

The developmental impact of foreign subsidiaries: A linkage-based view

Abstract

Although the host country impact of MNC subsidiaries has been attributed to the vertical linkages created by the foreign subsidiaries, so far, rather little is known about how the creation and nature of the subsidiary's vertical linkages relates to the developmental impact of foreign subsidiaries in the host country. Based on data on 210 foreign-owned subsidiaries in a developed country context, this study investigates how the creation of and the nature of foreign subsidiary – vertical linkages impact on the upgrading of capabilities among host country firms. The results indicate that the creation of vertical linkages that transcend arm's length transactions and contain quality features such as e.g., trust, and mutual dependency, e.g. relational vertical linkages, becomes an important strategic matter for foreign subsidiaries in situations of high competitive pressures in the local business environment. We also find that such relational linkages is directly related to the capability upgrading among customers and suppliers (e.g. vertical upgrading) whereas indirectly related to capability upgrading among the subsidiaries' competitors (e.g. horizontal upgrading) through the capability upgrading among the subsidiaries customers and suppliers (e.g. vertical upgrading).

Keywords: Vertical linkages, spillovers, MNCs, embeddedness, economic development

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INTRODUCTION

Research suggests that host country development, to a large extent, depends on the accumulation and the upgrading of capabilities in domestic firms (Scott-Kennel and Enderwick, 2005). Foreign subsidiaries of multinational corporations (MNCs) may provide an impetus for this through the introduction of new technologies, skills and knowledge. Scholarly writings have provided evidence of foreign affiliates taking an active part in shaping the overall development of their host countries (cf. Marin and Bell, 2006) and a closer examination of recent work on foreign direct investment and host country development reveals an emphasis on MNC subsidiaries as “active agents” (cf. Giroud & Scott-Kennel, 2009; Perri et al., 2012) of host country development, where the impact of their behavior is conditioned by factors, such as institutional factors (Dunning, 1997), the absorptive capacity of local industry (Narula and Lall, 2004), strategies of MNCs (Enderwick, 2005; Görg and Greenaway, 2004), or the way in which they link up to local firms and industries (Altenburg, 2000; Giroud & Mirza, 2006; Giroud and Scott-Kennel, 2009; Hallin & Holmström Lind, 2012; Liu et al., 2009; Perri et al., 2012; Rugraff & Hansen, 2011; UNCTAD, 2001). Although the study of linkages is well established in the economic FDI literature (Rodríguez-Clare, 1996) it is still not very integrated within the literature of the behavior and activities of MNC subsidiaries (Jindra et al., 2009). As noted by Santangelo (2009, p. 192), research has not yet provided a “clear understanding of the factors behind the creation of the linkages through which MNCs may relate to the local economy and, ultimately, spillovers may be materialized”. With this in mind, the aim of this paper is to investigate the relationship between the creation and nature of foreign subsidiaries - vertical linkages and the impact of foreign subsidiaries on capability upgrading among firms in the host country environment.

The issue of linkage creation is especially relevant to the foreign subsidiaries that introduce innovations into a host market as we may expect that these subsidiaries are disposed to influence the capability upgrading among firms. This is in line with research proposing that potential for host country impact via vertical linkages are rather high for subsidiaries that source heavily from the MNC and thus have high quality knowledge stock (Jindra et al., 2009, p. 176). We distinguish between the upgrading of capabilities of customers and suppliers (vertical upgrading) and competitors (horizontal upgrading). To the best of our knowledge few, or any, studies have investigated *how* the creation of the subsidiary's vertical linkages relates to the upgrading of capabilities using this distinction. This also aligns to how vertical linkages should be defined: while some authors prefer a broad definition that encompass transactions between foreign firms and local firms (cf. Altenburg, 2000), other literature on FDI-induced local linkages propose a network perspective that integrates a relational dimension that includes linkage features such as resource sharing and trust (Ghauri et al., 2005; Giroud & Scott-Kennel, 2009; Saliola and Zanfei, 2009). Hence, based on research on inter-firm networks (cf. Andersson et al, 2002; Forsgren et al. 2005) and social embeddedness theory (Ahuja, 2000; Grabher, 1993; Granovetter, 1985; Gulati et al., 2000; Uzzi 1997) this paper views *relational linkages* in terms of inter-firm relationships that transcend arm's length transactions and contain quality features such as e.g., trust, and mutual dependency (Forsgren et al., 2005).

In this paper we propose that relational vertical linkages reduce uncertainty when the business is exposed to strong competitive pressure, and can therefore be considered as strategic resource on behalf of the foreign subsidiary and, at the same time, serve as important channels for the capability upgrading among business actors in the host country. This is in line with research suggesting that the host country impact of foreign subsidiaries is dependent on the subsidiary's strategic behavior within host-countries (cf. Driffield et al., 2010). It has

even been suggested that some MNCs may be ‘developmental’ in the sense that they have the creation of linkages as a key component in their strategy (Altenburg, 2000). Since much of the empirical research on the host country impact of foreign subsidiary has been focused on less advanced and developing economies (Giroud, 2007; Hansen et al., 2009; Javorcik, 2005; Jindra et al., 2009; Santangelo, 2009; Scott-Kennel, 2007) it neglects to predict the patterns of foreign subsidiaries’ local firm linkages creation in situations when “domestic actors are highly competitive and possess absorptive capacity” (Perri et al., 2012. p. 2). Hence, based on a unique dataset on foreign-owned subsidiaries in Sweden, we investigate how the creation and nature of the subsidiary’s vertical linkages impact on the technological upgrading of host country firms (customers and suppliers as well as competitors). A structural model is formed to investigate the relations between four theoretical constructs: the competitive pressure of the host market, relational (vertical) linkages, vertical upgrading, and horizontal upgrading. The study focuses on subsidiaries that all are receivers and exploiters of innovations that were developed by other units within their respective MNCs. Hence, they all bring new knowledge to the host market, which proposes that they represent a driving force of capability upgrading activities in the host country.

