relational embeddedness. For example, previous research neglects costs of strongly embedded relationships to a limited number of actors and hence the idea that certain characteristics of the network context of business relationships could decrease their value (e.g. Blankenburg Holm, 1999; Uzzi, 1997; Halinen & Törnroos, 1998).

This paper seeks to shed light on the above. We test a model in which firm-internal and external factors are used to explain variation of relational embeddedness across subsidiaries. While we control for a common set of MNC-internal variables we focus on one pertinent characteristic of the network context of the subsidiaries' business relationships, namely its complexity. Similar to Blankenburg Holm et al (1996; 1999), we define the complexity of the network context of business relationships as the extent to which a wide range of other actors outside the direct business relationship between the subsidiary and its partner exercise influence on the direct business relationship<sup>2</sup>.

Our results show that there is a very robust inverted u-shaped relationship between the complexity of the business network context and subsidiary relational embeddedness. Our study contributes to the literature in the following way:

First, we add to the literature on business networks and the markets-as-networks approach. Our measurement of the complexity of the business network context is based on

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<sup>2</sup> Note that Blankenburg Holm et al. (1996, 1999) name their construct "Business Network Connection" and it is based only on directly connected relationships.

the markets-as-networks view and we suggest that this measure is complementary to frequently used perceptual measures of abstract environmental characteristics. Our data shows that the business network context is of high importance for understanding variation in subsidiary relational embeddedness (cf. Blankenburg Holm et al., 1999; Halinen & Törnroos, 1998; Anderson et al., 1994).

Second, the curvilinear relationship that we find adds to the discussion on the strength of weak vs. strong ties and the notion of over-embeddedness (Uzzi, 1997; Hansen, 1999; Granovetter, 1973). The finding contrasts with previous research reporting a positive linear relationship between environmental threats and relational strength (Gulati, 1995; Beckman et al., 2004; Blankenburg Holm et al., 1999). In fact, subsidiaries and their partners seem to avoid situations of relational over-embeddedness in response to very high complexity in the business network context. Thus, very strong relationships to a limited set of external partners seem to lose value when situated in a very complex context.

The remainder of the paper is structured as follows. First, we review the literature and develop our concept of environmental complexity based on the markets-as-networks view. Then we develop our hypothesis, describe our empirical setting as well as operationalizations, and provide details on our estimations.

## **LITERATURE REVIEW AND CONCEPTUAL DEVELOPMENT**

Throughout the paper we focus on **business network relationships**. Such relationships describe the exchange relations between two firms doing business with each other, i.e. between buyers and suppliers (cf. Blankenburg Holm et al., 1999). They are of considerable importance, since they are often long-lasting (Håkansson, 1982) and very influential on the strategies of the exchange partners (Blankenburg Holm, 1999).

From a focal firm's perspective, business network relationships are maintained with a rather limited number of partners (Håkansson, 1989). It is argued that they are to a varying extent **embedded relationships**, i.e. relationships that have developed from arm's-length to close, interdependent relationships characterized by mutual adaptation and trust (Håkansson, 1982; McEvily & Marcus, 2005; Dyer & Singh, 1998). This is a result of a process where firms make relationship-specific investments (Håkansson and Snehota, 1995) and integrate and link their activities to each other (Håkansson and Johanson, 1992; Håkansson and Snehota, 1995).

The term **embeddedness** goes back to social network research which formulated the idea that economic exchange is socially embedded (Granovetter, 1985). It is argued that the joint commitment and trust builds the basis for higher-order knowledge-sharing and collaborative routines among the two partners which are necessary to acquire, combine, and build resources and capabilities (Blankenburg Holm et al., 1999; Uzzi, 1997). The relational adaptation yields the ability to exchange rather tacit, "fine-grained" (Uzzi, 1997), and socially embedded knowledge. Investing into and developing such strong relationships with external partner firms is therefore considered to be a source of competitive advantage (Dyer & Singh, 1998).

In the context of the MNC, researchers have used above-mentioned concepts and investigated the business relationships of MNC subsidiaries with their most important customers and suppliers (e.g. Andersson et al., 2001, 2002). Several studies investigated the average extent to which subsidiaries operate with embedded business relationships, often called "**subsidiary relational embeddedness**" (e.g. Andersson et al. 2007) and there is now substantial evidence that subsidiary relational embeddedness is conducive to knowledge generation and innovation as well as subsidiary performance (e.g.; Mu et al.,

2007; Almeida & Phene, 2004). Thus, subsidiary relational embeddedness is of high importance to the MNC which is in line with research seeing networks as important strategic resources (e.g. Dyer & Singh, 1998; Gulati et al., 2000).

### **Antecedents of Subsidiary Relational Embeddedness**

Given its importance, surprisingly few attempts have been made to study antecedents of subsidiary relational embeddedness (Andersson et al., 2005) and many studies have not integrated both firm-internal as well as external factors that might have an influence on how business network relationships of subsidiaries are governed.

A number of firm-internal factors have been identified as drivers of subsidiary relational embeddedness such as the headquarters (HQ) use of expatriates and the incentive system (Andersson et al., 2005). It is also argued that subsidiary age and proprietary resources have an effect on subsidiary relational embeddedness since they increase the attractiveness of the subsidiary to potential partners and give time to nurture the relationship (Luo, 2001, Håkanson & Nobel, 2001; Andersson et al., 2005).

Beyond MNC internal factors, environmental factors received some, albeit scarce, attention (e.g. Holm et al., 2005, Luo, 2001). Several studies capture industry or environmental effects by including country and industry dummies in their studies. For example, Jindra et al. (2009) use industry sector as well as country dummies, others only country dummies (e.g. Andersson et al., 2005; Chen et al., 2004) to explain subsidiary relational embeddedness. Others have used perceptual measures of specific environmental characteristics, such as the intensity of competition, and associated them with subsidiary relational embeddedness (see e.g. Holm et al., 2005; Luo, 2001). While all these studies help to characterize the environment to some extent they have important limitations.