The paper mainly contributes to the recent stream of research that emphasizes the developmental impact of foreign subsidiaries through vertical linkages (Jindra et al., 2009; Saliola & Zanfei, 2009; Santangelo, 2009; Perri et al., 2012). Secondly, by adopting an inter-firm network perspective, this study is a response to the call for research on the relational dimension of foreign subsidiaries – local firm linkages (Giroud and Scott-Kennel, 2009). Thirdly, given the rapid proliferation of inter-firm relationships and collaboration in recent years, viewing the importance of strategic foreign subsidiary – local firm linkages, may lead to an enhanced understanding of the behavior and performance of host country firms.

The structure of the paper is as follows: we begin with a literature review which is followed by the development of six hypotheses resulting in a theoretical model. In the subsequent section, we discuss the methods including data collection and measurements and test our hypothesised model by using the structural equation model technique LISREL. Thereafter follows the presentation of the results and a concluding discussion.

A LINKAGE-BASED VIEW ON SUBSIDIARY HOST COUNTRY IMPACT

Within international business research there has long been a focus on the existence and performance of firms involved in cross-border business activities and therefore the developmental effects of these transactions has in the past decade received rather little attention. The developmental issues have long been the domain of trade economists and industrial economists and to some extent political scientists, emphasizing the direct effects of FDI such as the inflow of capital and employment role (UNCTAD, 1999), and the role played by MNCs in technology transfer and FDI-induced spillovers (Blomström et al., 2000) and policy formulation (e.g. Moran, 2002). In a developmental context, several scholarly writings suggest that linkages between foreign affiliates and local firms, be they strategic alliances, joint ventures or buyer-seller linkages, are important channels for FDI to have a sustainable effect on the host countries. However, it seems like linkages still “constitute a “black box” in the discussion of when and how FDI induces host country development” (Hansen, et al., 2009. p. 122).

In Hirschman’s seminal work on the role of linkages for economic development (1958) it is argued that the lack of linkages leads to poor economic development. The leading argument is that important for the growth of a nation is the development of inter sector linkages, in which a leading sector, through linkages with a less developed sector, may foster the development of the latter industry. Similarly, early linkage research (e.g. Singer, 1950)

proposed that MNCs often fail to integrate in local industries and sectors, and without any linkage formation FDI may create “foreign enclaves” implying very little impetus for development. Enclave environments have been witnessed in special economic zone countries (SEZs) where foreign presence is high but where the MNC affiliates are export focused, relying heavily on inputs from their parents or other foreign firms (Aitken et al., 1997; McIntyre et al., 1996;). Although this early linkage literature is not specifically related to foreign firms, it has been a source of inspiration for later research on MNC linkages. Given the increasing importance of foreign direct investment and multinational companies for economic development, the issue of linkages between MNCs and indigenous firms has regained importance in the last decade of the 20th century and the general conclusion in the literature is that linkages are crucial channels for host country development (Hansen et al., 2009; Rugraff and Hansen, 2011; UNCTAD, 2001).

The literature on linkages provides a broad set of linkage categories. Linkages can be long-term, for example a long-term R&D partnership, or short-term, such as intermittent purchase on contract. They can be equity-based (for example a joint venture) or non-equity based linkages. The non-equity based linkages can be “horizontal” (cf. Aitken and Harrison, 1999; Djankov & Hoekman, 2000; Haddad & Harrison, 1993), “strategic” or “vertical”. According to UNCTAD (2001) *horizontal linkages* is defined as interactions with firms engaged in competing activities. Through these channels, spillovers may occur when local firms improve their efficiency by copying technologies of MNCs, through observation, hiring workers trained by the MNEs, or through a more efficient use of resources, or search for new technologies. *Strategic linkages* with domestic partners include any form of non-equity based agreement among firms, such as strategic alliances, specific technology development contracts, management contracts, and cooperative marketing agreements (Cantwell & Narula, 2001; Chen and Chen, 1998; Hagedoorn, 1993; Scott-Kennel, 2007).

However, from a developmental perspective, these types of linkages are often viewed in “quantity” terms, such as the number of cooperative agreements, or the amount of resource exchange and contractual technology transfer from the foreign firms to domestic partners (cf. Scott-Kennel. 2007).

Vertical linkages include backward, forward and contractual linkages. Backward linkages are linkages established with supplier firms and subcontractors, and forward linkages comprise relations with business customers or agents in the host economy. Contractual linkages are formed with domestic firms that undertake licensing or franchising contracts with foreign affiliates. These types of agreements may enable the affiliate to specialize by contracting out non-core activities, to meet host country regulations on local content, or to take advantage of existing local manufacturing capacity or sales outlets. However, contractual agreements are less commonly used in conjunction with FDI (Ietto-Gillies, 1992). While much of the literature is devoted to horizontal linkages and strategic linkages there is growing evidence that vertical linkages promote host country development (Alfaro & Rodríguez-Clare, 2004; Javorcik, 2004; Liu et al., 2009; Hoekman & Javorcik Smarzyska, 2006; Kugler, 2006; Scott-Kennel, 2007; Scott-Kennel & Enderwick, 2005) and provide important channels for knowledge and technology exchange (Girma et al. 2004; Giroud, 2007; Günther, 2005).

In this study we distinguish between “transactional” and “relational” vertical linkages. *Transactional linkages* refer to the rather broad definition of linkages that encompass transactions between foreign firms and local firms (cf. Altenburg, 2000; Liu et al., 2009; Scott-Kennel, 2007). In case the interaction between buyers and suppliers is limited to an “inputs-for-payment” exchange the likelihood of the transfer of other resources or knowledge is low, implying a rather limited developmental impact of these linkages (Turok, 1993). In the study of the developmental impact of MNC subsidiaries via vertical linkages a special attention has therefore been put on the “relational” nature of linkages. Within the FDI

literature this relational dimension of linkages is emphasized in terms of specific linkage attributes (Giroud, 2007; Giroud & Scott-Kennel, 2009; Santangelo, 2009; Scott-Kennel & Enderwick, 2004; Spencer, 2008), such as depth and duration, which captures the quality aspect of an on-going relational interaction. Research on vertical linkages between foreign subsidiaries and local firms has argued for an adoption of a inter-firm network perspective that integrates a more relational (or even social) dimension of interactions as this allows for a better understanding of inter-firm learning and spillovers (Ghauri et al., 2005; Giroud & Scott-Kennel, 2009; Perri et al, 2012). Within studies on inter-firm networks the concept of “embeddedness” (cf. Granovetter, 1985) is often used to explain that exchange takes place through complex social relations containing relational features such as, for instance, trust and mutual reliance (Ahua, 2000; Uzzi & Gillespie, 2002). Social embeddedness theory (Barney and Hansen, 1994; Uzzi, 1997, 1999) suggests that arms-length ties are likely to be characterized by opportunistic action and as a consequence unique resources and knowledge are withheld to prevent “acts of misappropriation in exchanges” (cf. Williamson, 1985). On the contrary, embedded relationships provide a mechanism for mutual trust and reliance which offers reciprocal investments (Uzzi 1997) and thus promote mutual transfers of unique resources and capabilities. Hence, for the purpose of this study, *relational linkages* which are referred to as embedded inter-firm relationships with domestic firms that are characterized by trust and mutual dependency (Ahua, 2000; Andersson et al., 2002; Chen & Chen, 1998; Morgan & Hunt, 1994).

Intra-firm linkages as a strategic resource

Within the strategic linkage literature (Chen & Chen, 1998; Nohria & Garcia-Pont, 1991) the main argument is that firms can get access to strategic capabilities by linking to firms with complementary capabilities. The network approach adopts a more intrinsic view of linkages

in that a firm is “embedded” in one or more networks via the linkages it has with customers, suppliers, subcontractors etc. Research on inter-firm networks suggest that “the image of atomistic actors competing for profits against each other in an impersonal marketplace is increasingly inadequate in a world in which firms are embedded in networks of social, professional and exchange relationships with other organizational actors” (Gulati et al., 2000: 203). It is suggested that “strategic networks” encompass a set of linkages, be they vertical with customers and suppliers or horizontal with competitors, or both (Galaskiewicz & Zaheer, 1999; Gulati, 1998). As the economic environment becomes more competitive, a firm’s network of relationships is of enhanced strategic importance (Gulati et al., 2000). Several scholars argue that the location in or in the proximity of inter-firm networks of relationships is an important element of competition (Nohria and Garcia-Pont, 1999; Zaheer and Zaheer, 1999) and Gulati (1999) suggests a view of inter-firm relationships as a strategic resource in the sense that important resource and knowledge inherent in the relationships provide firms with a strategic advantage by allowing them to act quicker than rivals. Hence, being part of a network of important inter-firm relationships may give rise to strategic benefits in terms of access to better opportunities for those firms which belong to such networks than those firms that are more peripheral to these networks (Barney, 1991; Black & Boul, 1994, Gulati, 1999). This also implies that the “relative location” to a strategic network is likely to be an important competitive advantage (Gulati et al., 2000).

Hypotheses development

Within the literature on the relationship between competition and innovation in general (cf. Arrow, 1962; Grant, 1991; Porter, 1990; Schumpeter, 1942), and product and process development in particular (Boone, 2000) it can be concluded that competition may encourage investments in research and development activities aimed at avoiding competition. Research

in strategic management (e.g., Chandler, 1962; D'Aveni, 1994; 1990) and the general FDI literature (cf. Blomström & Kokko, 1998) suggests that competitive pressures has a strong impact on the behaviour and strategies pursued by firms (see also Porter, 1990; Tseng & Lee, 2010). Empirical evidence shows that high levels of competition foster the adoption of new technologies by local firms (Mansfield & Romeo, 1980) and also enhances the pace by which competitors develop and introduce similar products or processes to defend their market share, or become more efficient (Blomström et al., 1999). A high level of competitive pressure in the local business environment also forces firms to become proactive and give incentives to engage in competence-enhancing activities (cf. Blomström, 1989; Blomström & Kokko, 1998; Holm et al., 2003; Holm et al., 2005; Saxenian, 1994). Based on this, we could expect that the competitive pressure in the subsidiary's business environment will spur capability upgrading activities among the subsidiary's competitors.