Most importantly, it is argued that business network relationships of firms or subsidiaries should not be seen in isolation, i.e. the markets in which the subsidiaries and their partners operate can themselves be seen as networks of interconnected firms. Firms are “*tied together directly and indirectly through networks of relationships which may extend in any direction without limit*” (Blankenburg Holm et al., 1999, p. 468). This “markets-as-networks” approach sees markets not as a faceless, abstract thing which often assumes quite clear boundaries between the firm and the environment but as a fairly stable network of relationships (Anderson et al., 1994). It treats this context rather as socially constructed (Anderson et al., 1994) with a number of actors influencing a focal relationship. This is the context in which individual business network relationships are embedded. It encompasses directly and indirectly connected exchange relationships (Anderson et al., 1994).

We argue that existing research on the antecedents of subsidiary relational embeddedness is to some extent based on and, simultaneously, at odds with the markets-as-networks approach. On the one hand, it considers the effects and inner working of direct business network relationships very much along the lines of the markets-as-networks approach. On the other hand, it does not conceptualize the context of these business network relationships in a way which is consistent with the markets-as-networks approach. Andersson, Forsgren, and Holm (2007a, p. 816) conclude that “*the external network of the subsidiary has been conceptualized only in terms of dyadic relationships*”.

Using non-markets-as-networks concepts to capture the environment has strong implications. For example, it has been argued that in the markets-as-networks approach, markets do not have a nationality, i.e. that “*national boundaries do not necessarily imply a punctuation or discontinuity in network relationships*” (Yamin 2007, p. 137). When

relationships cross borders, country dummies become imprecise. Similarly, industries defined based on industry codes (e.g. SIC or NAICS) are very likely to be different between buyers and sellers. Using industry dummies to characterize the context in which relationships between subsidiaries and their partners are embedded is, therefore, useful only to a limited extent. Also perceptual measures of abstract environmental characteristics (such as “intensity of competition”) are not related to the idea that business relationships are embedded in a wider network and thus directly or indirectly influenced by other actors’ beliefs and actions within the wider network. This is fatal as recent network and alliance research has increased our understanding of the effect of the wider network (also called 2<sup>nd</sup>-order network or the structural embeddedness dimension) on direct relationships in dyads (Uzzi, 1996, 1997; Powell et al., 1996; McEvily & Zaheer, 1999; Venkatraman & Lee, 2004). Thus, what seems to be missing is an explicit understanding of the effect of the wider network context on the direct business relationships that subsidiaries maintain (cf. Halinen & Törnroos, 1998). This gap refers also to a certain neglect of the costs of forming and maintaining strong ties (e.g. Hansen, 1999) in the literature on MNC subsidiaries. Indeed, there seems to be an implicit assumption in extant subsidiary embeddedness research that benefits of strongly embedded relationships generally outweigh the costs associated with nurturing and maintaining such strong ties.

In order to shed light on the above issues, our study is based on the concept of the environment as a network, i.e. the markets-as-networks perspective. In order to characterize the environment we focus on the particular dimension of the complexity of the business network context.

## **Environmental complexity from a markets-as-networks perspective**

The focus on the complexity of the environment is appropriate since it is a well-established environmental context variable (e.g. Reus et al., 2009) which has been connected to network evolution (Wiersema & Bantel, 1993; Beckman et al., 2004).

The notion of environmental complexity has been endowed with a range of diverse meanings (Siggelkow & Rivkin, 2005). For example, complexity is linked to the number of elements in a firm's environment that the firms need to consider for decision-making (Duncan, 1972). The situation of high complexity is then defined as a situation of many dissimilar, yet related elements. Simon (1962) and Thompson (1967) focus on the degree of interdependence among the decisions that a firm faces as a key driver of complexity. Although the interdependencies of the decisions occur within the firm, it is assumed that they originate in the environment (Siggelkow & Rivkin, 2005).

Environmental complexity is also considered to be a fundamental driver of uncertainty because the high number of interdependencies creates ambiguities and increases the amount of information needed for decision-making. Reus et al. (2009) conclude that in a complex environment decision makers are more likely to lack information since it may require the firm to employ greater rationality in its analysis in order to understand the high number of environmental elements and their interconnectedness. Furthermore, Aldrich (1979) proposes that the interconnections among environmental elements increase environmental dynamism which is unpredictable and ambiguous. In complex environments, change can come from anywhere, and triggers of change as well as consequences are more difficult to interpret (Reus et al., 2009).

In line with the above, we define the complexity of the business network context as the average degree of influence from a wide range of network actors on the direct business

relationships the subsidiary maintains with its most important business partners. That is, the measure covers the extent to which decisions in the focused buyer-seller relationships have to take into account the interests, behavior, and strategies of other actors in the business network context. Thus, this definition captures interdependencies among environmental elements (Aldrich, 1979; Reus et al., 2009) of a great number of actors (Duncan, 1972), and their influence on decision-making within the dyad (Simon, 1962)<sup>3</sup>.

In the following, we are focusing on the relationship between the complexity of the business network context and subsidiary relational embeddedness. We do not develop hypotheses for other variables (such as firm-internal characteristics) used in previous research. Instead, we are controlling for these variables in our estimation.

### **HYPOTHESIS DEVELOPMENT**

In general, complexity and uncertainty are often seen as a threat to firm performance (e.g. Wiersema & Bantel, 1993; Luo, 2003). Since firms suffer from resource constraints and bounded rationality, under situations of complexity, firms have difficulties evaluating the behavior and moves of all kinds of actors in the market. In complex situations, firms might strengthen existing relationships and hence enforce mutual commitment and resource-sharing with long-standing partners (Luo, 2003). The reason is that firms seek stability and trust in their relationships, which is more likely to occur in existing, mutually adapted partnerships than in new relationships (Hansen, 1999; Gulati, 1995). A high number of influencing factors also leads to uncertainty (Reus et al., 2009) which, in turn, is argued to lead to a strengthening of existing relationships (Gulati, 1995; Beckman et al., 2004). It is a form of “threat-rigidity” response (Staw et al., 1981) since the firm maintains

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<sup>3</sup> Note that we do not consider this as a measure of structural embeddedness in the tradition of social network research (e.g. Burt 1992) as we do not capture actual linking within the wider network in which subsidiary’s direct relationships are embedded.

its partners but increases its commitment. A firm's relationships with a limited number of key suppliers and customers help the firm to acquire or jointly develop inimitable knowledge which is critical for competitiveness. The dyads profit from the joint trust and mutual adaptation, are able to protect themselves against unfavorable environmental impact, and profit from the knowledge networks of their counterparts (Blankenburg Holm, 1999; Lindstrand et al., 2009; Baum et al., 2000; Holm et al., 2005).

However, contrary to the above, we argue that if business network complexity becomes too high, further investments into a few strong relationships might be too risky or costly, i.e. we explicitly take the costs of maintaining strong relationships into account. First, building and nurturing direct relationships is costly and requires substantial managerial resources (Chen et al., 2004), and maintaining strong ties is more costly than weak ones (Hansen, 1999). It requires frequent visits, discussions, and managerial attention (cf. Andersson et al., 2005). The higher the complexity of the business network context the more the subsidiary and its partners need to allocate their scarce attention to this context in order to understand what kind of influence these actors have and if this influence is critical which requires consideration. Assuming that such managerial capacity is limited, additional influence and interference from the context will gradually demand more and more managerial capacity which, in the end, takes away managerial resources needed to nurture the individual dyads.

Second, the subsidiary (and its partners) might fear potential sunk costs when investing more into the maintenance and nurturing of the relationships while other actors fundamentally influence the exchange process. High levels of complexity reflect a situation of ambiguities and lack of information (Reus et al., 2009). Cautious actors would then avoid a situation of further investing into an existing relationship when it is unclear if it

pays off in the future. For example, alternative suppliers might influence the exchange relationship by strongly decreasing their prices which could lead to a termination of the relationship with the supplier, i.e. sunk costs occur.

Third, the subsidiaries and their partners might fear over-embeddedness. Over-embeddedness refers to the idea that a network might be too closed and interconnected to allow for important novel information to get introduced into the network. This can lead to the non-survival of entire networks (Uzzi, 1997). Strengthening a limited number of existing partnerships under conditions of very high complexity runs counter the firms' need for flexibility (Haagedorn, 2006). Firms would rather invest more in exploring new, probably weak(er) relationships which yield additional, potentially non-redundant information (Hansen, 1999). The reason is that high relational embeddedness between subsidiaries and a partner constrain action severely since the reciprocity makes the relationships binding (Hansen, 1999). Strong reciprocity means that the subsidiaries lose some autonomy regarding their actions because they have to, for example, provide more help to the partner or give more managerial attention to relational issues. Thus, subsidiaries might end up spending a lot of time with their partners cutting in potential exploration and initiation of new relationships. It is also claimed that high relational embeddedness might start out yielding non-redundant information but that, over time, the frequent and close interaction taking place in highly embedded ties introduce the subsidiary to connected partners of their direct partners. This increases the likelihood of an increasingly closed network (Hansen, 1999). Hence, strongly embedded relationships are increasingly creating opportunity costs under situations of very high levels of complexity (cf. Rowley et al., 2000).

In sum, very high levels of complexity in the business network context may lead to a situation in which both subsidiaries and their partners consider it too risky and/or too costly maintaining or further increasing the relation specific investments, i.e. embeddedness, in their limited number of most important relationships. Therefore:

***Hypothesis: There is an inverted u-shaped relationship between the complexity of the business network context and the subsidiary's relational embeddedness.***

## METHODS

### Sample and research process

The sample of our study is based on 20 Swedish firms<sup>4</sup> from a variety of industries, such as pulp & paper, telecommunications, petrochemicals, hard materials, power systems, machine equipment and transportation. These firms were selected because we wanted to limit home-country variation (since firms from different countries, e.g. Japan vs. US, might exhibit different preferences for governance styles) and type of sector variance (e.g. financial sector firms can be expected to act differently with regard to external networks).

Furthermore, since we were interested in true MNCs, we made sure that all firms were highly international. Roughly 75% of them had more than half of their employees outside the home country. Approaching such a specific set of firms first, in order to get subsidiary-level data in a second step, is a common approach in international management (cf. Andersson et al., 2002; Ciabuschi, 2004).

From these firms, data on 97 subsidiaries were collected between 1990 and 1994<sup>5</sup>. Hence, on average, approximately five subsidiaries were studied in each firm. We selected

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<sup>4</sup> Most of the firms belong to larger conglomerates but they are very independent entities focused on a particular industry. Therefore, we refer to these entities as firms and not as “divisions” of the 13 conglomerates in our study.

<sup>5</sup> Note that actual sample size used in the estimations is slightly smaller due to missing values.

the subsidiaries based on the following considerations. First, we wanted our subsidiaries to be highly representative of the firms' businesses. Therefore, we first asked firm-level managers to help us identify such subsidiaries in every firm. By consequence, the subsidiaries in our sample accounted on average for more than 50% of the firm's total operations (in terms of the number of employees). The actual number of subsidiary employees ranges from 50 to over 5,000. Second, we were interested in established subsidiaries that had responsibility for their own production and sales. This ensured that the subsidiaries were quite independent in decision-making concerning external relational embeddedness. Table 1 shows some information on the firms.

---- Table 1 about here ---

The bulk of the data used in our analysis comes from a survey based on the perceptions of several managers per subsidiary. Using perceptual self-assessments is a very good way of measuring the true drivers of subsidiary behavior as it is argued that managers will act rather based on what they believe and perceive and not on some objective truth (Weick & Roberts 1993; Day & Nedungadi 1994). It also fits the markets-as-networks view of rather socially constructed contexts of business relationships (Anderson et al., 1994). Additional data on subsidiary country characteristics were collected using OECD databases.