Hypothesis 1a: The competitive pressure is positively related to horizontal capability upgrading

However, within the FDI literature it is stated that some of the knowledge spillovers from foreign affiliates operate via the vertical linkages between the affiliates and the domestic firms (Blomström & Kokko, 1998; Lall, 1980; Meyer, 2004). The literature as well as empirical research on the link between linkages and spillovers is rather vague concerning the nature of such linkages (Giroud & Scott-Kennel, 2009; Jindra et al., 2009). Network scholars in fact suggest that under high competitive pressure, increasing the quality of local linkages is a valid firm reaction (cf. Holm et al., 2005). This is confirmed by recent research showing that, in a developed country context, subsidiaries need to “fit” with the local business network under increasing competition due to more complex demand characteristics and industrial structure

dynamics (Perri et al., 2012). This implies that in order to overcome the disadvantages deriving from being an external actor and at the same time cope with high competitive pressure, the creation of quality linkages may be a way to reduce uncertainty when rivalry is difficult to stabilize (cf. Pfeffer & Novak, 1976). This is also in line with Dyer and Singh (1998) suggesting that for partners that do not invest in certain relationship-specific assets (e.g. trust), competitive advantage is unlikely to arise from that partnership. The creation of relational (vertical) linkages where the subsidiaries interact deeply with vertical partners could therefore be considered as an important strategic move in the sense that such deep linkages give access to important resources and knowledge inherent in the relationships and thus provide firms with a strategic advantage over rivals (Gulati, 1999; Nohria & Garcia-Pont, 1999; Zaheer & Zaheer, 1999). Hence, it can be expected that the competitive pressure in the subsidiary's business environment will result in the development of relational linkages, that is, linkages characterized by mutual trust and interdependence.

Hypothesis 1b: The competitive pressure is positively related to the development of relational linkages.

It has been argued that competitive rivalry lead firms to collaborate, to share unique competences with alliance partners and to engage in mutual development, despite the difficulties associated with this strategy and the risks of losing O-advantages to competitors (Cantwell & Narula, 2001). This idea also find support in literature on inter-firm cooperation (Arikan, 2009; Miller & Arikan, 2004; Santoro & McGill, 2005), suggesting that firms are able to counterbalance competitive pressures by engaging in cooperative strategies, including technology investments. Similarly, network scholars (Holm et al., 2005) have argued that the competitive pressure in the subsidiaries' business environment more or less forces the

subsidiaries' to deal with that pressure and the resulting "uncertain environment" through conducting capability upgrading activities within relationships with important counterparts in the business environment. One argument put forward by Arikan (2009) is that firms that adopt an exploitation-based strategy tend to develop inter-firm relationships in order to gain access to complementary knowledge that could facilitate the exploitation of the "new" knowledge. From this it can be stated that:

Hypothesis 1c: The competitive pressure is positively related to capability upgrading within vertical linkages, i.e. vertical upgrading.

Next, the importance of the quality of vertical linkages has been observed in a vast number of studies, which shows that factors such as relationship trust and dependency increase the likelihood of long-term exchange and continuous development between the involved actors (e.g. Håkansson, 1989). The wish of a subsidiary to create long-term relational linkages on a foreign market can be considered as a strategic and competitive behavior. Given that the subsidiary is an exploiter of innovations it is likely to be considered as a potential competitor among other firms with similar activities in the host market. Hence, the depth of the vertical linkages of a foreign subsidiary that serves its host market with new competences, and builds deep relationships with customers and suppliers, is likely to motivate competitors to be proactive in their capability upgrading behavior. This reasoning is similar to the arguments of the effect of cluster building within an industry of a country market and the innovation-related benefits of clustering (Porter, 1990, 2000; Tallman et al., 2004). It has been argued that knowledge creation capability of firms is attributed to number of opportunities that exist for inter-firm knowledge exchanges as well as the effectiveness of inter-firm knowledge exchanges within specific knowledge-intensive clusters (cf. Arikan, 2009). Based on this

reasoning it can also be expected that the continuous exchange of knowledge that can be attributed to the relational linkages, i.e. the effectiveness of such linkages will affect the capability upgrading behavior among competitors located in the geographical proximity of such quality networks. We therefore propose:

Hypothesis 2a: The relational linkages are positively related to horizontal capability upgrading (i.e. horizontal upgrading)

It has been claimed that the transfer of knowledge is easier to accomplish within organizations than between organizations (Kogut & Zander, 1992). One reason for this is that knowledge is context, or even relation-specific (Forsgren et al., 2000; Lane & Lubatkin, 1998). Organisations do not have equal capacities to learn and acquire knowledge from one another (Hansen, 1999; Lane & Lubatkin, 1998; Tsai, 2001; Uzzi, 1996) and, therefore, a firm's ability to identify and assimilate relevant information is dependent on the closeness of its relationships with its business partners (Lane & Lubatkin, 1998). Hence, it has been recognised that embedded relationships facilitate information and knowledge exchange between the counterparts involved (cf. Andersson et al., 2002; Gulati, 1998; Håkansson, 1989; McEvily & Marcus, 2005; McEvily & Zaheer, 1999; Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998; Uzzi, 1999). This implies that the nature of a subsidiary's linkages with customers and suppliers, e.g. whether the subsidiary's linkages are of a relational nature, will affect the extent to which information and knowledge is shared and thus the level of technological upgrading within these linkages. This is in line with Andersson et al., (2002) stating that the higher the level of relational depth, the more the possibility for product and production process development to occur. Thus, we can expect that:

Hypothesis 2b: The relational linkages are positively related to capability upgrading within vertical linkages (i.e. vertical upgrading)

The subsidiary's relationships with local customers and suppliers can by no means be treated exclusively in the sense that the subsidiary's vertical counterparts might also have significant exchange with other firms in the local business network, including the subsidiary's competitors. As a consequence, through its relational linkages with local customers and suppliers the subsidiary is, to some extent, indirectly connected to the activities undertaken by competing firms. It is also likely that competitors, without conducting direct exchange with the subsidiary or its counterparts, will learn about the business related development occurring through the relational linkages of the foreign subsidiary and, consequently, invest in capability upgrading. Together, this implies that, through vertical relational linkages, the subsidiary can influence the activities of other firms in the surrounding network (cf. Gulati et al., 2000). In that sense, the competitors' "relative location" to a competence-enhancing is likely to be an important competitive advantage (Gulati et al., 2000). This is much in line with the idea of "network transitivity" proposed by Uzzi and Gillespie (2002), where the main argument is that a firm's network of connections can provide benefits that can "spill" over to other counterparts that exist beyond the network of ties that generated the benefits. Accordingly, the following hypothesis can be formulated:

Hypothesis 3: Capability upgrading within vertical linkages (i.e. vertical upgrading) is positively related to horizontal capability upgrading (i.e. horizontal upgrading)

METHOD

In the following sections we discuss the collection of data and the operationalization of the three constructs. We then present some descriptive statistics and the chosen observable indicators that the constructs measure. In a subsequent step, we adopt the LISREL technique (Jöreskog & Sörbom, 1993) for the empirical test of the hypothesized model. The test was done in two steps. The first was to run a measurement model test, which secured construct and discriminant validity. The second was to test the hypothesized relations in accordance with the model in Figure 1. On this basis we present the resulting structural model. The significance of the resulting model is evaluated and used for possible verification of relationships between the four constructs, thereby testing the hypotheses.

Background of the study

This study is based on data on the transfer of technological innovations to foreign affiliates of MNCs in Sweden. With the exception of some early studies on the effects of inward FDI on the host country (e.g., Caves, 1974; Globerman, 1979), most of the research conducted in this field has focused on industry spillovers in emerging countries in Eastern Europe (e.g., Konings, 2001) and in developing countries (e.g., Aitken & Harrison, 1999; Blomström & Persson, 1983; Haddad & Harrison, 1993; Jordaan, 2005). In contrast to these countries, Sweden has developed a highly internationalized and knowledge-based economy and has demonstrated figures of economic growth that are above the average in the European Union (Invest in Sweden Agency, 2005). Although the emphasis on developing and transition economies are important for our understanding on how less developed countries can gain from MNC activity, it also neglects the fact that the linkages patterns are indeed affected by the specific characteristics of the domestic actors which in developed countries “are likely to be highly competent, equipped with absorptive capacity, and located in competitive industries” (Perri et al., 2012, p. 2).

Data collection and sample

A pre-tested questionnaire was sent out to 1 515 Swedish subsidiaries of MNCs, addressed to the subsidiary manager or marketing director, including a cover letter stating the purpose of the research and explaining the different areas covered in the questionnaire. The focus of the data collection was on innovations transferred to the subsidiary from another MNC unit (either HQ or another MNC unit) during the period 2000 to 2005. The data collection resulted in responses from 376 subsidiaries, corresponding to a 25 percent response rate. The average proportion of missing values for individual questions is low and a test of non-response bias revealed no significant differences between responding and non-responding subsidiaries in terms of their size (number of employees) and sales volume.

In the present study we have included subsidiaries that received a technological innovation (i.e. product or a process innovation) from another unit of the MNC between the years 2000 and 2004. There are several reasons for delimiting the time frame for the received innovations, the first being that respondents may have difficulty recalling the circumstances surrounding innovations received before this time. Second, it could be that the appropriate respondent is no longer part of the organisation and, assuming that s/he is still present; by limiting the time frame we can hopefully avoid post-rationalization of events. However, setting this time demarcation necessarily excludes the study of older innovations that have been of importance to the subsidiaries. Third, it is plausible that there is a time lag involved when studying the effects of innovation transfer on the local business environment, which is why we have excluded innovations received in the last year surveyed in the questionnaire.

The final sample included 210 subsidiaries belonging to MNCs in the service and manufacturing industries. The subsidiaries belong to MNCs whose headquarters are located in 17 different countries. The geographical distribution of MNC headquarters is as follows: 23% of the MNC headquarters were located in the Nordic countries, 55% were located in other

European countries and 22% were located in the rest of the world. About two thirds of the subsidiaries had been established through mergers or acquisitions and the rest were green-field establishments. The subsidiaries had been part of their respective MNCs for an average of 15 years. The average size and turnover of the subsidiaries in the sample was 286 employees and 553 million SEK, respectively.

Operationalisation of variables

The variable *Competitive pressure* (in the host country) conceptualises the level of competition among firms in the local business environment. The variable competitive pressure attempts to capture competition as a rather “aggregated force” manifested in the perception of inter-firm rivalry and the number of competitors (Holm et al., 2005). Hence, the respondents were asked to describe the characteristics of the subsidiary’s local business environment in terms of the level of 1) rivalry and 2) the number of competitors within the business environment. The two items were measured on a 7-point Likert scale (where 1=very low and 7=very high).

The variable *Relational linkages* capture the inter-firm relationships that transcend arm’s length transactions and contain quality features such as e.g., trust, and interdependencies as suggested by Giroud and Scott-Kennel (2009) and Forsgren et al. (2005) among others. Hence, the respondents were asked to describe the subsidiary’s relationships within its local business network (specifically its relationships with its three most important customers and suppliers) with regard to 1) mutual dependence and 2) mutual trust. The two items were measured on a 7-point Likert scale (where 1=very low and 7=very high). In other words, the items reflect important relational dimensions of the vertical linkages such as depth and content.

The construct *Horizontal upgrading* reflects the development of technological capabilities that takes place within the vertical linkages (e.g. with the subsidiary's customers and suppliers in the host country). Hence, we have conceptualized the construct along two dimensions capturing the capability upgrading among competitors. Respondents were asked to evaluate the dynamics of the competitors' activities in the subsidiary's local business environment, in terms of the development of 1) new products and 2) production processes. These items were measured on a 7-point Likert scale (where 1 = not at all and 7=very much). Table 1 presents the inter-item correlations.