The quantitative survey data was collected via face-to-face interviews using a standardized questionnaire. A multiple steps approach was used with interviews covering managers both at the firm level and at the subsidiary level. While the firm-level managers were only asked to identify appropriate subsidiaries to include in our study, 291 interviews at the subsidiary level were carried out to collect the data for our 97 subsidiaries (3 interviews per subsidiary, i.e. with subsidiary top management as well as the sales and purchasing managers of the subsidiary). A key advantage of administering the survey

instrument face-to-face is that it can be secured that the target respondent actually is the person answering the questions. The interviews lasted for about two hours which also allowed for explanation of constructs in case of potential misunderstandings or other problems.

The final sample composition shows good variance. The subsidiaries are located in 16 countries. 47% of all subsidiaries are located in Central European countries (Austria, Belgium, France, Germany, Netherlands, Switzerland and UK) and, 34% are from Northern European countries, thereof 20% in Sweden itself. The remainder is from Southern Europe (Italy, Spain, Turkey) and North American (Mexico and US).

## **Measures**

*Subsidiary relational embeddedness.* Our measure reflects the investment subsidiaries and their partners have made to establish close, interdependent relationships. For each subsidiary, we asked the subsidiary's sales as well as the subsidiary's purchasing managers to assess to what extent the six most important relationships with external customers (3) and external suppliers (3) had resulted in two outcomes: the extent to which the product technology and and production technology has been adapted in the dyad. Hence, the measurement depicts the degree of interdependence and mutual adaptation of the subsidiary and its external partners compared to an arm's-length relationship. Following Andersson et al. (2002) we measure the two indicators on a five-point Likert-type scale from 1 (not at all) to 5 (very much). For each indicator, we added the scores for each of the subsidiaries' external relationships and then divided the score by the number of external relationships identified for each subsidiary. The two resulting subsidiary-level indicators for adaptation of product and production development load on one factor explaining 82% of the variance

( $\alpha = .79$ ) and represent the subsidiary's average degree of external relational embeddedness.

*Complexity of the business network context.* The measure is a composite index constructed from a number of indicators. Similar to Blankenburg et al. (1996, 1999) we asked the subsidiaries' sales and purchasing managers to rate the extent of influence other actors in the network have on the subsidiary's most important customer and supplier relationships. The influence of the following actors that are all "outsiders" to the focal relationship were considered: Other competing suppliers; supplementary suppliers; supplier's suppliers; other customers; customer's customers, competitors; governments, and non-commercial organizations and their influence was measured on a five-point Likert-type scale from 1 (very low) to 5 (very high). We summated the influence scores from all external actors across the business relationships and divided them by the number of influencing actors.

*Control variables.* We used a number of variables to control for other causes that might drive subsidiaries and their partners into building close relationships. First, from OECD databases we compiled the host country's **R&D expenses** as well as the **GDP per capita** as indicators for the knowledge available in a country as well as its prosperity. Subsidiaries can be more inclined to build strong linkages to firms residing in such countries as this might represent important learning opportunities. We calculated an average for the two variables across the four years of data collection. Second, in line with previous literature, we controlled for a number of subsidiary characteristics such as **subsidiary age** and **size** (e.g. Håkanson & Nobel, 2001). The size was measured in terms of the total number of employees. We added also the average length of the subsidiary's business relationships.

Size and age measures were logged. We furthermore controlled for the **subsidiary mandate** (competence creating mandate) since the mandate could have a strong influence on the subsidiary's motivation to invest into local relationships. The measurement was built on two items which asked how important the subsidiary was for other MNC units' production and product development competencies. Both variables loaded on the same factor ( $\alpha = .67$ ). High levels indicate that the subsidiary is a source of competence for other units.

We also used the **formation** of the subsidiary (a dummy variable marking if the subsidiary had been acquired) to control for effects different internationalization processes could have on the embeddedness of the subsidiary. Finally, we controlled for MNC coordination and control mechanisms since they are supposed to have an effect on subsidiary behavior (Martinez & Jarillo, 1998) and they have been highlighted in previous studies (Andersson et al., 2005). We controlled for the **decentralization of decision-making**, the extent of **formalization** used, as well as if **expatriates** are used to govern the subsidiary. We used an average score of five indicators<sup>6</sup> to measure decentralization. We used a dummy variable to indicate the use of expatriates in the top management group of the subsidiary company. Finally, for the level of formalization we used the average score of two items ( $\alpha = .69$ ). It was measured with a five-point Likert-type scale asking for the extent to which the subsidiary relies on written manuals from the divisional headquarters concerning marketing activities and the overall company philosophy. One missing value was mean-imputed for this measure. Table 2 presents descriptive statistics as well as inter-correlations of the variables. It also provides information on the informants for each variable.

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<sup>6</sup> We asked the respondents to rate the extent of decision making power of the subsidiary level on a five-point Likert-type scale for the following decisions: supplier choice, change in organizational structure, investments into production, investments into R&D, and acquisitions within the subsidiary country.

--- Table 2 about here ----

In cross-sectional research designs, common method bias (or common method variance: CMV) is a cause for concern and has recently been highlighted specifically for the area of international business (Chang et al., 2010). We have integrated several processual remedies in our research which we believe have minimized potential common method variance problems in this study. First, our key variables are informed by different individuals within each subsidiary since we asked the subsidiary CEO, subsidiary sales managers and subsidiary purchasing manager about different characteristics of the subsidiary and the external relationships the subsidiary maintains. Hence, both our independent variable in our hypotheses as well as the dependent variable are based on information from different individuals which we combine. This reduces the risk of common method bias (Podsakoff et al., 2003). Furthermore, we protected respondent anonymity, and, over the course of the interview, we secured to communicate that there are no “wrong” answers to reduce the risk of social desirability. To further decouple the responses, our survey, which took 1½ to 2 hours to complete, included several sections with questions unrelated to this study in between those measuring the independent variables and the dependent variables (cf. Haas & Hansen, 2007). Siemsen et al. (2009) also report that quadratic effects are very unlikely to be the result of common method bias and such effects – on the contrary – are more difficult to detect under circumstances of method bias. They conclude that “*research articles whose primary purpose it is to examine quadratic effects should not be criticized for suffering from CMV*” (Siemsen et al., 2009: 13). Finally, it should be emphasized that all interviewed subsidiary managers were primed to focus on the subsidiary’s most important product or group of products. Consequently, the questions regarding the subsidiary’s external embeddedness in their business relationships, the level

of complexity of the business network context, and the mandate of the subsidiary all refer to a specific product or group of products rather than to the subsidiary's overall activity. This enhances the precision of our research.

## **Analysis and Results**

We used ordinary least square regressions to test our hypothesis. We used the robust clusters procedure as implemented in STATA and controlled for the fact that several subsidiaries belong to the same firm. This is necessary as subsidiary responses are not independent. A relatively high intra-class correlation coefficient of .21 also suggested accounting for the fact that several subsidiaries belong to the same firms. We checked the assumptions of regression analysis, especially the normality of the residuals and the absence of multicollinearity. The average VIF of 1.3 indicates low likelihood of multicollinearity issues as do the pair-wise correlations (Hair et al., 2006).

----- Table 2 about here -----

We first tested Model 1 which only includes the control variables, then Model 2 which added the two terms regarding the complexity of the business network context. Our results show that the control variables add significantly to explaining the extent of subsidiary external relational embeddedness. Model 1 explains roughly 18% of the variance and the usage of expatriates as well as the subsidiary mandate is significant. Model 2 increases the R-squared to 29% which is a significant increase ( $p < .01$ ). The complexity term is positive and significant at the .01 level while its squared term is negative and significant at the .05 level. Hence, we find support for a curvi-linear relationship between complexity of the business network and the extent to which subsidiaries and their partners develop high levels of relational embeddedness. Of the control variables, the results do not change substantially

with regard to Model 1 with the exception of the subsidiary size variable which becomes marginally significant at the 10% level.

**Robustness tests.** In order to check for the robustness of our results we conducted several post-hoc analyses. **First**, we re-ran the robust cluster regression and controlled for the fact that several subsidiaries belong to the same conglomerate instead of them belonging to the same firm. Controlling for these 13 conglomerates yielded qualitatively the same results for the hypothesized variables. **Second**, we re-ran the regression while controlling for the 16 countries in which the subsidiaries are located with robust clusters. Again, results were qualitatively identical for the hypothesized variable while lending statistical support at the 5% level for the effect of the subsidiary mandate. **Third**, we re-ran the regression without any robust clusters and without control variables that showed to be insignificant in the main model. The results were qualitatively similar with complexity being positively related to subsidiary embeddedness ( $p < .01$ ) while the squared term is negatively related ( $p < .01$ ). The subsidiary size and mandate effects were both significant at the .05 level. Expatriate usage did not remain significant. Adjusted R-square amounted to 16.2%.

## DISCUSSION AND CONCLUSION

This study is one of the few studies which investigates the antecedents of subsidiary relational embeddedness and which takes both firm-internal as well as firm-external factors into account. We find that subsidiary relational embeddedness is associated with firm-internal factors and firm-external factors. Regarding the firm-internal factors especially the subsidiary's mandate and the usage of expatriates gained some support across our different specifications and robustness tests. Strong control via expatriates moves the attention of subsidiary managers back to the MNC and expatriates are – by definition – stronger socialized and connected with the MNC than with the subsidiary context. This prevents

them from putting enough resources into the business relationships with the subsidiaries' external partners (Andersson et al., 2005). Contrary to the effect of expatriate control, subsidiaries with competence creation mandates are more prone to operate with strong embeddedness. This is in line with previous findings showing support for a positive relationship between embeddedness and learning (e.g. Mu et al., 2007). Other variables characterizing the firm-internal setup are not significant. For example, autonomy is insignificant which is in line with other inconsistent findings in previous literature (e.g. Jindra et al. 2009). The non-finding regarding subsidiary age is in line with our reasoning that – while subsidiaries need some time to build up strongly embedded relationships – it is first and foremost considerations of benefits vs. costs which influence how strongly subsidiaries are embedded with a given set of business partners.

The main focus of our paper sets on the effect of the business network context. Our findings contribute in a number of ways to current scientific discussions.

First, we make a conceptual contribution. Contrary to previous literature, we develop and use a measure of environmental complexity which is inspired by and linked to the markets-as-networks literature (Anderson et al., 1994). We argue that our measure has several advantages: Our measure approximates environmental complexity by measuring the extent of influence that a range of other actors in the business network context have on subsidiaries' business relationships. Thus, notwithstanding its consistency with the markets-as-networks view and its inherent logic of socially constructed environments (Anderson et al., 1994), it is not bound to arbitrary definitions of relevant industry or country context. Our measure is also advantageous as it proxies well the idea that high complexity reflects a situation in which a high number of elements need to be considered for decision-making (Duncan, 1972), that interdependencies exist between decisions of

actors in the network (Simon, 1962; Thompson, 1967), and that uncertainty derives from such complexity since, in complex environments, change can come from anywhere and triggers of change as well as consequences are more difficult to interpret (Reus et al., 2009). We see our complexity concept as complementary to previous research which has frequently used managers' perceptions of macro-level issues such as the level of competition or overall uncertainty without linking these measures to the markets-as-networks view. Managers might be able to judge how uncertain their business environment is in an abstract sense. Yet, our measure focuses on the idea that some abstract environmental characteristics might find its way to the decision-maker through the influence of other actors in an interdependent network. Future research could directly compare the usefulness of these two approaches. Furthermore, we are not capturing the whole network and its interlinkages from a structural perspective. To this end, future research could try to capture more structural embeddedness characteristics of the wider network such as its density or the existence of structural holes (e.g. Burt, 1992) and investigate to what extent this has an influence on perceived business network complexity. Finally, our measure is capturing in a very intuitive way that managers perceive varying degrees of influence from a complex business network context. This suffices for capturing if such influence has a bearing on relational governance. However, it would be interesting to analyze how such influence materializes to get a more fine-grained understanding of these processes<sup>7</sup>. For example, the influence could manifest itself in different forms and be perceived as positive or negative. This is another potential area for future research.