The construct *Vertical upgrading* reflects the development of technological capabilities that takes place within the vertical linkages (e.g. with the subsidiary's customers and suppliers in the host country). Respondents were thus asked to evaluate the extent they cooperate with the relational counterparts for the development of 1) new products and 2) production processes. These items were measured on a 7-point Likert scale (where 1 = not at all and 7=very much).

--- Table 1 about here ---

A note on the data

Since both the independent and dependent variables were drawn from the same survey we conducted Harman's single-factor test (1967) to ensure the absence of potential common method bias (Campbell & Fiske, 1959). An advantage with using structural equation modeling is that we can conduct confirmatory factor analysis (CFA), which is considered a more sophisticated method to check for common method bias (Podsakoff & Organ, 1996; Podsakoff et al., 2003) and is used to test how well the measured variables represent the number of constructs. We could clearly reject models prior to the final one, where at least one of the factors were set to account for all of the variance in the data. Although it has been

argued that, through the experience of conducting business with local counterparts, the subsidiary managers are in a good position to assess the impact of their subsidiaries' presence and activities on the local market (Holm et al., 2003), it should be noted that there is always a possibility that respondents have overestimated the impact of their own activities. Hence, we might have obtained different results if we also had collected data from domestic firms.

RESULTS OF THE STRUCTURAL EQUATION MODELLING

The hypothesised model was tested by using a LISREL technique which allows for the simultaneous formation of underlying constructs (measurement model) and tests the structural relationships between these constructs (structural model). The validity of LISREL models is estimated by the validity of the measurement and structural model combined, i.e., the nomological validity. However, before testing the nomological validity it is important to evaluate the hypothesized relationship between the constructs as well as the convergent validity (homogeneity) and discriminant validity (distinctiveness) of the constructs. To test for convergent and discriminant validity, using the LISREL technique, we thus ran the observable indicators used for measuring the three constructs in a measurement model (Jöreskog & Sörbom, 1993). In Table 2 the convergent validity of the constructs are evaluated by the factor loadings (the strength of the relationship), the t-values (significance test of each relationship in the model), and the R^2 -values (the linearity of the relations) for each indicator. The convergent validity was good, as factor loadings ranged between 0.50 and 0.89, all t-values exceeded 3.01, and R^2 -values ranged between 0.36 and 0.72. Our set of latent constructs also show good discriminant validity, as no construct (or indicator) had significant factor loadings vis-a-vis any indicator other than those that they were stipulated to indicate.

--- Table 2 about here ---

Analysis of the structural model

The first test comprised all six stipulated hypotheses. The model was marginally significant above the 0.05 level as the p-value was 0.057 (Satorra-Bentler scaled χ^2). However, in this comprehensive model the hypothesised relation between *Competitive pressure* and *Horizontal upgrading* (hypothesis 2) was insignificant with a factor loading of 0.03 and a t-value of 0.24. This test also contains an insignificant relation between *Relational linkages* and *Horizontal upgrading*, with a factor loading of 0.05 and a t-value of 0.35. Therefore, in a next step we tested the model again after omitting these relations. The result of this analysis revealed a model fit with a significant p-value of 0.097 ($\chi^2=23.63$, $df=16$, and $RMSEA = 0.048$). Figure 2 presents the final model and its results.

--- Insert Figure 2 about here ---

The model fit the data above the 0.05 level, which is the fundamental test of the model, indicating that the distance between the data and the model is low (Bollen, 1989; Jöreskog & Sörbom, 1993). The nomological validity of the resulting model was assessed by different goodness-of-fit measures. To start with, the RMSEA measure, proposed by Browne and Cudeck (1989), which tests the null hypothesis of close fit between model and data rather than the null hypothesis of perfect fit, showed a good fit ($RMSEA = 0.048$). However, the evaluation of the model through the significance of the Chi-square statistics (p-value) may be somewhat tentative for a sample of observations that is larger than 200 or smaller than 100 (210 observations were used in this study). Therefore other fit statistics should also be evaluated (Hair et al., 2006). Table 4 shows the fit indices CFI, GFI, NFI, NNFI. Values

higher than 0.90 reflect acceptable fit in these indices (Bentler, 1990; Bentler & Bonett, 1980). Moreover, the Normed Chi-square test was also acceptable with a value of 1.48. On a whole, the fit indices suggest that the model is acceptable.

For specific hypotheses about direct and indirect effects, we can state, to begin with, that the factor loading (0.03) and the insignificant t-value (0.24) did not support the direct effect, that is, hypothesis 1a, indicating that competitive pressure that a subsidiary experiences in the host country has no direct effect on horizontal upgrading, that is among competitors in the form of new product and production development. However, we found that competitive pressure was significantly and positively affecting the creation of relational linkages, which supports hypothesis 1b (factor loading = 0.46, t-value = 4.03). The results also supported hypothesis 1c, which posed a direct association between competitive pressure and the upgrading of vertical linkages (factor loading = 0.43, t-value = 2.39). Interestingly, we also found support for hypothesis 2b as relational linkages are positively associated to vertical upgrading (factor loading = 0.43, t-value = 2.76). Hence, vertical upgrading is positively associated with both relational linkages and competitive pressure. However, relational linkages were not positively related to horizontal upgrading. We were consequently not able to verify hypothesis 2a. This means that the relationship quality as such is not a significant trigger for capability upgrading among competitors. However, hypothesis 3 was supported, indicating that vertical upgrading is positively associated with horizontal upgrading (factor loading = 0.42, t-value = 2.98). This means that horizontal upgrading is a reactive effect that occurs due to the development that is conducted within business relationships of the subsidiary, whereas competitive pressure as such and the creation of deep linkages did not motivate such upgrading effects.