Second, our conceptual contribution is further supported by an empirical contribution with strong implications for business network theory and the literature on over-embeddedness. Our results present evidence that the complexity of the business network

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<sup>7</sup> We thank one anonymous reviewer for pointing this out.

context is strongly associated with subsidiary relational embeddedness explaining roughly 13% of the variance of it. Thus, we are fully in line with previous business network literature (Anderson et al., 1994; Blankenburg Holm et al., 1996, 1999) who argued that business relationships “*can be better understood if looked at in context*” (Blankenburg Holm et al., 1999, p. 473) and that “*interdependence in the focal relationship is also contingent on interdependence in the network*” (p. 474). It was argued that the learning and coordination potential, and thereby performance and survival for the subsidiary, is enhanced by the closeness of the relationships (cf. Blankenburg Holm et al., 1999). However, in contrast with previous findings, we predicted and found that when complexity continues to rise, i.e. when there is increasing influence from other actors on the business relationship, the partners forming the business relationship realize that the relative benefits of further relationship specific investments are counteracted by opportunity costs and decreased flexibility. Complexity of the business network context only has a positive impact on subsidiary relational embeddedness for complexity levels below a threshold value. Differentiating the prediction equation according to the complexity variable and equating it to zero (i.e. setting the slope of the quadratic function to zero) renders a solution of complexity of the business network context equaling 1.01. This means that the level of subsidiary network complexity for which the highest level of embeddedness can be observed is 1.01. Hence, the quadratic effect captured in our model describes not only a decreasing marginal effect but a threshold level at roughly 1 standard deviation above the mean. Beyond 1 standard deviation, the subsidiary relational embeddedness decreases again. Since we can assume context complexity to be normally distributed, roughly 16% of all subsidiaries are located beyond this threshold<sup>8</sup>. We conclude that a considerable amount

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<sup>8</sup> In fact, our sample distribution is slightly positively skewed. While the kurtosis normality tests are insignificant the skewness test of normality is significant at the 10% level. Due to this skewness, only 14% of

of subsidiaries perceive that they are exposed to high complexity contexts and these subsidiaries shy away from having a limited set of very strongly embedded relationships. This finding brings back the costs of maintaining and nurturing strongly embedded business relationships to the discussion and we are able to shed light on the phenomenon of over-embeddedness (Uzzi, 1997). In accordance with Uzzi's findings, we show that relatively weaker ties seem to become more appropriate than increasing the strength of the already strong ties under conditions of very high complexity of the business network context. Hence, we suggest that subsidiaries and their partners are indeed *aware* of costly over-embeddedness which triggers a process of decreasing valuation of strongly embedded relationships. We advance three reasons for this behavior: resource constraints, potential sunk costs, and opportunity costs.

The fact that subsidiaries are aware of relational over-embeddedness has important implications for future research. Our results indicate that it might be relatively unlikely to observe relational over-embeddedness since firms and their partners would anticipate negative effects and would not allow this to happen. Presumably, this is true as long as the complexity and uncertainty of the environment is still "identifiable". Under such circumstances, dyads know what kind of environmental effects they have to consider and they act accordingly and reduce or increase their mutual adaptation. Yet, this changes when context change is radical, i.e. when a number of elements in the business network context suddenly exercise an unforeseen influence on the key business relationships. In such a situation, it is probably more likely to be able to observe relational over-embeddedness. Since we are not differentiating between different types of complexity and uncertainty (e.g. between static and dynamic complexity, or radical vs. relatively predictable change), this is a very interesting avenue for future research. It can also be combined with above-

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our subsidiaries are beyond the threshold of 1 standard deviation above the mean.

mentioned need to further compare perceptual measures of abstract environmental characteristics with network measures.

## **Limitations**

Notwithstanding the contributions and strong robustness of our results, our study suffers from some limitations: First, we are not investigating the performance implications of various levels of embeddedness while taking into account complexity measures. We focus primarily on describing antecedents to subsidiaries' interorganizational behavior. While this is in our mind a very important first step, future research should investigate performance consequences. It might be particularly interesting to investigate to what extent perceptions of environmental complexity correspond with some objective truth or if subsidiary managers systematically misperceive the influence the wider network exercises on their business relationships. We believe that our subsidiary managers are advanced in their skills to have a good perception of the environment's complexity. Our informants can be expected to be very knowledgeable and to have good skill, judgment, and talent. Otherwise, it is difficult to imagine that they would have become top managers within the subsidiary firms of our multinational companies. By consequence, we believe that their perceptions of important issues related to their job – the management of the business relationship – must on average strongly correlate with objective reality (cf. McGrath, 2001). Assuming that our subsidiary managers have a good picture of the true complexity of the environment, our observed average behaviour should then be the behaviour which maximizes performance. In other words, deviance from this behaviour should be negatively related to performance.

Second, we are only capturing the most important actors by our measure of subsidiary relational embeddedness. The limitation to just six relationships for each subsidiary is justified by the large amount of data needed to establish and assess the relationships. Our approach is further justified as a focus on a limited number of actors is a common approach in ego-network studies (e.g. Moran, 2005) and it has been shown that important relationships tend to be rather few (e.g. Håkansson, 1989). With our data, we are able to support the idea that the relational embeddedness to the most important business partners, i.e. those that are supposed to require the highest levels of relational governance (Larson, 1992), is reduced under high complexity. However, it is impossible for us to investigate if the subsidiary is investing into a broader network via a larger number of weak ties in case of high complexity. We can only infer from our results that subsidiaries seem to weaken their most important relationships. Future research could further investigate along these lines and attempt to capture a broader network. However, given that defining the boundaries of a network is complex and poses difficulties in terms of data gathering (Laumann et al., 1983) this requires substantial research efforts.

Third, we are working with a cross-sectional data set. Therefore, we cannot infer causality from our results. However, we consider it very unlikely that there is a causal effect of subsidiary relational embeddedness on the extent of influence wider network actors have on these relationships.

Finally, our data has been collected in the 1990ies and one could question its representativeness for subsidiaries today. We do not think that this poses a big problem to the validity of our findings. Eventually, all our constructs are universal across time. We acknowledge that the average value of embeddedness or business network complexity might be influenced by recent developments (such as technology or globalization) but we

do not think that this changes the fundamental aspect of our measures and phenomena. Today's relationships still vary between rather arm's-length and more integrated governance, and environments can be more or less complex. Future research could replicate our study and validate the universality of our phenomenon.

### **Conclusion and managerial implications**

In a broader context, our research adds to the understanding of networks offering opportunities as well as constraints to firms and organizations embedded in such networks (Haagedorn, 2006; Håkansson & Ford, 2002; Hansen, 1999). Our measure of complexity captures very well the fact that firms are not free to act according to their own aims only (Håkansson & Ford, 2002). There are opportunities since, for instance, the business relationships yield access to strategic resources the company does not possess (Gulati et al., 2000; Dyer & Sing, 1998). Simultaneously, these business relationships are influenced by all kinds of actors in the business network context, and high level of mutual adaptation and “binding” (Hansen, 1999) represent opportunity costs that might be prohibitively high under certain circumstances. This is not well reflected in existing research on subsidiary relational embeddedness (Wilkinson & Young, 2002) and this study is, to our knowledge, among the first showing that MNC subsidiary behavior takes both opportunities and costs into account. To this end, it is important for managers to be aware of potential overembeddedness and to actively manage its network attempting to avoid negative effects. A higher level of such “network management skills” might require that managers increase awareness of interdependencies within networks, that they acknowledge that network contexts constrain, and that, therefore, decreasing relational embeddedness can be beneficial. While this might be inherently clear to many a manager, the question could be to

what extent procedures and routines support such awareness. Within strategy processes, for example, the MNC could require from business managers to support their planned relationship-specific actions with information regarding the environmental context of these business relationships. This could enable senior managers to challenge these plans. It might also require a more systematic collection of data and a more sophisticated way of interpreting environmental forces regarding the extent to which variety and change is needed in the network portfolio, or if increased focus on a limited set of strong partners is required.

**Table 1: Correlations and Descriptives<sup>a)</sup>**

| <b>Firm</b>                  | <b>Size<br/>(employees)</b> | <b>No. of studied<br/>subsidiaries</b> | <b>Average subsidiary<br/>size (employees)</b> | <b>Average<br/>subsidiary age<br/>(years)</b> |
|------------------------------|-----------------------------|--|--|---|
| ABB Relays                   | 4150.0                      | 6                                      | 139.5  | 10.8  |
| ABB Motors                   | 2700.0                      | 5                                      | 373.8  | 72.6  |
| AGA                          | 11000.0                     | 3                                      | 458.3  | 67.3  |
| Alfa Laval Separation        | 4700.0                      | 3                                      | 262.0  | 51.0  |
| Alfa Laval Thermal           | 3100.0                      | 3                                      | 329.3  | 13.0  |
| ASG - Air and Sea            | 315.0                       | 4                                      | 78.8   | 20.8  |
| ASSI                         | 4600.0                      | 9                                      | 455.4  | 60.4  |
| Berol Nobel                  | 1040.0                      | 5                                      | 140.4  | 4.8   |
| Ericsson Cable               | 12000.0                     | 6                                      | 1306.8   | 21.8  |
| Ericsson Radio               | 16000.0                     | 4                                      | 221.0  | 19.5  |
| Ericsson Telecommunication   | 27600.0                     | 8                                      | 3005.3   | 61.0  |
| ESAB Consumables             | 3000.0                      | 6                                      | 143.5  | 50.5  |
| Garphyttan Pumps and Systems | 660.0                       | 3                                      | 220.0  | 81.3  |
| Garphyttan Haldex            | 720.0                       | 2                                      | 320.0  | 19.5  |
| IBS                          | 972.0                       | 7                                      | 123.6  | 9.4   |
| Mercuri                      | 1000.0                      | 7                                      | 65.0   | 25.0  |
| SCA Packaging                | 10500.0                     | 4                                      | 1427.5   | 62.0  |
| SCA Graphic paper            | 3400.0                      | 4                                      | 840.0  | 90.0  |
| Sandvik Saws and Tools       | 3200.0                      | 4                                      | 111.0  | 46.0  |
| Sandvik Coromant             | 6333.0                      | 4                                      | 2412.0   | 47.8  |
| <b>Average</b>               | <b>5849.5</b>               | <b>4.9</b>                             | <b>684.3</b>                                   | <b>41.0</b>                                   |