In total we find that competitive pressure is an important driver of both relational linkages and the upgrading of such linkages. The quality of relational linkages are, in turn, also

important for the upgrading occurring in such relationships, whereas this upgrading seems to be important for corresponding upgrading among competitors of the host market.

CONCLUDING DISCUSSION

Researchers suggest that the impact of MNC subsidiaries on economic development must become more central in the mainstream of international business research (Ghauri & Buckley, 2006; Jindra et al., 2009). The impact of MNC subsidiaries in turn, have, by recent research, been attributed to the vertical linkages created by the foreign subsidiaries (Günther, 2005; Javorcik, 2004; Jindra et al., 2009; Kugler, 2006; Scott-Kennel & Enderwick, 2005; UNCTAD, 2001). However, few, if any studies, have provided evidence on the link between the creation and nature of foreign subsidiary vertical linkages and the impact of foreign subsidiaries on the capability upgrading among local firms. The results indicate that the creation of relational vertical linkages is a response to an increase in competitive pressure, as perceived by the subsidiaries. The evidence therefore supports our main argument that the extent to which foreign subsidiaries impact on the host country, in terms of the upgrading of local firm capabilities, is dependent on the strategic posture of the subsidiaries. We also found that such relational linkages is directly related to capability upgrading among customers and suppliers (e.g. vertical upgrading) whereas indirectly related to capability upgrading among the subsidiaries' competitors through vertical capability upgrading. This adds to recent studies (Perri et al., 2012) in that quality linkages per se do not give rise to horizontal spillovers, rather it is the effectiveness in terms of the capability upgrading within these linkages that act as conduits for such impact. This also implies that the upgrading of capabilities of host country firms seems to be more related to the quality and effectiveness of vertical linkages, than the mere potential prospect of knowledge "spillovers" via vertical linkages (cf. Blomström et al., 2000). In accordance with recent research (e.g. Milner et al., 2006), this

study indicates that the opportunity to create relational linkages and to be a part of knowledge intense network of vertical linkages enhances capability upgrading, both vertically and horizontally. In contrast to some scholars arguing that firms tend to avoid engaging in knowledge-intensive activities in locations that are characterized by high levels of competition (cf. Alcácer & Chung, 2007), this study suggests that competitive pressure are inductive for the involvement in capability enhancing vertical linkages. This study also pays attention the potential for technological spillovers from MNC subsidiaries via the creation of vertical linkages are to be viewed in the light of the subsidiaries' own technology base. In line with research on the link between subsidiaries technological competencies and their host country impact (Jindra et al., 2009; Marin & Bell, 2006), we show that subsidiaries that possess innovations may generate quality linkages as a part of their exploitation strategy and to overcome the liability of foreign competitiveness (cf. Arikan, 2009).

Our study also suffers from some limitations. One limitation that should be mentioned relates to the fact that the business relationships which can give rise to localized externalities might be difficult to observe as a network outsider, and perhaps in particular for foreign firms. Another limitation is the use of perceptual data from subsidiary managers which might cause a common-method bias problem. However, since perceptions are important drivers of firm behaviour in general (Weick & Roberts, 1993) and for subsidiaries in particular (Perri et al., 2012) the use of such perceptual measures for the aim of this study seems adequate. Moreover, from the empirical support for the impact of relational linkages on capability upgrading among customers and supplier firms, it can also be expected that, such linkages may develop in a rather "unplanned" manner, due to public policies aiming to increase the visibility of existing dynamic business networks.

An interesting managerial implication of this study is that relational linkages act as an indirect channel for capability upgrading among local competitors. This implies that implies

that situations might arise where the potential cost of enhancing competitors' capabilities through the creation of relational linkages leads to a subsidiary choosing not to engage in such quality linkages, or at least, to severely restrict them. This is also in line with research suggesting that, in developed countries, where the environment is highly competitive, subsidiaries tend to reduce their investments in their vertical linkages to ultimately limit the risk of horizontal spillovers (cf. Perri et al., 2012). Thus, gaining an understanding of how foreign subsidiaries are connected to one another within a regional or national business network is a difficult but important task for subsidiary managers.

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FIGURES AND TABLES TO BE INSERTED