**Table 1: Correlations and Descriptives<sup>a)</sup>**

| #          | Variables                              | 1      | 2      | 3      | 4     | 5      | 6      | 7      | 8      | 9      | 10    | 11    | 12    | 13    |  |
|------------|--|--------|--------|--------|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|--|
| 1          | Sub Relational Embeddedness            | 1.000  |        |        |       |        |        |        |        |        |       |       |       |       |  |
| 2          | Sub Country's R&D Expenses             | 0.058  | 1.000  |        |       |        |        |        |        |        |       |       |       |       |  |
| 3          | Sub Country's GDP/capita               | -0.115 | 0.340  | 1.000  |       |        |        |        |        |        |       |       |       |       |  |
| 4          | Sub Size                               | 0.217  | 0.017  | -0.125 | 1.000 |        |        |        |        |        |       |       |       |       |  |
| 5          | Acquisition Dummy                      | 0.096  | 0.049  | -0.144 | 0.159 | 1.000  |        |        |        |        |       |       |       |       |  |
| 6          | Sub Age                                | -0.053 | 0.001  | 0.105  | 0.394 | -0.082 | 1.000  |        |        |        |       |       |       |       |  |
| 7          | Average Relationship Age               | -0.008 | -0.170 | 0.030  | 0.345 | 0.185  | 0.361  | 1.000  |        |        |       |       |       |       |  |
| 8          | Sub CC Mandate                         | 0.291  | 0.004  | 0.216  | 0.123 | 0.023  | 0.024  | 0.185  | 1.000  |        |       |       |       |       |  |
| 9          | Expatriates Dummy                      | -0.046 | -0.020 | -0.349 | 0.061 | -0.088 | -0.114 | -0.145 | -0.188 | 1.000  |       |       |       |       |  |
| 10         | Decentralization                       | -0.014 | 0.074  | 0.057  | 0.152 | -0.013 | 0.085  | 0.211  | -0.069 | 0.117  | 1.000 |       |       |       |  |
| 11         | Formalization                          | 0.055  | 0.060  | -0.015 | 0.205 | 0.011  | -0.073 | 0.022  | -0.011 | 0.014  | 0.341 | 1.000 |       |       |  |
| 12         | Complexity of Bus. Netw. Context       | 0.309  | 0.059  | 0.163  | 0.096 | 0.121  | 0.088  | 0.123  | 0.257  | -0.115 | 0.068 | 0.237 | 1.000 |       |  |
| 13         | Complexity Squared Term                | -0.032 | 0.023  | -0.013 | 0.203 | 0.146  | 0.136  | 0.037  | 0.144  | -0.125 | 0.040 | 0.291 | 0.327 | 1.000 |  |
| Statistics | Mean                                   | 2.44   | 16,371 | 18,967 | 2.38  | 0.22   | 1.39   | 2.68   | 2.55   | 0.21   | 3.33  | 2.90  | 0.00  | 0.99  |  |
|            | Std. Dev.                              | 0.82   | 28,817 | 3,012  | 0.59  | 0.41   | 0.53   | 0.69   | 1.09   | 0.41   | 0.90  | 0.31  | 1.00  | 1.36  |  |
| Informants | HQ-level manager: Subsidiary selection |        |        |        |       |        |        |        |        |        |       |       |       |       |  |
|            | Subsidiary general manager             |        |        |        |       |        |        |        |        |        |       |       |       |       |  |
|            | Subsidiary sales & purchasing managers |        |        |        |       |        |        |        |        |        |       |       |       |       |  |
|            | Secondary Data                         |        |        |        |       |        |        |        |        |        |       |       |       |       |  |
|            |  |        |        |        |       | x      |        | x      |        | x      | x     | x     | x     |       |  |
|            |  | x      |        |        |       |        |        | x      |        |        |       |       |       | x     |  |
|            |  |        |        |        |       |        |        |        |        |        |       |       |       | x     |  |
|            |  |        |        |        |       |        |        |        |        |        |       |       |       | x     |  |

a) Sub = Subsidiary; CC = Competence Creating; Bus. Netw. = Business Network; Std. Dev. = Standard Deviation.

b) Average Gross Domestic Expenditure on R&D - GERD Database (millions of USD of current purchasing power parity) for the four years 1990-1994.

c) Average GDP per head (USD of current purchasing power parity - expenditure approach) for the four years 1990-1994.

**Table 2: Results of OLS regression estimation.<sup>a</sup>**

|  | (1)                | (2)                            |
|--|--------------------|--------------------------------|
| Sub Country's R&D Expenses             | 0.000<br>(0.000)   | 0.000<br>(0.000)               |
| Sub Country's GDP/Capita               | -0.000<br>(0.000)  | -0.000<br>(0.000)              |
| Sub Size (logged)                      | 0.309<br>(0.207)   | 0.364 <sup>+</sup><br>(0.175)  |
| Acquisition Dummy                      | 0.028<br>(0.188)   | 0.011<br>(0.161)               |
| Sub Age (logged)                       | -0.152<br>(0.126)  | -0.155<br>(0.107)              |
| Average Relationship Age (logged)      | -0.121<br>(0.096)  | -0.170<br>(0.103)              |
| Sub CC Mandate                         | 0.237**<br>(0.079) | 0.199*<br>(0.075)              |
| Expatriates Dummy                      | -0.213*<br>(0.113) | -0.248 <sup>+</sup><br>(0.137) |
| Decentralization                       | 0.032<br>(0.086)   | 0.020<br>(0.065)               |
| Formalization                          | -0.025<br>(0.147)  | -0.080<br>(0.148)              |
| Complexity of Business Network Context |                    | 0.282**<br>(0.068)             |
| Complexity Squared term                |                    | -0.139*<br>(0.064)             |
| Intercept                              | 2.684*<br>(1.086)  | 3.358**<br>(1.12)              |
| <i>Observations</i>                    | 96                 | 95                             |
| <i>F-Value</i>                         | 2.81**             | 8.67***                        |
| <i>R-squared</i>                       | 0.182              | 0.294                          |
| <i>Change in R-squared</i>             | 0.182**            | 0.126***                       |
| <i>Average VIF</i>                     | 1.31               | 1.34                           |

a. Unstandardized regression coefficients. Robust standard errors (robust clusters for firms) in parentheses.

Sub = Subsidiary; CC = Competence Creating.

\*\* p<0.01, \* p<0.05, <sup>+</sup> p<0.1.

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