Figure 1 The hypothesised model

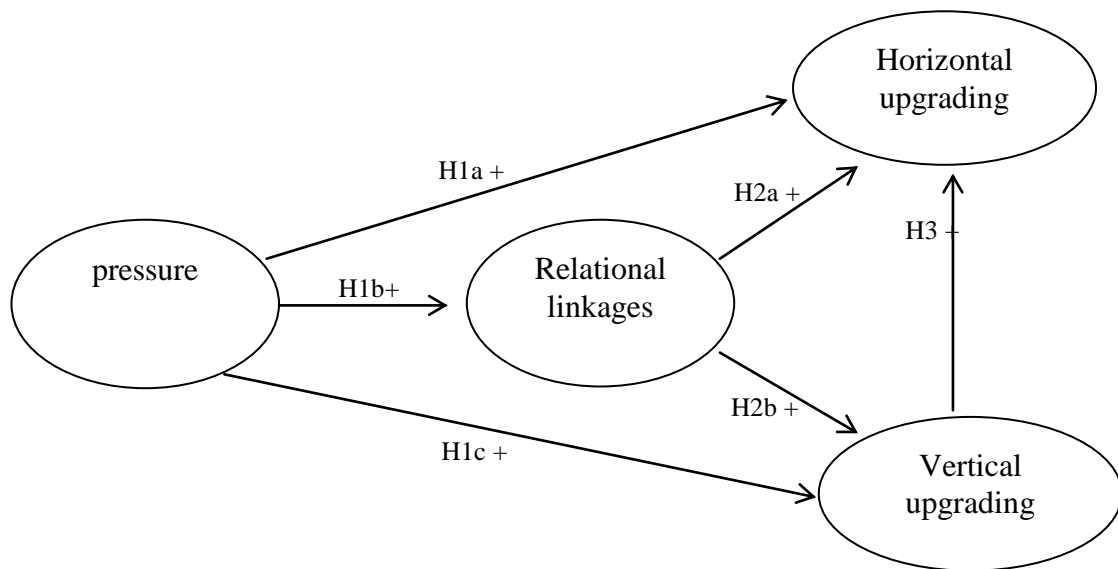


Table 1 Correlation matrix of construct indicators

	Competitive pressure		Relational linkages		Horizontal upgrading		Vertical upgrading	
	RIV	COMP	DEP	TRUST	CPTDEV	CPNDEV	COOPPT	COOPPN
RIV	---							
COMP	0.58	---						
DEP	0.31	0.22	---					
TRUST	0.32	0.35	0.57	---				
CPTDEV	0.06	0.21	0.13	0.07	---			
CPNDEV	0.11	0.16	0.07	0.02	0.47	---		
COOPPT	0.10	0.23	0.24	0.32	0.14	0.29	---	
COOPPN	0.18	0.33	0.22	0.27	0.20	0.11	0.18	---

Table 2 Correlation matrix of constructs

	Competitive pressure	Relational linkages	Horizontal upgrading	Vertical upgrading
Competitive pressure	---			
Relational linkages	0.46	---		
Horizontal upgrading	0.27	0.27	---	
Vertical upgrading	0.63	0.63	0.42	---

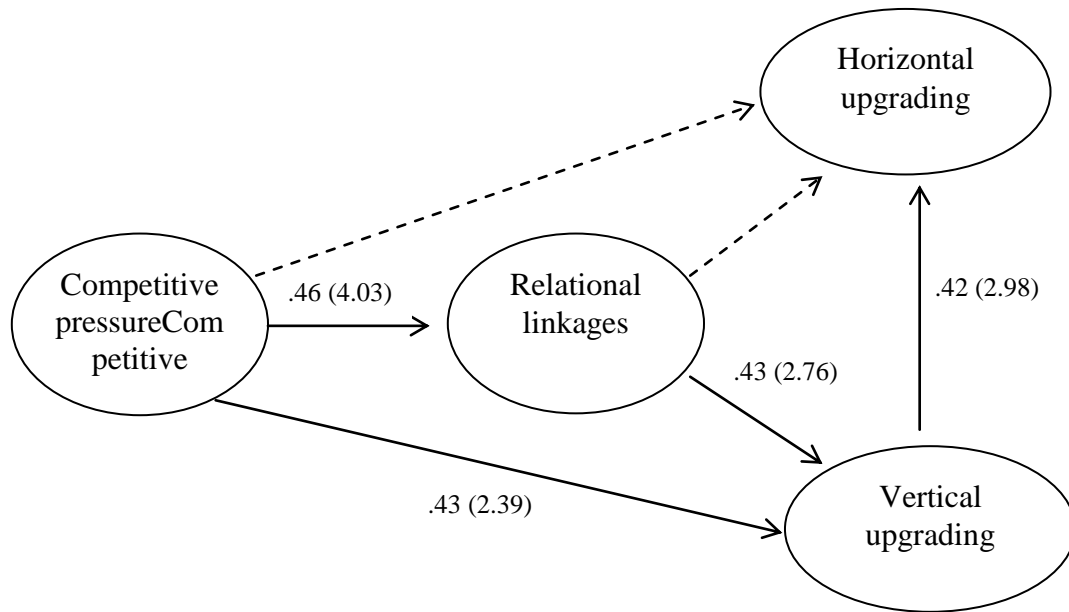
Table 3 Means, standard deviations, factor loadings, T-values and R²-values of construct indicators (standardized solution)

<i>Constructs</i>	<i>Indicators</i>	<i>Abbreviation</i>	<i>Mean</i>	<i>S.D.</i>	<i>Factor loading</i>	<i>T-value</i>	<i>R²-value</i>
Competitive pressure	1. Rivalry among competitors	RIV	5.74	1.57	0.65	- - -	0.47
	2. No. of competitors	COMP	4.96	1.77	0.89	5.13	0.72
Horizontal upgrading	3. Competitors' product dev.	CPTDEV	4.36	1.37	0.71	- - -	0.55
	4. Competitors' production dev.	CPNDEV	3.81	1.45	0.66	3.01	0.39
Vertical upgrading	5. Cooperation in product dev.	COOPPT	4.36	1.66	0.47	- - -	0.42
	6. Cooperation in production dev.	COOPPN	3.29	1.74	0.50	3.82	0.36
Relational linkages	7. Mutual dependence	DEP	5.04	1.20	0.66	- - -	0.44
	8. Mutual trust	TRUST	5.38	1.17	0.86	5.76	0.72

Table 4 Evaluation of the proposed model with Goodness-of-Fit measures

<i>Goodness-of-Fit Measure</i>	<i>Level of acceptable fit</i>	<i>Calculation of Measure</i>	<i>Acceptability</i>
Comparative fit index (CFI)	Recommended level: 0.90	CFI=0.98	Acceptable
Goodness-of-fit index (GFI)	Higher values indicate better fit	GFI = 0.96	Acceptable
Normed fit index (NFI)	Recommended level: 0.90	NFI = 0.94	Acceptable
Non-normed fit index (NNFI)	Recommended level: 0.90	NNFI=0.97	Acceptable
Normed Chi-square	Lower/higher limit: 1.0-2.0	Chi-square/df = 1.48	Acceptable

Figure 2 The resulting model



P-value (Satorrta-Bentler) = 0.098, Df =16, RMSEA=0.048